Editorial

Contributions and Field Reports

Kodaş
Boncuklu Tarla

Henley and Lyman-Henley
Snakes of Göbekli Tepe

Gebel *et al*.
Ba`ja 2018

Getzov *et al.*
The "Nahal Zippori Horizon"

News Section

Gebel
Conference Reports Kuwait City, Dec. 2018, and Leiden, July 2019: Struggles to Make Sense. On Arabia's Neolithic.

Gebel
Workshop Report: Neolithic Pathways (J. Santana), Durham University, Oct. 2019

Gebel
Conference Report: ppn9 Tokyo, Nov. 2019

Jammo
Thesis Abstract: Communal Cemetery Tell el-Kerkh (2018)

Gülçür
Book Review: M. Özbaşaran, G. Duru, and M.C. Stiner (2018). Aşıklı Höyük. Essays in Honor of Ufuk Esin

Bocquentin *et al.*
Conference Report: EAA Session 85, Sept. 2019

Samuelian
New Publication: Abris du Natoufien final de Eynan-Mallaha

Obituary Notices
Avraham Ronen, Nur Balkan-Atlı, Olivier P. Nieuwenhuijse

Editorial cont't

Masthead

NEO-LITHICS 19

The Newsletter of Southwest Asian Neolithic Research

Editorial *2*

Contributions and Field Reports

Ergül Kodaş
Un Nouveau Site du Néolithique Précéramique dans la Vallée du Haut Tigre: Résultats Préliminaires de Boncuklu Tarla *3*

Tracy B. Henley and Lani P. Lyman-Henley
The Snakes of Göbekli Tepe: An Ethological Consideration *16*

Hans Georg K. Gebel, Marion Benz, Christoph Purschwitz, Hala Alarashi, Joachim Bauer, Julia Gresky, Blair Heidkamp, Bellal Abuhelaleh, Lucia Mišolciová, Arnica Keßeler, Barbora Kubíková, Denis Štefanisko, Martin Strauss, and Kai Wellbrock
Household and Death, 2: Preliminary Results of the 12th Season (2018) at Late PPNB Ba`ja, Southern Jordan *20*

Nimrod Getzov, Ianir Milevski, and Hamoudi Khalaily
The "Nahal Zippori Horizon": a new Entity Between the Lodian and Wadi Rabah Cultures *46*

News Section

Hans Georg K. Gebel
Conference Reports. Struggles to Make Sense: Two Recent Gatherings on Arabia's Neolithic, and the Question of Outdated Concepts of the Near and Middle Eastern Neolithic. Kuwait City, Dec. 2018, and Leiden, July 2019 *A1*

Hans Georg K. Gebel
Workshop Report on the Pathways of the Neolithic in Southern Levant. A Marie Curie Actions Workshop Organised by Jonathan Santana. Durham University, 30th October 2019 *A5*

Hans Georg K. Gebel
Conference Report on the 9th International Conference on the PPN Chipped and Ground Stone Industries of the Near East (PPN9). University of Tokyo, 12th-16th of November, 2019 *A7*

Sari Jammo
Thesis Abstract on Beyond Death: The Tale of a Neolithic Society and the Study of an Outdoor Communal Cemetery at Tell el-Kerkh, Northwest Syria. PhD thesis (2018). University of Tsukuba *A13*

Sevil F. Gülçür
Review of Mihriban Özbaşaran, Güneş Duru, and Mary C. Stiner, 2018. The Early Settlement at Aşıklı Höyük. Essays in Honor of Ufuk Esin. Istanbul: Ege Yayınları *A15*

Fanny Bocquentin, Katarína Kapustka, Julien Vieugué, and Eric Huysecom
Conference Report on Session 85: Tracking the Neolithization Processes on Both Sides of the Sinai: a Bridge Between the Near East and North-Eastern Africa. 25th Annual Meeting of the European Association of Archaeologists. University of Bern, 6th, September 2019 *A18*

Nicolas Samuelian
New publication on les abris du Natoufien final de Eynan-Mallaha, Israël. Organisation spatiale et interpretation fonctionnelle. Mémoires et travaux du Centre de recherche français à Jerusalem 11. 2019. Paris: Boccard *A21*

Obituary Notices
Avraham Ronen, Nur Balkan-Atlı, Olivier P. Nieuwenhuijse *A22*

Editorial cont', and Masthead *A23*

Editorial

The longer credits and portals like *Academia* and *ResearchGate* define and influence research subjects and success, the more academic life becomes absurd. Researchers are forced, if they want to succeed, to chase for impact points. Business-models of publishing houses control publishing and therefore research by maintaining review and submission regimes. They take cash for publishing articles and for providing online access, while counting on the eagerness of researchers and demand. Researchers work for the publishers' profit – either as paying authors or as editors working for reputation without financial remuneration. What may have started as an honest attempt to democratize science and save time and resources, the result has been a big success – though not for science but for commercial enterprises. Online publishing, possibly one of the best innovations of circulating science, comes up with many drawbacks. Slavishly we track the amount of downloads. We believe in the stats of online portals, even though we ignore the obscure algorithms that calculate the rankings. However, what does the number of clicks, downloads and followers mean? Appealing key-words and "attractive" titles compete with straightforward scientific reporting and diminish its value. The sheer amount of answers and questions inflates our status, irrespective of whether the replies make sense or not. Quantity instead of quality counts. Authors are literally subject to mechanical assessments. Regarding automatized download suggestions or replies, these systems become ever more dubious. Yet, their effectiveness seems unbroken: credits remain important criteria for getting a job. (*continued on Page A23*)

Un Nouveau Site du Néolithique Précéramique dans la Vallée du Haut Tigre : Résultats Préliminaires de Boncuklu Tarla
A New Aceramic Neolithic Site in the Upper Tigris Valley: Preliminary results of Boncuklu Tarla

Ergül Kodaş

Résumé : La néolithisation de la vallée du Haut Tigre est un processus encore mal connu. Les fouilles réalisées depuis la découverte de Çayönü ont permis de mettre en lumière ce phénomène, de même qu'un ensemble de sites précéramiques mis au jour suite à la construction du barrage d'Ilısu (Körtik Tepe, Gusir Höyük, Hasankeyf Höyük et Sümaki Höyük). A ces derniers doit maintenant s'ajouter le nom de Boncuklu Tarla, qui s'impose comme un site capital par la richesse singulière de ses données mais aussi par la présence d'un imposant bâtiment communautaire. Identifié en 2008, il fut fouillé à deux reprises, en 2012 et 2017, campagnes qui ont permis de dater son occupation de l'Epipaléolithique à la fin du PPNB récent. Celles-ci révèlent déjà la présence exceptionnelle de plus de cent-vingt individus enterrés intra-muros, dont beaucoup sont accompagnés d'offrandes, en particulier des parures en perles. Certaines figurent des animaux. L'absence de figurines, à ce jour, est également marquante.

Mots-clefs : Néolithique précéramique, Haute Vallée du Tigre, Préhistoire de la Haute Mésopotamie, Boncuklu Tarla.

Abstract: The process of Neolithization in eastern Anatolia is still little known but the excavations realized since the discovery of Çayönü highlight this phenomenon, along with others Aceramic Neolithic sites discovered during Ilısu Dam construction (Körtik Tepe, Gusir Höyük and Hasankeyf Höyük). The name of Boncuklu Tarla must now be added to these sites as most significant, because of the singular richness of the material and of the finding of an impressive community building. Identified in 2008, the site was excavated twice in 2012 and 2017, allowing us to date the occupation from the Epipalaeolithic to the end of the late PPNB. As for now, the excavations reveled more than 120 individuals buried intramural, many of which are accompanied with offerings, in particular bead ornaments. Some of them depict animals. To this day, no figurine was found, a fact that must be underlined.

Keywords: Pre-pottery Neolithic, Upper Tigris Valley, Prehistory of Upper Mesopotamia, Boncuklu Tarla.

Introduction

Le site de Boncuklu Tarla est une opportunité pour mieux comprendre le processus de néolithisation en Anatolie orientale, en Turquie. Nos recherches héritent plus d'un demi-siècle de fouilles archéologiques menées dans la région, au sein desquelles elles s'inscrivent tout en offrant de nouvelles perspectives (Cauvin et Cauvin 1993; Balkan-Atlı 1994). Les fouilles menées depuis les années 1960 à Çayönü (Braidwood *et al.* 1981; Braidwood et Braidwood 1982; Erim-Özdoğan 2007, 2011a) représentent déjà une avancée notable dans notre appréhension du phénomène; les fouilles réalisées à Cafer Höyük (Cauvin *et al.* 1999) dans les années 1970, dans la Haute Vallée du Tigre à Hallan Çemi (Rosenberg 2011a) et Demirköy (Rosenberg et Peasnall 1998; Rosenberg 2011b), dans la région de Şanlıurfa à Nevali Çori (Hauptmann 1993, 2011), Göbekli Tepe (Schmidt 2010, 2011; Banning 2011) et Gürcütepe (Schmidt 1995) depuis les années 1990 l'ont encore approfondie. Plus récemment, la construction du barrage d'Ilısu, dans la vallée du Haut Tigre, a suscité des campagnes de fouilles à Gusir Höyük (Karul 2011), Körtik Tepe (Özkaya et Coşkun 2009, 2011; Benz *et al.* 2015, 2016), Hasankeyf Höyük (Miyake *et al.* 2012; Maeda 2018) et Sümaki Höyük (Erim-Özdoğan 2011b). De même, la construction du barrage de Birecik, sur l'Euphrate, a permis de mettre au jour les sites de Mezraa Teleilat (Özdoğan 2007, 2012) et Akarçay Tepe (Özbaşaran et Molist 2007; Özbaşaran et Duru 2011). Boncuklu Tarla n'est pas seulement un nom de plus à ajouter à cette liste: par sa superficie (3.5 ha) il ne le cède qu'à Çayönü (Özdoğan et Özdoğan 1989; Erim-Özdoğan 2011a) et la campagne de fouille de 2017, d'une durée de six mois, nous a déjà livré un matériel riche et intéressant. On citera notamment la découverte d'un complexe communautaire du PPNB moyen, de 69 sépultures dans lesquelles ont été retrouvés, selon une première estimation, pas moins de 124 individus; de parures atypiques, dont l'une est anthropomorphe; mais aussi d'un atelier de taille lithique. De surcroît, chose rare dans la vallée du Haut Tigre, le site de Boncuklu Tarla permet de retracer la chronologie complète du néolithique précéramique, depuis l'Epipaléolithique jusqu'à la fin du PPNB récent.

Notre étude, nécessairement interdisciplinaire, prend en compte les différents temps de l'Histoire, avec une attention particulière pour la longue durée

Fig. 1 Localisation de Boncuklu Tarla et certains sites néolithiques du Proche-Orient. (Carte: Ergül Kodaş)

(Braudel 1949). Les questions que nous nous posons, portent aussi bien sur la façon dont les hommes qui ont vécu sur le site se sont organisés et échangé avec leurs voisins, que sur la façon dont nos données peuvent nous en apprendre davantage concernant des problèmes essentiels pour comprendre la néolithisation du Haute Vallée du Tigre, tels que la sédentarisation des sociétés, l'apparition de l'agriculture, leurs compositions, leurs interactions, l'évolution architecturale des villages ou encore la symbolique de leurs pratiques funéraires.

Situation géographique et découverte du site

Isolé, perché sur un plateau à 500 m d'altitude, cerné par des montagnes s'élevant à 1 500 m, le site de Boncuklu Tarla surplombe une rivière (*Nevala Maherk*) dont le cours a profondément marqué le relief. Son cours sinue jusqu'au Tigre quelques 2 km en aval. Face au site, un volcan, dont l'activité est à l'origine de ressources abondantes en basalte et de la percée d'eaux sulfureuses. Ces dernières sont mises à profit dans une installation thermale située en contrebas du plateau, à quelques minutes du site, au bord du Tigre. Aujourd'hui, il est situé dans le district de Dargeçit (Fig. 1), à environ 125 km à l'est de Mardin, en Turquie. Il a été découvert en 2008 lors d'une prospection réalisée à proximité du barrage d'Ilısu par T. Ökse, professeur à l'Université de Kocaeli (Ökse *et al.* 2010). Le site a été prospecté la même année par H. Taşkıran et M. Kartal (Université d'Ankara; Taşkıran et Kartal 2010; Kartal *et al.* 2014). Les premières fouilles ont été réalisées en 2012 sous la direction du Musée de Mardin, dirigé par N. Erdoğan, et sous la direction scientifique de T. Ökse. Elles ont été reprises en 2017, sous la direction du Musée de Mardin dirigé par N. Erdoğan, et sous la direction scientifique d'Ergül Kodaş (Université de Mardin-Artuklu).

Stratigraphie du site

Nous avons pu retracer assez précisément la chronologie de l'occupation du site. Les efforts d'une équipe nombreuse et d'ouvriers compétents ont permis de mettre au jour une surface considérable. Lors des deux campagnes de fouilles, près de 3000 m^2 ont été fouillés (soit 300 m^2 en 2012 et 2700 m^2 en 2017) sur une profondeur maximale d' 1 m pour les secteurs et de 2.50 m pour les sondages. Par ailleurs, la dureté du sol est compensée par la rapidité avec laquelle

Fig. 2 Vue aérienne du site. (Photo: Archive de Boncuklu Tarla)

les strates archéologiques sont atteintes, celles-ci se trouvant seulement à 10 cm sous la surface actuelle, voire moins. La pratique ancienne d'activités agricoles et l'érosion naturelle en sont les principales raisons. Des murs en pierre et des sols avaient été mis au jour pendant la campagne de 2012, pointant vers une occupation exclusive du site à la période du PPNB moyen et récent. La campagne de 2017 a remis en question ce constat. Les résultats d'une analyse rigoureuse de la stratigraphie, du tamisage systématique des sédiments archéologiques, ainsi que du prélèvement d'échantillons en vue d'analyses au ^{14}C calibré indiquent la présence de 6 niveaux d'occupation. Le *Niveau* 1 correspond au PPNB récent; le *Niveau* 2 au PPNB moyen (TÜBITAK_0199 : 9207 ± 39 BP) ; le *Niveau* 3 au PPNB ancien (TÜBITAK-0200: 8508 ± 37 BP); le *Niveau* 4 à la période de transition du PPNA vers le PPNB; (voir Stordeur et Abbès 2002; Yartah 2013; Stordeur 2014); le *Niveau* 5 au PPNA (TÜBITAK-0201: 10389 ± 41 BP); et le *Niveau* 6 à l'Epipaléolithique. Le forte décalage entre les dates radiocarbonnes et la stratigraphie demandera une analyse profonde dans le futur. Seulement la date du *Niveau* 2 correspond à la datation stylistique et la séquence stratigraphique.

Architecture

L'amplitude chronologique de l'occupation du site permet d'observer en continu des phénomènes généralement perçus de façon fragmentée dans l'espace et le temps (Fig. 2). Ainsi peut-on suivre l'évolution du plan circulaire vers le plan rectangulaire, du PPNA au PPNB, en passant par le plan sub-rectangulaire caractéristique de la phase de transition du PPNA vers le PPNB. Ces modifications ne sont pas seulement de forme: elles s'accompagnent de la complexité croissante des plans et par conséquent du nombre de pièces des bâtiments. À ces données structurelles s'ajoute un autre aspect méritant notre attention, et sur lequel nous reviendrons: la présence d'espaces domestiques et communautaires aux schémas variés.

Architecture du Niveau 1 : Au PPNB récent deux bâtiments (*bina*) domestiques de plan cellulaire à murs orthogonaux ont été identifiés dans les secteurs K10 et L10. Le bâtiment mis au jour dans le secteur K 10 n'est pas complet mais celui du secteur L10 est bien conservé. Il mesure environ 10 m de longueur et 5.50 m de largeur et présente 12 cellules de tailles variables (Fig. 3). Ces deux bâtiments ne furent pour autant pas construits au

Lab Code	^{14}C age BP ± 1σ	^{13}C (‰) ± 1σ	BCE (2 σ)	contexte	matériau
TÜBITAK-0199	9207 ± 39	-25.1 ± 0.8	8546-8502 (12.0%) 8496-8302 (83.4%)	Niveau 2	charbon indet
TÜBITAK-0200	8508 ± 37	-25.1 ± 0.8	7592-7522 (95.4%)	Niveau 3	charbon indet
TÜBITAK-0201	10 389 ± 41	-26.4 ± 0.6	10471-10109 (95.4%)	Niveau 5	charbon indet

Table 1 Dates radiocarbonnes de Boncuklu Tarla, calibrées avec Oxcal v. 4.3.2. (Reimer *et al.* 2013)

Fig. 3 Photo des bâtiments en plan cellulaire à murs orthogonaux du niveau 1. (Photo: Archive de Boncuklu Tarla)

Fig. 4 Certains bâtiments domestiques du niveau 2. (Photos: Archive de Boncuklu Tarla)

PPNB récent: ils sont la conséquence de rénovations effectuées sur des bâtiments du PPNB moyen. De fait, on voit clairement dans le secteur L10 que le plan du bâtiment s'appuie sur un plan anciennement pluricellulaire, c'est-à-dire possédant des pièces de différentes tailles, en l'occurrence une pièce centrale dans la partie ouest et des cellules dans la partie est. Cette configuration laisse donc entrevoir une continuité entre les occupations du PPNB moyen et du PPNB récent.

Architecture du Niveau 2 : Le *Niveau* 2 du site correspond au PPNB moyen caractérisé par des habitations unicellulaires (6 x 5.5 m de superficie) et pluricellulaires (de 9 x 5.5 à 9 x 6 m de superficie, Fig. 4a). Tous les bâtiments domestiques se trouvent à l'ouest du *Bâtiment au terrazzo*, seul bâtiment communautaire découvert à ce jour pour les niveaux du PPNB moyen et du PPNB récent. Ce dernier mesure environ 15 m de long (E-O) et 13 m de large (N-S), soit environ 195 m^2 de superficie (Fig. 5a-b). Autour de ce bâtiment, à l'ouest, au sud et au nord, se trouvent juxtaposées des pièces orientées est-ouest mais dont l'entrée est séparée, ce qui nous a conduit à le requalifier de complexe communautaire. Il s'agit en particulier de structures de stockage,

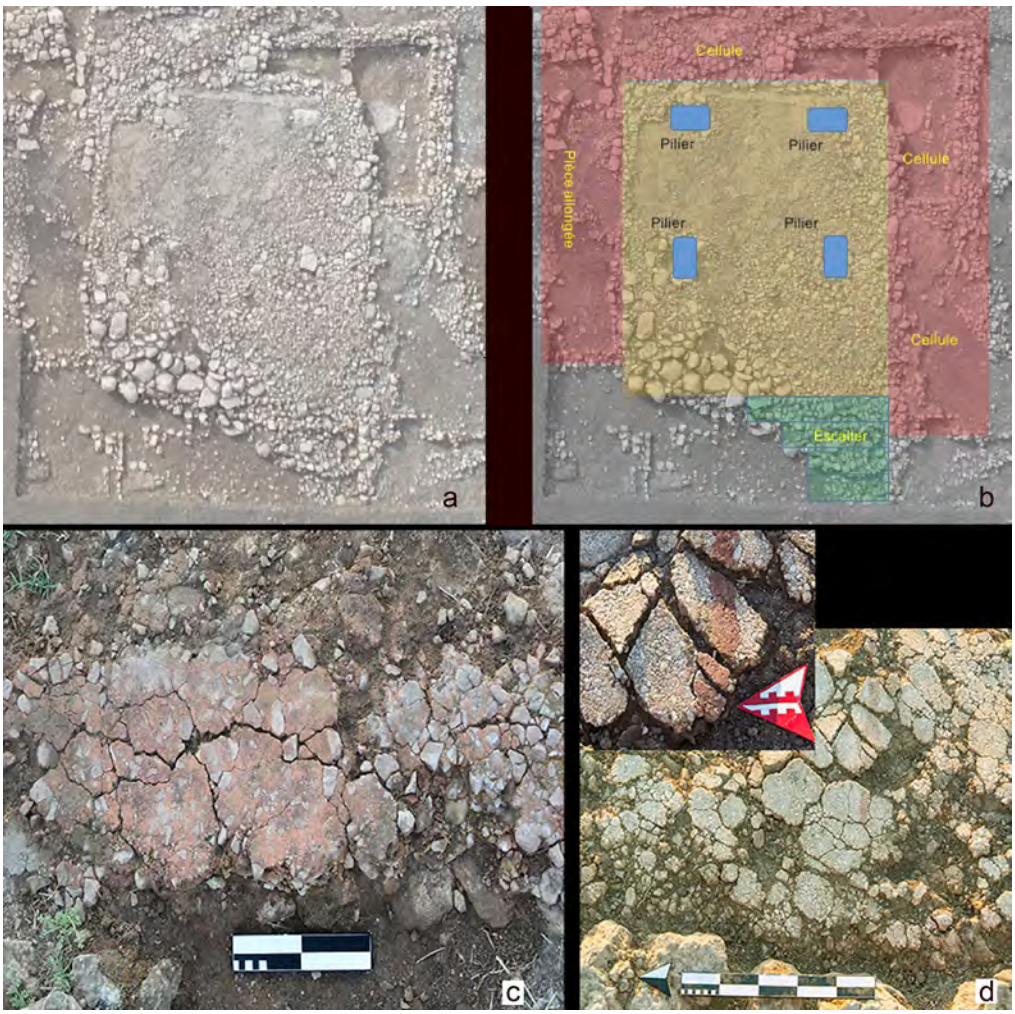

Fig. 5 a-b) Vue aérienne du *Bâtiment au terrazzo*, c) détail du sol en terrazzo (rouge), d) détail du sol en terrazzo (blanc) de la pièce ajoutée au PPNB récent. (Photos: Archive de Boncuklu Tarla)

au sein desquelles nous notons, au nord, la présence de petits espaces clôturés par des murets de pierre et installés sur des sols de galets, tandis que le sol des cellules est fait d'argile. L'accès au bâtiment s'effectue par un escalier situé en direction de l'est. Au sud, se trouve une pièce longeant ce dernier orientée ouest-est. Le *Bâtiment au terrazzo* était très probablement doté de 4 piliers disposés de façon symétrique, dont subsistent les bases et d'un sol tout à fait singulier, puisque réalisé en *terrazzo* peint de couleur rouge (Fig. 5c-d). Malheureusement, le pigment est difficilement décelable car il a été endommagé par les activités agricoles.

Au PPNB récent, nous observons des traces de rénovation de ce bâtiment (*Bina AA3/2*): il a bénéficié d'une extension vers l'ouest. L'une des cellules jouxtant le bâtiment au PPNB moyen a été fermée pour agrandir le *Bâtiment au terrazzo.* Nous voyons nettement les murs de cette dernière ressortir sous le sol en terrazzo qui leur a été superposé afin qu'il soit à niveau avec le reste du bâtiment. Contrairement à l'espace principal, ce sol a été peint en blanc. De ce fond, se détachent deux lignes rouges orientées est-ouest; il est possible qu'il y en ait eu davantage (Fig. 5a-b).

De façon plus générale, dans l'état actuel des fouilles, nous notons qu'aux PPNB moyen et récent tous les bâtiments domestiques se situent à l'ouest du *Bâtiment au terrazzo*. Des traces d'enduit ont pu être décelées sur les murs de certains d'entre eux. A l'opposé se trouve une zone de stockage comprenant des silos et des sols en *terrazzo*. Il nous paraît probable, par ailleurs, qu'elle ait pour fonction, non seulement, le stockage des céréales mais aussi leur préparation en vue de ce dernier. Il nous faut aussi signaler que de nombreux ossements d'animaux y ont été retrouvés ainsi que de rares outils. Aucune sépulture n'y est présente. Des analyses botaniques et archéozoologiques sont en cours.

Architecture du Niveau 3 : Nous n'avons pas encore identifié les caractéristiques de l'architecture du PPNB ancien, mais sa présence a été détectée dans les sondages réalisés dans les secteurs T5 et K9, notamment des sols et des murs en pierre. De ce fait, nous ne pouvons pas dresser de plan général pour ce niveau.

Architecture des Niveau 4 et Niveau 5 : Des éléments architecturaux des *Niveau 4* et *Niveau 5* ont été repérés dans le sondage réalisé dans le secteur K10 en 2012. En 2017, d'autres vestiges de ces niveaux ont été mis au jour dans la partie est du site, entre 10 et 40 cm de profondeur. L'architecture du *Niveau 4* se caractérise par des maisons sub-rectangulaires mesurant environ 10 m de longueur et 4 à 5 m de largeur. Elles sont installées autour d'un bâtiment circulaire mesurant

Fig. 6 a) Vue aérienne du niveau 4-5, b) détail des structures rondes du niveau 5, c) bâtiment circulaire du niveau 5 mis au jour dans le secteur O 11. (Photos: Archive de Boncuklu Tarla)

environ 5 m de diamètre (S-N) et doté de trois niches dans sa section nord-est (Fig. 6a). Il s'agit du seul bâtiment communautaire, défini par la présence de trois niches à l'intérieur du bâtiment, son placement spatial au milieu des bâtiments sub-rectangulaires et l'absence des sépultures qui est caractéristiques dans les autres maisons. Au *Niveau 5*, deux structures circulaires ont par ailleurs été mises au jour, d'un diamètre approximatif de 1.5-2 m (Fig. 6b). L'une d'elles possède en outre un sol en pavage de galet. Nous avons partiellement mis au jour un bâtiment circulaire dans le secteur O11, dans la partie nord-ouest du site. Il mesure environ 5 m de diamètre (Fig. 6c).

Industrie lithique

Nous avons la chance de réunir, d'ores et déjà, une industrie lithique fournie, remarquable aussi bien par la diversité des types retrouvés que, surtout, des techniques de taille employées (Abbès 1997). Le PPNB moyen est caractérisé, sur notre site, par un débitage par pression laminaire et majoritairement lamellaire issu de nucléus de formes conique, pyramidale, ou encore en balle de fusil (voir Pelegrin 2012). Les nucléus à lamelles de petite taille sont très nombreux et mesurent 1 à 5 cm de long et 0.3 à 0.5 cm de large (Fig. 7a). Plus rares, des nucléus naviformes ainsi que

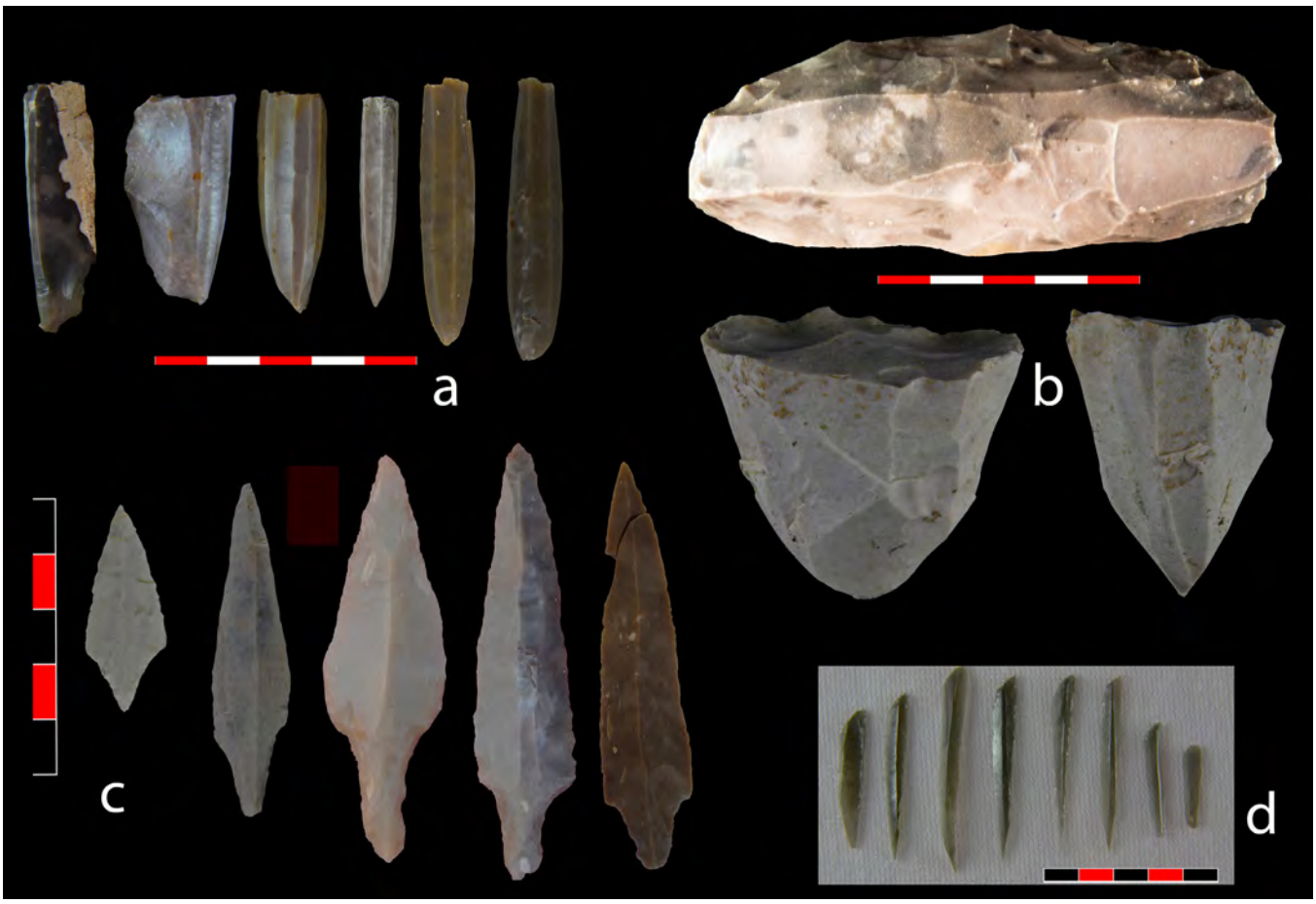

Fig. 7 a) Nucleus à lamelles, b) nucleus naviforme et nucleus conique, c) diverses pointes de flèche, d) microlithes du niveau 4-5. (Photos: Archive de Boncuklu Tarla)

des lames débitées sur nucléus naviformes (débordantes, en upsilon, *etc.*), à la pierre tendre, ont aussi été retrouvés dans ce niveau (Fig. 7b). De même, nous pouvons signaler la présence de nucléus coniques taillés par débitage direct (à la pierre tendre) et indirect. Le silex est en majorité dans l'industrie lithique du PPN mais l'obsidienne est forte présente dans tous les niveaux du site.

Dans les niveaux du PPNB moyen et du PPNB récent, des pointes de flèche de type Byblos, Amuq et Nemrik ainsi que d'autres types de pointes de flèche à pédoncule ont été retrouvées en quantité surprenante (*BAI : Big Arrowheads Industries*; Gopher 1994, Aurenche et Kozłowski 2000:103, Fig. 7c). Par ailleurs, la forte présence de microlithes dans les niveaux du PPNB moyen et du PPNB récent, récupérées grâce au tamisage, doit être soulignée. Dans le niveau du PPNB moyen, un atelier a été mis au jour à l'intérieur d'une maison (*Bina BA 1*), livrant une vingtaine de nucléus, des centaines de lamelles taillées par pression et une multitude de déchets de taille. Peu de grands éclats et aucune lame de grande taille n'y ont été découverts. Les lamelles et éclats de petite taille constituent l'essentiel du matériel rassemblé. Chose également rare et qui mérite tout notre intérêt, au même niveau, une cachette contenant une vingtaine de lames taillées par percussion directe, accompagnées d'un percuteur en pierre tendre, a été mise au jour (*Bina BA 5*).

Les industries lithiques du PPNA (*Niveau 4,* Fig. 7d) présentent des microlithes sans retouches, retouchés et géometriques (segments de cercle, triangles, lamelles à dos, trapèzes), ainsi que des micro-burins. Nous avons principalement pu identifier des lamelles à dos retouchées et des parties proximales et distales de lamelles retouchées de forme triangulaire (*Backed Bladelets,* Hole 1994; Kozłowski 1994), retrouvées en grande quantité aux *Niveau 4* et *Niveau 5*. Des *choppers* sont aussi attestés.

Objets figuratifs

Les objets figuratifs du Néolithique proche-oriental ont fait l'objet de plusieurs études (Garrod 1932; Bar-Yosef Mayer 2013; Alarashi 2014; Baysal 2015), pour l'essentiel consacrées aux figurines animales. Contrairement à nos attentes, nous n'en avons retrouvé aucune. Cette absence a été compensée par la découverte de perles atypiques aux formes surprenantes, le plus souvent en contexte funéraire, mais aussi de bracelets, de pierres à rainures, de labrets d'oreille et de plaques en os.

Perles : Le nom du site « Boncuklu Tarla » signifie en turc « champ de perles ». Il lui a été donné par des villageois en raison de l'abondance de perles retrouvées là lors de leurs activités agricoles. Un certain nombre

Fig. 8 Diverses perles retrouvées en 2017. (Photos: Archive de Boncuklu Tarla)

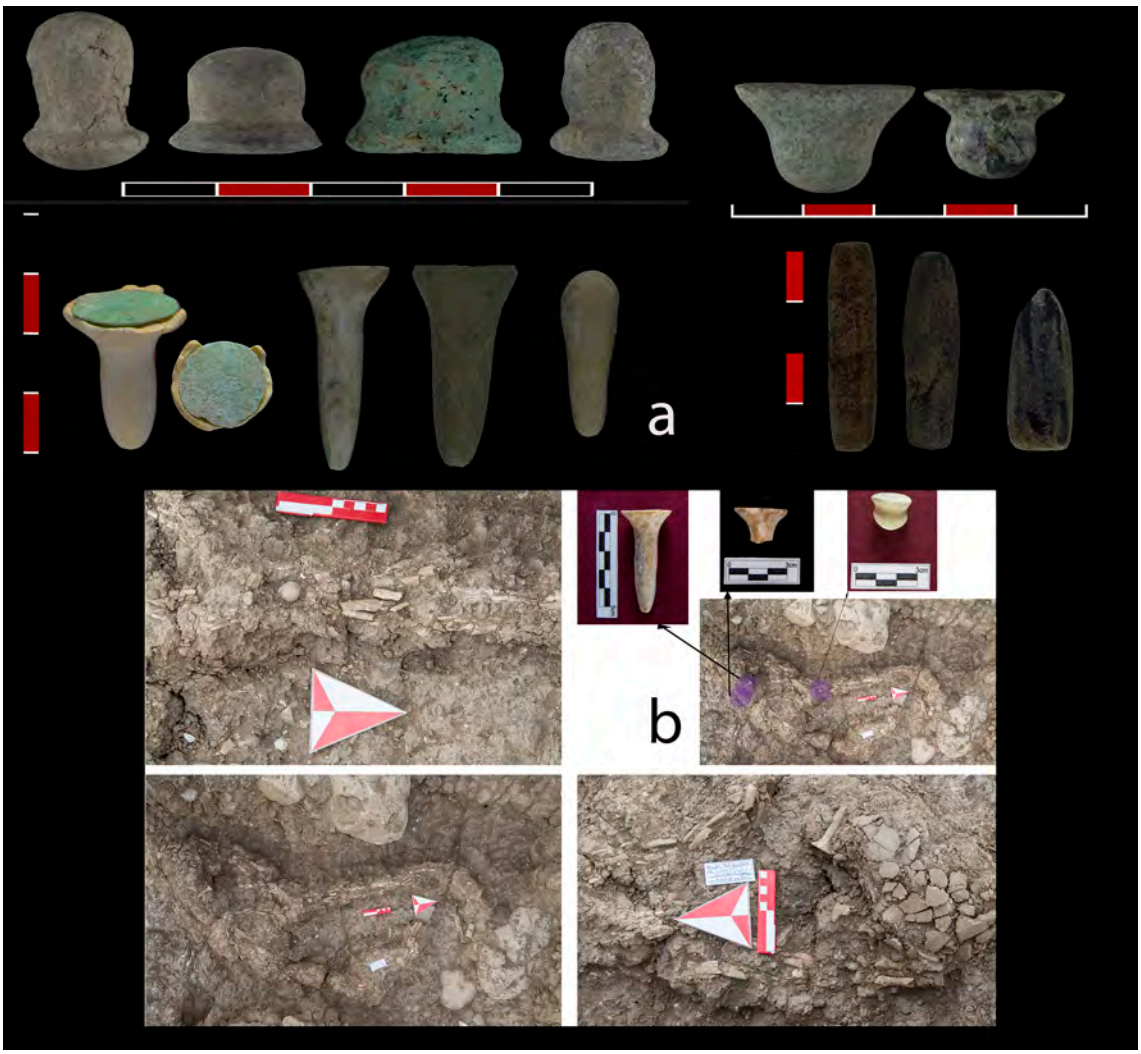

Fig. 9 Diverses objets définis comme bouchons d'oreille, des labrets d'oreille ou jetons. (Photos: Archive de Boncuklu Tarla)

Fig. 10 Deux bracelets en marbre retrouvées en 2017. (Photos: Archive de Boncuklu Tarla)

de perles ont été découvertes sur le site en 2012 et en 2017 (Fig. 8a) dont une perle anthropomorphe (schématisée) provenant du *Niveau 2*. Il s'agit d'une perle en serpentine mesurant 5 cm de long et 1.40 cm de large. À ce cas unique s'ajoutent, aux deux premiers niveaux, des perles de forme et de matière très variées dont une vingtaine de perles en forme de haches polies. Ce qui éveille surtout notre intérêt est la découverte de perles zoomorphes représentant avec finesse une faune composée d'animaux. Elles empruntent ainsi la forme de serpent, scorpion, oiseau, poisson, tête d'aurochs, de cerf et de chèvre (Fig. 8b). Ce répertoire, habituellement associé aux figurines, paraît avoir été transposé de façon originale sur notre site. Par ailleurs, aucune figurine n'a été, pour l'instant, retrouvée dans les sépultures et dans des maisons.

Bouchons d'oreille, des labrets d'oreille ou jetons : Au total 78 objets ont été définis comme « bouchons d'oreille », « labrets d'oreille » ou « jetons » lors des deux campagnes de fouille (pour des comparaisons voir Gebel *et al.* 2017). Il s'agit d'objets de petites dimensions, c'est-à-dire d'environ 1.5-4.51 cm de long pour 0.5-3 cm de diamètre (Fig. 9a). Ils présentent par ailleurs une certaine diversité typologique (nous avons identifié 6 types différents) qu'il faut mettre en parallèle avec des différences contextuelles (Aurenche et Kozłowski 2005). Certains ont été retrouvés *in situ* dans des sépultures des *Niveaux* 2 et 4, en particulier les plus petits objets du premier type, lesquels ont été découverts près du conduit auditif externe des crânes. Les objets de deuxième type ainsi que les objets les plus longs de premier type étaient placés verticalement sur le conduit auditif externe (Fig. 9b).

Bracelets : A Boncuklu Tarla, les « bracelets » en marbre à section ronde ou ovale sont fréquents au PPNB moyen et au PPNB récent. Plus de 100 « bracelets » ont été mis au jour; seuls 5 nous sont parvenus complets (Fig. 10). L'un d'eux fait exception: il se trouvait près du pelvis d'un jeune individu et était doté de 4 trous disposés de façon symétrique. Nous supposons qu'il s'agit d'une boucle de ceinture. Quant aux autres objets, leur diamètre est compris entre 5 et 9 cm. Pour les plus petits d'entre eux, il paraît impossible cependant, de les passer au poignet. Tous sont également percés de façon symétrique de 2 ou 4 trous. Certains ont été retrouvés dans les sépultures d'individus adultes.

Pierres à rainure et plaques gravées : Plusieurs pierres à rainure, dépourvues de motifs et souvent brisées, ont été retrouvées dans le niveau du PPNB moyen (*Niveau 2*) et du PPNA-PPNB transition (*Niveau 4*). On trouve également des galets plats gravés de motifs multiples (« *multi-engraved flat pebbles* », Aurenche et Kozłowski 2005) dans les niveaux du PPNB moyen et du PPNB récent (Fig. 11).

Plaques en os : Un certain nombre de plaques en os ont été retrouvées en 2012 et 2017. La plupart sont dépourvues de représentations mais des motifs géométriques sont gravés sur certaines d'entre elles et, plus rarement, des motifs animaliers (Fig. 12a). Cette pluralité ne reflète toutefois pas une diversité technique: tous les motifs ont été réalisés par incision. L'un d'eux paraît faire, ici aussi, exception: le motif incisé fut ensuite incrusté de petites pierres de couleur verte (Fig. 12b). Or, celle-ci concerne justement un motif animalier: deux

Fig. 11 Une pierre à rainure complet et un galet plat gravé de motifs multiples. (Photos: Archive de Boncuklu Tarla)

Fig. 12 Plaques en os retrouvées en 2012 et 2017. (Photos: Archive de Boncuklu Tarla)

Fig. 13 Quelques sépultures fouillées en 2017. (Photos: Archive de Boncuklu Tarla)

araignées réalisées de façon symétrique. Une technique d'incrustation similaire a été identifiée sur une labret d'oreille.

Restes humains

En 2017, plus de 124 individus répartis dans 69 sépultures ont été mis au jour. Les sépultures peuvent être individuelles, doubles, triples ou multiples (Fig. 13). Ces individus sont pour la plupart, en position foetale et, plus rarement, en position semi-fléchie. L'inhumation secondaire est également attestée. Nous avons de surcroît retrouvé 5 dépôts de crânes isolés. Les analyses anthropologiques sont en cours.

Réflexion et projet futur

La fouille de Boncuklu Tarla se poursuivra dans les années à venir avec une équipe – nous l'espérons – toujours nombreuse et forte de différents spécialistes du Néolithique proche-oriental. Les données déjà accumulées nous présentent un site au riche potentiel dont la période d'occupation s'étend sur plus de 5 000 ans, entre 12 500 et 7 000 ans avant notre ère. L'amplitude chronologique peut effrayer, tant nos efforts pour étudier le matériel archéologique de phases d'occupation aussi longues paraissent dérisoires. Toutefois, c'est aussi ce qui rend Boncuklu Tarla si digne d'intérêt. Sa complexité, spatiale et temporelle, révèle déjà certains indices sur l'organisation des hommes qui se sont succédés à cet endroit, notamment la présence non seulement de deux bâtiments communautaires, mais aussi d'espaces de stockage à visée communautaire et d'espaces ouverts (dépourvus d'architecture) que nous supposons collectifs. Par ailleurs, la présence de sépultures dans les bâtiments domestiques, dont plusieurs portent des marques de rénovation et/ou réutilisation, est tout à fait remarquable, y compris sur un plan symbolique. Chose rare en Anatolie orientale, le site permet donc de retracer la chronologie complète du néolithique précéramique mais aussi d'apporter des éléments de compréhension inédits concernant l'apparition de l'agriculture, la sédentarisation des sociétés, leur composition et leurs interactions, l'évolution architecturale des villages ou encore la symbolique de leurs pratiques funéraires. Finalement, sur un fond commun aux villages du Néolithique précéramique de l'Anatolie orientale, c'est d'abord la singularité qui marque Boncuklu Tarla comme un lieu de variation culturelle et d'expression artistique. A ce titre nous l'espérons, pour vous comme pour nous, il réclame notre curiosité.

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The Snakes of Göbekli Tepe: An Ethological Consideration

Tracy B. Henley and Lani P. Lyman-Henley

Göbekli Tepe is an important and well-documented Pre-Pottery Neolithic (PPN) site near Şanliurfa in modern-day Turkey (*e.g.* Schmidt 2005, 2010, 2011; Clare *et al.* 2018) featuring stone pillars with animal imagery. The animal most frequently depicted is the snake, most likely the *Macrovipera lebetina*. Four hypotheses for the meaning of the snake imagery have been previously suggested: As a representation of the penis; as a death related symbology; as supporting a narrative with the goal of building loyalty; and as associated with the "journeys" of a shaman. Each of these are considered against the actual snake depictions and actual snake behavior. Ethological data would seem to best align with the snake as a death related symbol, although that use itself could also facilitate loyalty or be associated with shamanistic activities.

Although detailed descriptions can be found in the works cited herein, for this article most salient among Göbekli Tepe's many features are the sculpted "T-shaped" stone pillars arranged around the perimeter of a series of circular enclosures. A strong case has been made that the site was not a residential, but rather a ritual, center (*e.g.* Notroff *et al.* 2015). These structures then are generally understood to constitute the oldest known examples of monumental architecture, and constituting the oldest known "temple" (Norenzayan 2013).

Geophysical surveys suggest a total of some 200 large (up to 5+ meters) pillars, of which 69 have so far been excavated. These pillars generally contain animal imagery, whose purpose has been the subject of considerable discussion (*e.g.* Schmidt 2006; Morenz and Schmidt 2009; Schmidt 2012; Notroff *et al.* 2016) although a common view is that they are facilitating a narrative in some literal sense, likely manifested through story telling and/or rituals (*e.g.* Benz and Bauer 2015; Henley 2018).

Based on an analysis of the first four enclosures to have been excavated, Peters and Schmidt (2004) previously reported that snakes were the most depicted animal, accounting for 28.4% of the representations and about double the second most commonly depicted animal, the fox at 14.8%. It should be noted that this was a conservative accounting, as groups of snakes were scored only as one instance. Looking at the structure of the head, the relationship of the head to length, and in context (see below), the snake being sculpted was most probably the highly venomous *Macrovipera lebetina.*

As for that context, Dietrich *et al.* (2020: 320-321) support the view that whatever their ultimate purpose that the animals were likely intended to be frightening. Specifically, they write: "These animals are depicted attacking: Aurochs, for instance, are usually shown with lowered head and presented horns; foxes are leaping as if approaching prey, or in a threatening pose, snakes are appearing as whole packs, and scorpions over-sized."

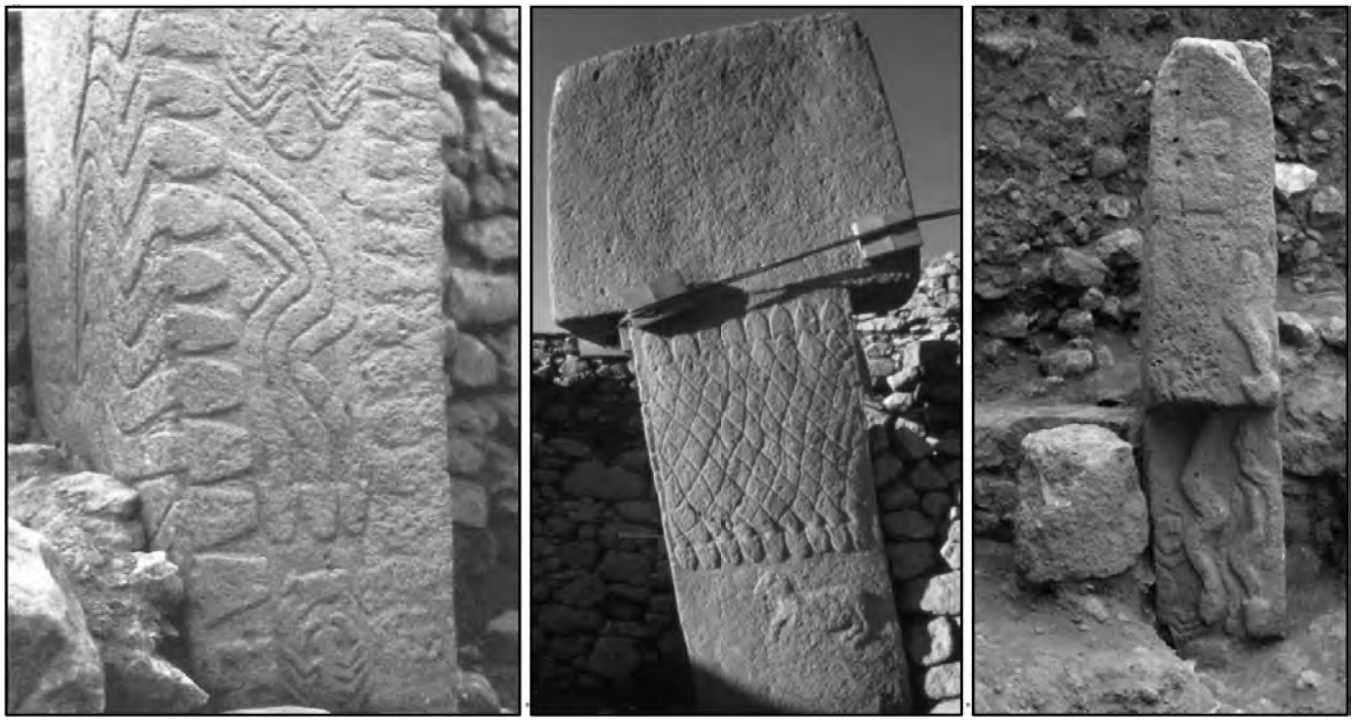

Fig. 1 Snakes shown on different pillars at Göbekli Tepe. (courtesy of the Göbekli Tepe Project, Deutsches Archäologisches Institut)

This general description of the animals as "fierce" has been widely accepted, and at times further developed. For example, Benz and Bauer (2013) have argued that these depictions may have conveyed a frightening narrative intended to develop social control and/or build cohesion and cooperation. On such an account, the gist of this narrative was most likely something akin to predator-prey, or "protection." Subsequently, they (Benz and Bauer 2015) refocus this thesis to frame the snake (along with the scorpion and other standardized images) as associated with the role of shaman. Related, Schmidt (*e.g.* 2006, 2012) suggested the story being told at Göbekli Tepe was one of life and death. For him, the context could have been educational (*e.g.* concerning hunting, funeral practices), social (*e.g.* initiating new members, strengthening groups), memorial (*e.g.* exchanging and encoding information), or some combination of all those within a religious framework likely concerning death. All of these ideas can also be reconciled with Norenzayan's (2013) suggestion that the site can be seen as evidence for a theology that featured supernatural watchers (see also Henley 2018).

Somewhat differently, Hodder and Meskell (2011) note the obvious possible link between the snake imagery and the penis. Indeed, there is much here to suggest sexuality – including both the general phallic shape of the pillars themselves (elongate, pronounced head) and the fact that all the fierce animals (as biologically appropriate) are depicted as male with a penis showing. With that said, four different theories about the snakes of Göbekli Tepe seem to have been suggested: That the snakes represent 1) the penis; that the snakes (as well as the other fierce creatures) represent 2) something death related; that the snakes (as well as the other fierce creatures) represent 3) a narrative with the goal of behavioral control by building loyalty (cooperation, cohesion, *etc.*) in the group, to social elites, to shamanistic ideals, or even in relation to a shared belief in supernatural watchers; or 4) that snakes represent "the shaman's journey" itself (Benz and Bauer 2015: 9).

It should be noted that these options are not mutually exclusive. For example, Benz and Bauer (2015) also underscore the association between snakes and death, suggesting then the sort of death-related rituals Schmidt focuses on could have been a part of the "shaman's journey." Obviously, other options surely could also obtain and some, such as clan symbols, have been alluded to (*e.g.* Peters and Schmidt 2004). That said, even if the animal imagery collectively served as such emblems, that still begs the questions of what the snake itself may have meant as a symbol.

One other matter also needs to be introduced here; the quality of the animal images. They are generally highly realistic – some amazingly so (see the first panel in the figure). Indeed, they are so realistic that exceptions have been noted as assuredly meaningful. For example, Schmidt 2006 and Dietrich *et. al.* 2020: 321-322, in the context of discussing masks found at the site) underline that some crane images appear to have human legs: "Their unusual human-like legs contradict the otherwise detailed and correct naturalistic depiction of many other birds' anatomical details – and therefore might indeed indicate masked humans." Following this logic, what could a deeper consideration of the snake art possibly reveal?

If we make the assumption that the snakes at Göbekli Tepe mean the same (or the same "basic") thing in all contexts, then it is not likely the literal penis. Considering just the three samples provided in the figure, if we accept the premise that the juxtaposition of images here actually was intended to mean something – to tell a story if you will – what stories could possibly be told if snake means penis in each case? Of course, by metaphoric extension (*e.g.* Johnson 1987), the snake(s) instead could mean man, or striking, or potency, or guile, and all of those remain plausible even if penis *per se* is eliminated.

The primary curiosity for us is the depiction of snakes in groups, as snakes are not generally regarded as social animals. Although there is some evidence for limited intraspecific activity in a few contexts (*e.g.* Gillingham 1987; Greene 1997) such as thermoregulation or defense, there are two well-documented situations where "packs" of snakes do obtain: Groups of male snakes could be seen pursuing a female with the intention of mating (*e.g.* Crews and Garstka 1982; Rivas and Burghardt 2005), and in the context of emerging from hibernaculum (*e.g.* Parker and Brown 1973; Burger and Zappalorti 2015) which can contain literally thousands of individuals (Crews 1983).

Sadly, little is known about the behavior of these reptiles in this region even by genus experts (K. Mebert, pers.comm. 2019) or resident herpetologists (K. Çiçek, pers. comm. 2019). *Macrovipera lebetina* is a "highly defensive" if not aggressive snake, especially at night, and known for a distinctive loud hiss used to frighten potential predators. It does aestivate in rocky slopes, and very interestingly, given the potential role of Göbekli Tepe in the advent of agriculture (*e.g.* Notroff *et. al.* 2015) is documented to frequent bushy terrain at the edge of agricultural developments (Mallow *et al.* 2003). Mebert reports that the "snake encounter rate can be quite high for agricultural workers," and that in modern day Şanliurfa these snakes "can be quite common on the surface in, or next to, the agricultural fields during April to June." There is also some suggestion that a related species (*Macrovipera schweizeri*) may congregate near water sources (Nilson *et al.*1999), in part to ambush birds.

Assuming, that a group female-tracking (*e.g.* Ford and Schofield 1984) or group mating in this species could have been observed, we return to the possibility that the snakes do in some sense represent something sexual (and perhaps the penis, metaphorically). Nevertheless, it should be noted that the likelihood of observing such an ad hoc group mating-related activity seems extremely low, and as such an improbable explanation for why groups of snakes would become an oft-used pictogram.

The other situation where groups of snakes might more reliably be seen is at their exit from aestivation. As this would happen annually at essentially the same time, and likely at the same general location (*e.g.* Wastell and Mackessy 2016), it is possible that such an event could have been witnessed by many (and so the "right") hunter-gatherers. As such, snakes could be seen annually "disappearing into the earth" only to reliably be later seen (and possibly as a group) returning from their "journey" (as per Benz and Bauer 2015). Likewise, if dormant snakes were viewed as dead, or something akin to dead, then their mass exodus from dens and return to life could readily align with Schmidt's idea that the imagery – and perhaps especially the snake imagery – was linked to death (see also Fagan 2017). This then could also be consistent with the shaman's journey into, and back from, a spiritual world as suggested by Benz and Bauer.

One final option would be that like the oversized scorpions noted by Dietrich *et al.* 2020 the sculptors purposefully crafted something they had never actually seen – snakes in groups – so as to make the image more "fierce". If so, one could imagine how such a mythic narrative may intersect with the ideas of predator-prey or of conjuring an image of something (a group of advancing vipers) that one would certainly desire protection from. But that said, if the image was just fanciful and had no basis in observed nature, why just groups of snakes? Why not flying snakes, or snakes with spears? Surely if the idea was simply to make the snake just seem more "fierce," options beyond increasing numbers would have obtained.

In sum, although the actual behavior of snakes or other animals cannot fully explain what role they served at Göbekli Tepe, we submit that it is an important (and seemingly neglected; though do see Russel and McGowan 2003) bit of data for assessing the relevant theories. Additionally, it is perhaps noteworthy that snakes (and other animals) also appear on smaller objects found at Göbekli Tepe that have generally been hypothesized to be cups/bowls, shaft-straighteners, and symbolic plaquettes. Perhaps something about the animals depicted could refine the understanding of such objects. For example, beyond just shape, the sudden appearance, striking speed, and deadliness of a snake could associate them with weaponized projectiles (see Morenz and Schmidt 2009) supporting the hypothesis of shaft-straightener. Conversely, the functionality of such objects could further illuminate why a given animal was being depicted on such a thing. Still, even Benz and Bauer's (2015) excellent and comprehensive consideration of the imagery at Göbekli Tepe and associated sites is largely silent about the actual behavior of the animals involved.

In this case, and given the general realism seen in the animals depicted, that groups of snakes do "return to life" and exit aestivation (or hibernation) sites in groups annually at similar locations would seem to favor Schmidt's death account or Benz and Bauer's notion of a journey "there and back again." Nevertheless, Mebert (K. Mebert, pers. comm. 2019) notes that even today local leaders may use tales of "many large snakes" as a "fear politic" to intimidate and manipulate. As such, some combination of using snake imagery around the matter of death but for behavioral control also seems plausible – and as was noted previously, these hypotheses are not mutually exclusive. Our point here was not to argue for any one answer but to suggest a role for ethology in developing, refining, and evaluating such ideas. Indeed, as more pillars are revealed and the circumstances of naturalistic and exaggerated animal depictions is further studied, such ethological information can surely provide both clues for further theory-building and an ongoing empirical "critique" for subsequent theory evaluation.

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Household and Death, 2: Preliminary Results of the 12th Season (2018) at Late PPNB Ba`ja, Southern Jordan

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Season's Operations and General Aims (H.G.K.G.)

Embedded within the research history of Greater Petra Area's Early Neolithic (since 1981, *cf.* Gebel *et al.* 2017), the 12th season of the Ba`ja Neolithic Project took place from June 23rd – July 20th, 2018. The season represents the second of field work for the DFG-Project *Household and Death in Ba`ja*[1], hosted by the Institute for Near Eastern Archaeology at Free University of Berlin and co-directed by Hans Georg K. Gebel, Marion Benz and Christoph Purschwitz.

Ba`ja is located in a secluded setting of the rugged sandstone mountains (Fig. 1; *cf.* Gebel *et al.* 2017 for more general site and project information) north of Beidha village near Wadi Musa. The site is best accessible by climbing through the narrow *siq al-Ba`ja*; therefore, any excavation requires a lot of logistical investment, physical strength by the team, and the acceptance of technical and conservational limits.

This season's main aims were to further enlarge the corpus of findings and data for the Household and Death subject, both from excavations in the deeper strata of the site's Areas C and D (Figs. 2-3) as well as by "shelf research" on relevant finds and samples of previous seasons. Apart from general archaeological work, findings attesting the spatial and ontological relationships between households and burials received special interest. Discoveries at Ba`ja hardly show a direct living household – burial relationship. Instead, we are dealing with the complexity of interacting intramural burials – or an intramural burial ground –, ritually deposited (transformed) household inventories, household dumps, and remains of active households (Gebel *et al.* 2017). In epistemic terms, the 2018 excavation work also served the holistic and integrated research on the development of the Neolithic social organization and ethos at Ba`ja, mirrored by household and sepulchral practices.

Initial discussion with the president of Yarmouk University, H.E. Prof. Dr. Zeidan Kafafi, and the Dean of the Faculty of Archaeology and Anthropology at Yarmouk University, Prof. Dr. Hani Hayajneh, took place for two future joint projects: The restoration and presentation of the extraordinary child Burial Loc. C1:46 in Room CR 36.1 (*cf.* below) in a Jordanian museum, and a cooperation for a future Eastern Jafr Joint Archaeohydrological Project between Yarmouk and Lübeck Universities.

An Extraordinary Child Burial in CR36.1, Loc. C1:46 (M.B., J.G., H.A.)[2]

This season, two burial contexts were uncovered: one was the accumulation of several individuals (*cf.* description of Room CR17), the other was a single child burial in Room CR 36.1 (Figs. 2, 4-5).

In Room CR17, beside the remains of a male adult, human bones of a juvenile girl (15 years ± 36 months) and a *c.* 6-10 years old child were found. Similar to the collective burial of Room CR34 (Gebel *et al.* 2006a), this deposit was covered with stones. Co-occurring isolated teeth and bones, mixed grave goods and the high amount of charcoal pieces in the pit might indicate a sort of secondary inhumation. In terms of funeral formality, this accumulation of human remains contrasts strongly with the child burial uncovered in Room CR36.1.

In Room CR36.1, excavations continued down to natural soil. A report on the room fills and architecture will be presented elsewhere (Purschwitz *et al.* in prep.), so that we can focus on the child burial in the following. A white plastered surface (Loc. C1:20) had already been identified in 2016 in the eastern part of Room CR36.1 as a possible grave cover (Gebel *et al.* 2017: Figs. 7 and 11). However, this season's excavation of the supposed burial exceeded all expectations.

The grave was segregated from the western part of the room by a small wall (Loc. C1:60). It was sealed by a layer of tiny limestone gravels, probably recycled from the floor which had been destroyed for the burial pit. The whole construction – except for the uppermost stone slabs of the small western wall (Loc. C1:60) – was coated with white plaster that ran onto the surrounding walls, indicating that the grave was younger than the architecture. Below this white surface, white Ordovician sandstone slabs, fixed in silty sand-mortar, covered the grave. Some of these fragments fitted together forming an oval plate of about 65 x 40 x 3 cm. One or two fragments had been found upside down proving the deliberate destruction of the slab outside the grave before they were placed in the grave cover. Since the broken edges of the fragments showed no abrasion and matched so precisely, the slab must have been smashed shortly before deposition, as clear impact points were not visible. It appears that this may have happened by simply stamping with a foot. Two stone slabs were stained red. Furthermore, the grave cover comprised five grinding stones.

Below this cover, an ovoid grey-reddish sandstone slab (max. 82.5 x 49 x 3-4 cm) was placed over two vertical parallel plates of grey-reddish "schistic" sandstone (Fig. 5). The southern part of the grave area was additionally bordered by a small wall. In the eastern area, the grave undercut the Wall Loc. C1:16 for about 10 cm. The burial pit had been dug through the floors (Loc. C1:64/68/[67?]) into the sterile *playa*-like sediment for about 20 cm on which the Neolithic layers rest. After the deposition of the child, the grave pit was filled with homogenous, almost sterile fine-grained silty sand. Between the chest and the legs of the skeleton, a lump of red pigment was found.

In the western part, between the small Wall Loc. C1:60 and the grave pit, and on top of the original floor (Loc. C1:64), there was a layer of white chalky stones embedded in silty sand. On top of them several stone slabs were deposited. The western border and these slabs overlapped, indicating that their construction must have been contemporaneous.

The grave construction resembles the grave of the adult individual in Room CR35 (Loc. C10:408; Gebel *et al.* 2017: Figs. 6-7). The cist-like construction also recalls burials from Shkārat Msaied (Hermansen 2017) and Wadi Hemmeh (Makarewicz and Rose 2011), but its truly hermetic sealing and the play of colours of white and red are unique, topped only by the burial itself (see below).

The buried child was an about eight-year-old girl (±24 months). She was resting on her left side in a crouched position. Her feet touched the western border of the pit and her back leaned against the northern slab (Fig. 6). The skull had turned down on its face. All her bones were stained red, but the sediment around the bones was obviously not coloured by pigments, except for the area around the red pigment lump (see above). The outer surfaces of the bones were stained red while the inner parts, *e.g.* the internal lamina of the skull, remained unstained; at least the skull was intact when the colour was applied. She was possibly wearing cloths coloured in red, or her skin had been stained in red. The preserved anatomical connections contradict a secondary deposition and thus make the colouring of the bones themselves improbable.

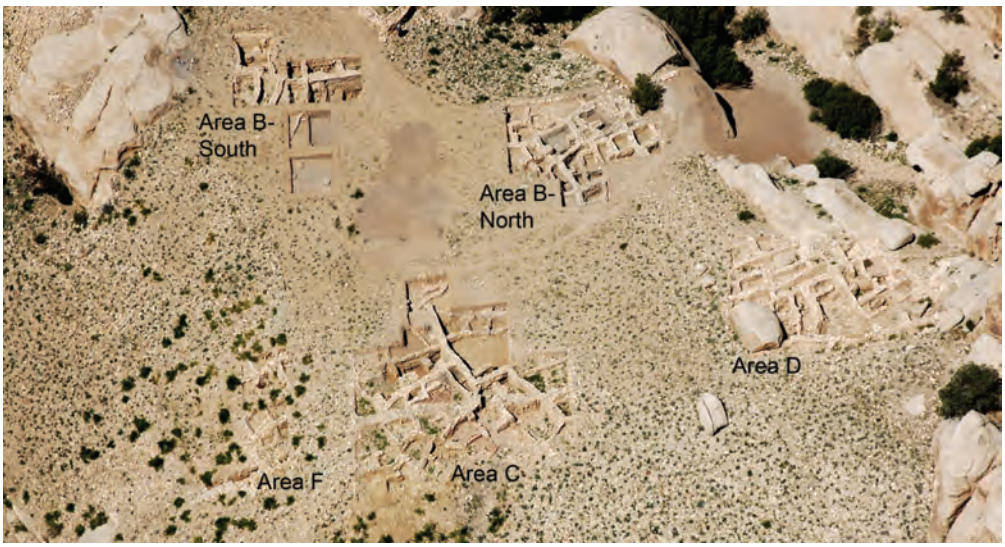

Fig. 1 Ba`ja helicopter view from E in Spring 2007. (Photo: D. Kennedy)

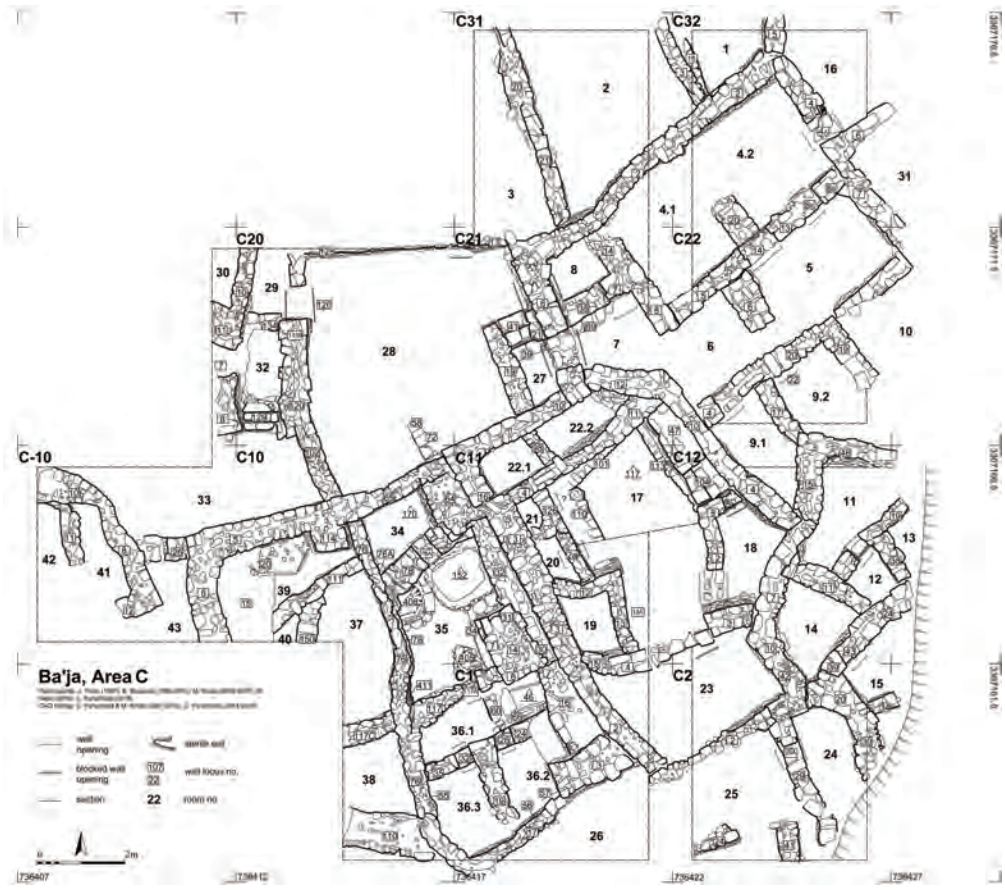

Fig. 2 Ba`ja, Area C architecture. (Drawing: M. Kinzel and C. Purschwitz)

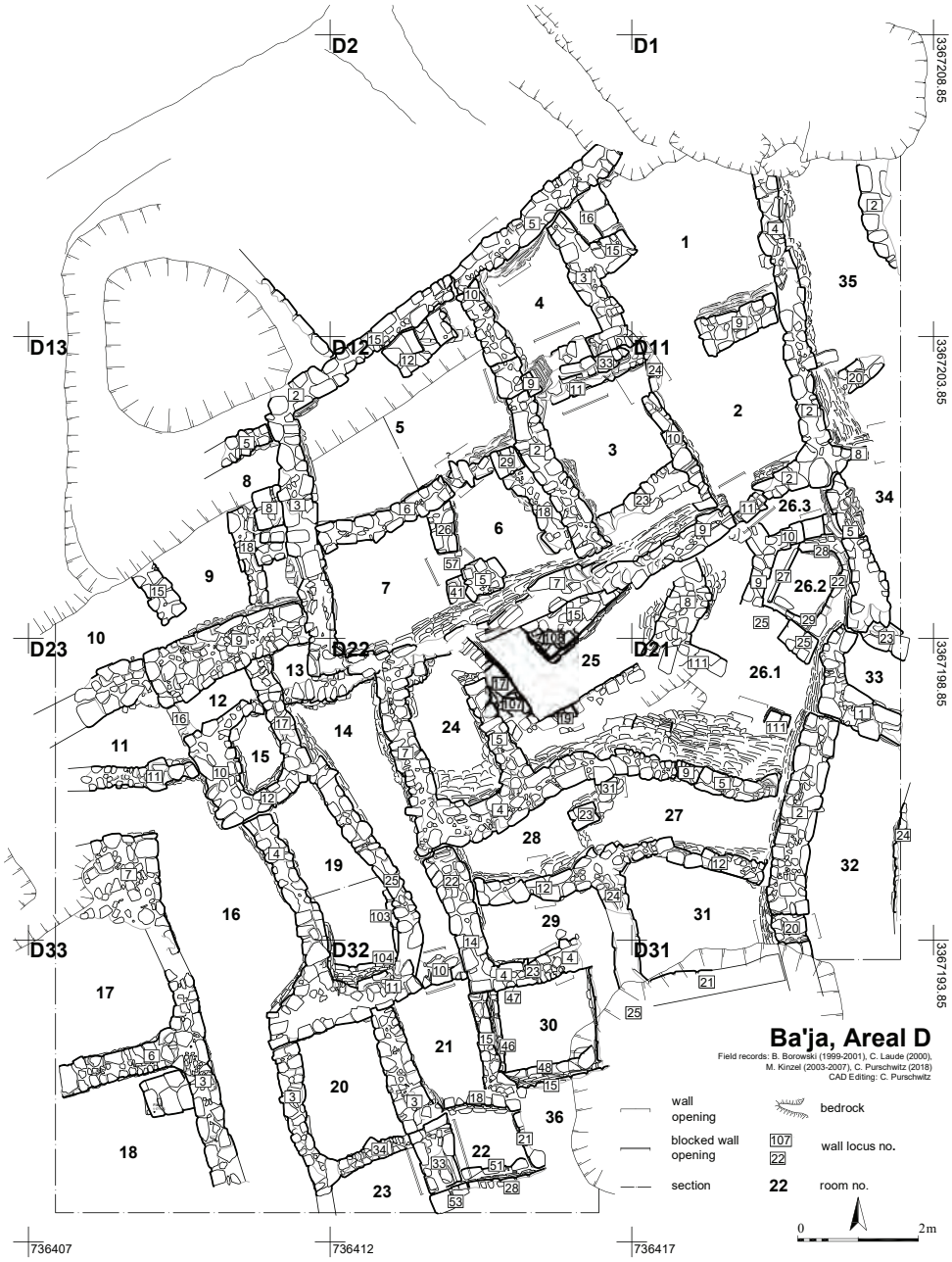

Fig. 3 Ba`ja, Area D architecture. (Drawing: M. Kinzel and C. Purschwitz)

The girl's necklace underlines the high esteem ascribed to her. Composed of more than 2500 beads and other elements, it was organized by a mother-of-pearl ring with perforated and denticulated extensions (Fig. 7). The beads of the necklace had slipped in the area of the chest, the neck and the left shoulder (Fig. 8). The position of the ring in front of the chest and small ring beads in the holes of the appendices suggest that it was used as a central "spacer" (Fig. 9). Similar objects were discovered with two infant burials at Ba`ja and at the late PPNB site of Basta, about 20 km southeast of Ba`ja (Gebel and Hermansen 2001: Fig. 7A; Gebel 2002: Fig. 10). The beads are mostly tiny ring disc beads of red coloured silicified limestone, as well as some barrel shaped and a few cylindrical beads of the same material. These contrasted with white, partly translucent cylindrical beads, possibly from fossilized *Tridacna* shell (B.D. Hermansen, pers. comm.). This play of colours of red and white was interrupted by five turquoise disc beads and two black spherical beads of hematite and an oval double-holed bead of the same material. The position of this item on the neck suggests that it was used as a "closing-buckle". This object seems extraordinary for the late PPNB as items of this type were considered characteristic for the Natufian (Bar-Yosef Meyer and Porat 2008). However, similar objects made of malachite were also found in Harifian contexts (Goring-Morris 1991: 199), in North Mesopotamia at the PPNA sites of Mureybet and Jerf el-Ahmar (Alarashi 2014), and in the PPNB phases of Anatolian sites such as Çayönü (Lichter 2007: 316).

The jewellery confirms close relations between the sites of Basta and Ba`ja. It also testifies access to far-reaching exchange networks (Hermansen 2004; Spatz 2017) for the procurement of exotic green stone beads which became increasingly important during the Pre-Pottery Neolithic (Wright and Garrard 2003; Hauptmann 2004; Maier 2008; al-Nahar 2014; Thuesen and Kinzel 2018). The repeated association of these specific mother-of-pearl rings with children suggests that these objects manifest a specific identity of the children for the people assisting the burial ritual.

The burial ritual can thus be reconstructed quite well (Table 1). Further analyses of the beads and anthropological investigations, including stable isotope and a-DNA, may provide important information on familial relationships and personal identity. Even though this burial is extraordinary for the Neolithic and even though it contrasts with other children burials at Ba`ja (see also Gebel *et al.* 2017), it would be premature to consider it an unambiguous evidence for institutionalized heritable hierarchies.

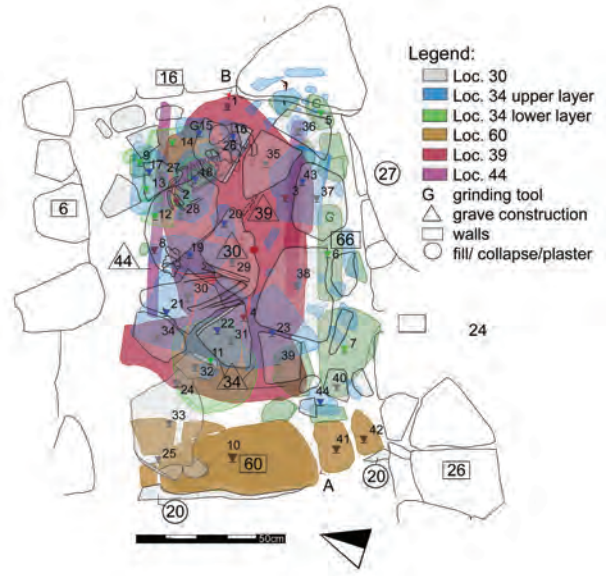

Fig. 4 Eastern Room CR36.1, grave construction: Cist burial of the 8 yrs (±24 months) old girl (Loc. C1:46). (Drawing: C. Purschwitz; for the levels *cf.* Table 3; compiled and digitalized data: M. Benz)

Fig. 7 Eastern Room CR36.1, Burial Loc. C1:46: (Selection of) necklace elements of the child comprised more than 2500 beads, most of them being tiny red limestone ring beads and cylindrical shell beads. The mother-of-pearl ring appears to be a spacer while the black double-perforated mineral bead – according to its position on the neck – probably served as a buckle. Lump of red pigment found in the grave. (Photo: H.G.K. Gebel)

Fig. 5 Eastern Room CR36.1, Burial Locus C1:46: Grave cover with the large slab in the eastern part; red stained stone and the small wall in the west, bordering the grave. (Photo: M. Benz)

Fig. 6 Eastern Room CR36.1, Burial Loc. C1:46: All bones of the young girl and some parts of the grave sediments around the lump of red pigment were stained in red. (Photo: M. Benz).

Event	Activities
1)	Cutting a pit through the floors Loci C1:64 and C1:68, probably also Loc. C1:67; undercutting Wall Loc. C1:16 for about 10 cm; preparing the corpse for the burial by grinding red colour on some white stone slabs; possibly colouring clothes or the corpse with red pigment/or painting the skin; Putting the necklace around the head of the child
2a)	Constructing the Walls Loc. C1:66 and possibly starting with Loc. C1:60
2b)	Fixing the southern and northern border of the pit with two vertical large slabs (Loc. C1:44) and some smaller slabs west of the northern slab of Loc. C1:44, comprising one of the slabs on which red pigment had been ground. Filling the space between the northern vertical slab of the grave cist and the Wall Loc. C10:117 with stones and sand/mortar.
3a)	Putting silty sand (similar to the mortar of the Walls Loc. C1:66 and C1:60 but looser) on top of the floor Loc. C1:64 between the Wall Loc. C1:60 and the grave pit, placing the chalky limestones (Loc. C1:63) on it, putting two large stone slabs and some smaller ones (Loc. C1:39-west) to fill the area in the south of the slabs. Fixing the vertical slabs with mortar (Loc. C1:65).
3b)	Adding more stone slabs on Loc. C1:60 [NB: The stones of Loci C1:60 and C1:39 overlap partly and thus were probably deposited in one event, but with Loc. C1:60 forming a clear border.]
4)	Placing the child in the grave; putting the red pigment in the space between her legs and arms; due to gravity the head of the child turned on its face to the left shoulder. Most of the beads/chains of the necklace accumulated in the area of the left shoulder, the neck and the chest. Their *in situ* position suggests that they were enchained on strings, spaced by the mother-of-pearl ring and closed in the back by a black mineral buckle.
5)	Closing the grave cist with the large stone slab (1) of Loc. C1:39
6)	[Possibly during burial ritual a fire was lit in front of the grave in the western area of the room; the round dark coloured circular patch of sediment (Loc. C1:70) might hint at that activity]; Destroying the prepared or available oval Ordovician sand stone slabs (Loc. C1:34)
7)	Covering the whole space between Walls Loc. C1:60 and C1:16 with up to three layers of the destroyed stone slabs, including a second plate on which pigment had been ground and five grinding stones.
8)	Covering the stone layer with mortar (Loc. C1:29) to fix the (recycled?) small limestone gravels on top (Loc. C1:20)
9)	Plastering the grave cover and the front of Loc. C1:60 with white lime plaster, except for the upper most layer of Loc. C1:60 [not drawn].
10)	No further activities could be recorded in relation to the ritual or memory activities around the grave, although it cannot be excluded that the ash/charcoal layer in Loc. C1:61 immediately in front of the grave is related to some rituals.

Table 1 Reconstruction of the child burial ritual in Room CR36.1 (events numbered a-c might be interchangeable).

Objects	Field numbers
CR36.1	
In the grave cover, Loci C1:33-34	
5x Grinding tools	106004 106019 106021 106044 106047
Use retouched flint flake with notch	102019
Objects inside the grave: C1:42 and C1:46, pigment and necklace (in total more than 2500 items, *cf.* Fig. 7)	
5x turquoise disc beads	100814.Zc, Box 3 100814.117 100814.166 100814.Zb, Box 3 100814.W, Box 3, ECXXX
2x Hematite spherical beads	100814.E 100814.B
Ovoid black buckle 29.5mmx21.5mmx5mm (hematite); double perforation (d: upside 4.7-5mm; downside 3mm);	100814.154
>2500 red limestone and shell beads (of cylindrical, ring [almost <1cm] and barrel shape)	100814
Mother-of-pearl ring: spacer	100814.20
Lump of red pigment	107907
CR17	
Above grave cover Loc. CR17:109-115	
2x polished fragments of limestone celts (Fig. 11)	105801
Basal fragment of a blade-based flint dagger (Fig. 11) Basal fragment of a blade (of a projectile or other point)	102042 102047

Table 2 List of objects found in both graves in Rooms CR17 and CR36.1. Mineralogical identifications of the beads' raw materials by M. Martin and G. Gerlitzki.

Objects	Field numbers
Associated with human bones CR 17:117	
A flint blade	102048
A cowrie shell (with the upper part of the shell destroyed)	100805
Pieces of red pigment	107816
Animal bones (1x horn core n°13, 1 scapula n°51, 1 vertebra? n°22, 1 indet. n°45)	104031 104044 104051 104052

Table 2 (Continued).

Levels of the grave construction burial CR36.1, Ind. 1							
ID	m a.s.l.	ID	m a.s.l.	ID	m a.s.l.	ID	m a.s.l.
1	1165.07	12	1165.09	23	1165.12	34	1165.21
2	1165.05	13	1165.11	24	1165.15	35	1165.24
3	1165.07	14	1165.15	25	1165.19	36	1165.26
4	1165.05	15	1165.15	26	1165.18	37	1165.26
5	1165.17	16	1165.13	27	1165.18	38	1165.24
6	1165.08	17	1165.15	28	1165.17	39	1165.21
7	1165.03	18	1165.13	29	1165.18	40	1165.14
8	1165.05	19	1165.12	30	1165.17	41	1165.14
9	1165.07	20	1165.12	31	1165.18	42	1165.15
10	1165.08	21	1165.15	32	1165.21	43	1165.18
11	1165.08	22	1165.13	33	1165.18	44	1165.18

Table 3 Levels of the grave cover of the single child burial in Room CR36.1.

Excavations in CR17, and Another Collective Burial (C.P., M.B., J.G.)

Investigations in Room CR17 aimed at completing the excavation of the room fill to increase our data on non-ritual household inventory disposals. The lower room stratigraphy was checked for its potential on sepulchral contexts. In order to document an E-W section through the entire room, CR17 was divided in two parts with only the northern half being excavated (Fig. 10).

The upper room fill is marked by a 1.50 m deep pit (Loc. CR17:107 filled by Loci CR17:103A and CR17:103B), which is very likely the modern looting pit reported by the first investigations at Ba`ja in 1984 (Sounding II or III, *cf.* Gebel 1986, 1988).

The excavation of the C11/ C12 baulk revealed a staircase (CR17:104) which abuts on its southwestern border to Wall C12:4=C22:12. Its lowermost step connects to the Buttress C12:47, indicating their contemporaneity in construction. There is a clear joint between the staircase and Wall C12:8, although the temporal distance of both constructions may not have been very long as both are related to the same mud floor (CR17:106).

The staircase, the buttress and several walls (*i.e.* C12:8, C12:47, C11:4=C21:11, CR17:104, CR17:108) were founded on a 10-15 cm thick layer of stone rubble, which sealed the wall tops of an earlier building level. Three walls of this lower level, *i.e.* CR17:101, CR17:110, and CR17:113, were excavated. They form a room of similar orientation, but of slightly different layout than the younger phase of the room. The upper room fill consisted of a more than 1m thick layer of rather loose sediment (with bits and chunks of charcoal, fragments of plaster, lumps of mud/

Fig. 8 Eastern Room CR36.1, Burial Loc. C1:46: Most of the beads slipped in the neck's and left shoulder area of the child. The black buckle was found beneath the neck. (Photo: M. Benz)

Fig. 9 Eastern Room CR36.1, Burial Loc. C1:46: Position of the mother-of-pearl ring in front of the chest hints at its function as a spacer. (Photo: H. Alarashi)

mortar, smaller-sized stone collapse while stones larger than 15 cm occur only sporadically). Artefacts were rare except for a high number of grinding tools (n=23). The homogeneous matrix and composition of this deposit suggest one or a few related intentional disposal events of unrecycled components of collapsed building materials (with an obvious lack of wall stones). Although speculative, there is good evidence that this layer relates to the earthquake event(s) which have been noted at various spots at Ba`ja (Gebel and Kinzel 2007; Kinzel 2013; Gebel *et al.* 2017).

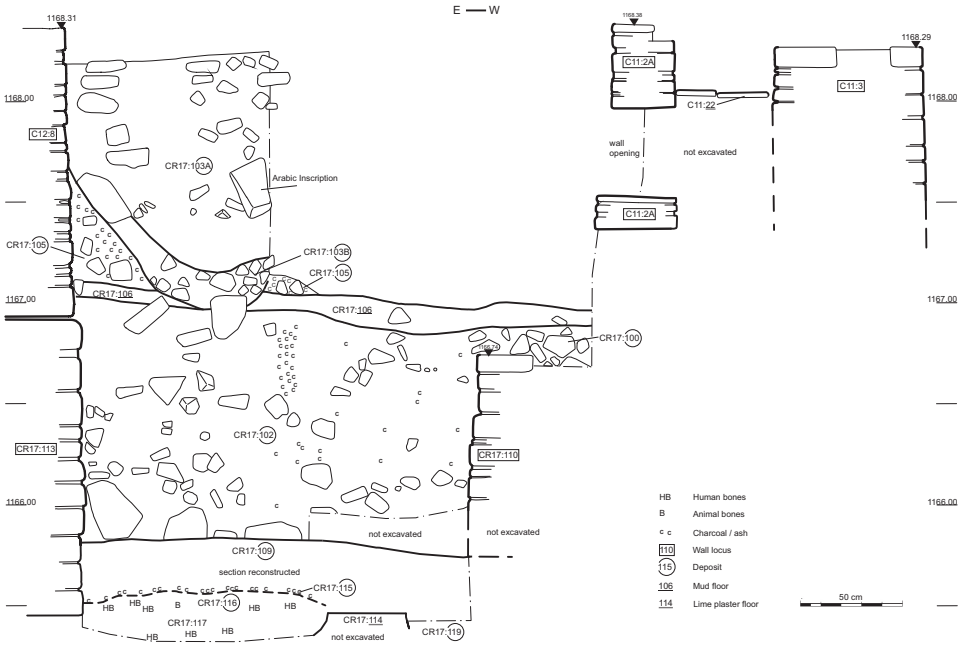

Fig. 10 Room CR17: E-W section through the room fill. (Drawing: C. Purschwitz)

The lowermost room fill consisted of collapse material (Loc. CR17:109) superimposing a plaster floor (CR17:114) and a pit. Loc. CR17:109 appears to have been used as a casual surface for some time as its top is quite horizontal and Walls CR17:110 and CR17:113 had been built on it. In the eastern part of the room, below Loc. CR17:109, a concentration of ash and charcoal (CR17:115) on top of a pile of up to fist-sized stones (CR17:116) could be observed. The latter covered a shallow pit which was cut through the Floor CR17:114. In the pit, human bones of at least three individuals (one female juvenile [15yrs ± 36 months], one child [m>w; 8yrs ± 24 months] and one possibly male adult) and animal bones were discovered in association with two polished limestone celts, a tip of a blade-based flint dagger; a cowrie shell, a flint blade and pieces of red pigment (*cf.* Table 2, Figs. 11-12). Some of the skeletal remains were still in anatomically correct positions. Further excavation and the ongoing anthropological analyses will improve our understanding of the context and character of this deposit.

Excavations in Room CR5, Exposing a "Steppe Signal"? (B.K., L.M.)

The intended continuation of excavations in Rooms CR6 and 7 in Square C21 and C22 was suspended, because Wall Loc. C21:8 (Fig. 2) was found partially collapsed upon arrival for the season. A support wall was inserted in Room CR6 in order to stabilise the surrounding and deeply excavated architectural remains. Due to these circumstances, excavations were shifted to the adjacent Room CR5 which was last excavated in 1997. After cleaning Loc. CR5:30, a layer containing the remains of a collapsed/eroded roof, wall stones and fragments with imprints of charred wood as large as 5-8 cm (!) were revealed (Loc. CR5:31); Below it, a room filled of rubble was located (Loc. CR5:34). A bifacially pressure-flaked projectile point (F.no 102020) with dimensions and a shape typical for the 7th millennium, was found in the room Fill Loc. CR5:37 near Wall C21:8A, together with a larger part of a charred beam.

Following Loc. CR5:34 in the western part of Room CR5, a thick ashy deposit (Loc. CR5:35) extended

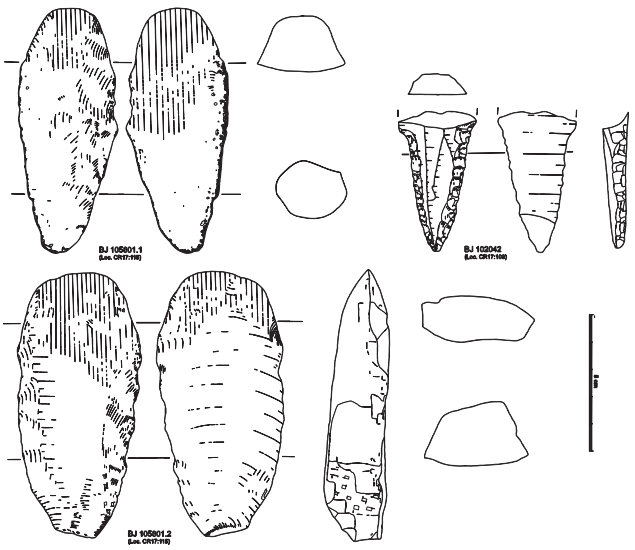

Fig. 11 Room CR17, Burial Loci CR17:119 and CR17:115: Items associated with human bones on top of the grave: polished limestone celts (F.no. 108801.1-2, Loc. CR17:115); base of flint dagger made on a large blade blank (F.no 102042, Loc. CR17:109). (Drawings: C. Purschwitz)

Fig. 12 Room CR17, Burial Loci CR17:117: At least three individuals were deposited in a pit in CR17 (excavation of Loc. 117 and anthropological analyses are not completed yet). (Photo: M. Benz)

between Walls C22:14, C22:13, C22:6, C22:20 (Fig. 13) containing ash-stained bones and artefacts (flints, stone ring and grinding tool fragments, malachite, and a clay figurine fragment: Fig. 16), all with traces of burning, and at least four charred wooden beam fragments suitable for dendrochronological analysis (F.no 107216).

Under the rubble fill in the eastern part of CR5, a layer (Loc. CR5:38) of plaster/ mortar-type of material containing sherd-like fragments was uncovered, preliminarily interpreted as remains of building material.

In the central parts of CR5 (Loc. CR5:36) isolated sherds of chaff-tempered baked/unbaked clay were found. Excavations in the central western part of CR5 exposed dark grey "sherds" resting on stones (Loc. CR5:39). A red-yellowish clay surface (Loc. CR5:41) hosted sherd-like material, too. It was founded on a dense layer of grit averaging 1 cm in dimensions and mixed with plaster. Excavating Loc. CR5:35 revealed a loose red-yellowish sediment below the ashy deposit, appearing pit-shaped in the cross-section. It may represent either disintegrated material of the sherds (*tabūn*?), or it could be the local *samagah* prepared/stored for making a *tabūn*. In Loc. CR5:42, mineral token-like items (Fig. 17) and a good collection of charred peas occurred (Fig. 18; identification by R. Neef).

Loc. CR5:38 in the eastern part of CR5 was followed by a thick deposit (Loc. CR5:40) of collapsed well-dressed wall stones, flat and angular stones with pieces of mortar attached and dumped grinding tools (Fig. 14). At the bottom of Loc. CR5:40, a broken empty limestone basin (Fig. 15: F.no 106805) was found, possibly resting on the same level as a formal trilith (Fig. 15: F.no 107216) erected by 3 dressed, respectively elongated shaped stone slabs. The fact that the slab elements of the trilith were still standing indicates a quick burying of the locus.

Wall Loc. CR5:55, uncovered in the south of Room CR5 and next to Wall Loc. C22:19, closed the room. The western buttress (Wall C22:6) was built upon the fill of CR5 during a later building phase.

While standing stones are attested with Neolithic settlements in the Transjordanian Highlands (Kafafi 2011), the very distinctive triliths, or trilith groups, – to the extent known and according to our knowledge – mark ritual and burial spaces in the eastern deserts' Late Chalcolithic to EBI (*e.g.* in Qulban Beni Murra, *cf.* Gebel 2013; in Dhofar the same structures date to the late Iron Age (Garba 2017) while at the same time commonly addressed as Neolithic (*e.g.* in Salalah's Frankincense Museum). However, triliths seem to be insignificant for the moderate zones of the Southern Levant. If the Ba`ja trilith is not a "formal accident" appearing in the LPPNB/PPNC, could it represent an early "steppe signal"? Ba`ja's contacts with the

Fig. 13 Room CR5 with Walls Loc. C22:14 and C22:6, and section under Wall Loc. C22:6. (Photo: C. Purschwitz)

Fig. 14 Room CR5, Loc. CR 5:40: Deep deposit of collapsed well-dressed wall stones, flat and angular stones with attached mortar, and dumped grinding tools. (Photo: M. Benz)

Fig. 15 Room CR5, Loc. CR5:40: Fractured limestone basin (F.no. 106805) associated with a – still standing – trilith (F.no 107216), erected by shaped stone slabs. (Photo: M. Benz)

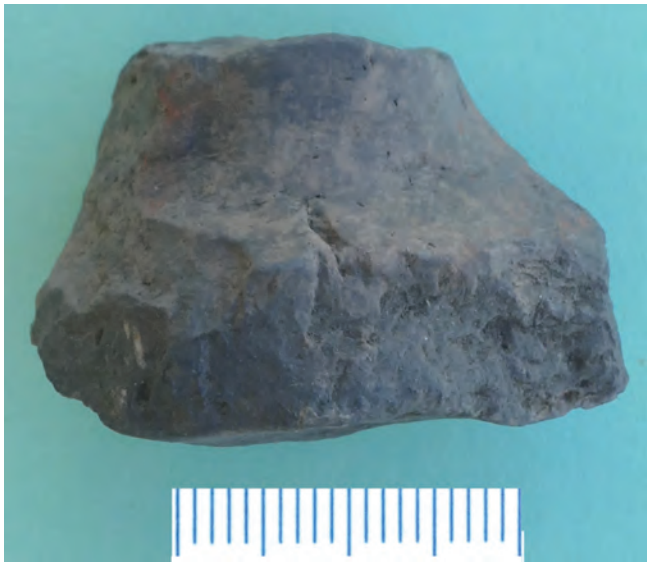

Fig. 16 Room CR5, Loc. CR5:35: Clay figurine fragment (F.no 101626), most probably the base of a human “stick-shaped” figurine as known from es-Sifiyeh. (Photo: H.G.K. Gebel)

Fig. 17 Room CR5, Loc. CR5:42: Token-like sandstone and quartz items (F.no 101811): two flat cylindrical ones of sandstone; one cone-shaped of sandstone, broken at tip and bottom; one cone-shaped of quartz, broken at tip). (Photo: H.G.K. Gebel)

Fig. 18 Room CR5, Loc. CR5:42: Selection from a well-preserved assemblage of charred peas (F.no 107417; identification by R. Neef). (Photo: H.G.K. Gebel)

eastern steppes are evident (dagger raw materials, including the daggers' manufacture?; ostrich egg shells; faunal remains).

The findings in Room CR5 have to await further excavation to reach a better chronological and functional understanding. As of yet, the aforementioned post-LPPNB arrowhead made from an exotic material, the trilith's ritual and geographic implications, and the overall puzzling findings of CR5's layers make it difficult to assess the nature of these fills: Are we dealing with later ritual impact, secondarily transforming a LPPNB household?

Excavation of Room CR22.2, and More From a Buried Household (L.M.)

Rooms CR22.1 and CR22.2 form one structural unit, separated by the Wall Loc. C11:98. They are part of the Building CV, separated from adjacent large Room CR17 by Walls Loci C11:4 and C11:11.

The layers of these rooms were previously interpreted as intentionally buried inventories of a terminated household (Gebel *et al.* 2017). During the 2018 season, excavations continued in Room CR 22.2 exposing four different layers (Loci C11:40-43) and are described in the following from top to bottom: an ashy black-grey sandy sediment (Loc. C11:40 in the central part of the room); an ashy sandy deposit with a high content of small round stones (approximately 5%) (Loc. C11:41); a layer of compact plaster material, partly crumbly (southern and southwestern part of the room); yellowish, greyish to reddish-brown in colour and containing small bits of charcoal, big well-dressed stones (presumably from a collapsed wall), as well as round and angular stones of various sizes (Loc. C11:42); and an ashy silty deposit of orange to greyish colour (Loc. C11:43). (Fig. 19)

The finds retrieved during the 2018 season resemble those of 2016, representing traces of household activities and household production items. Loci C11:40 and C11:41 provided high amounts of fragmented, mostly burnt bones, fragments of finished sandstone rings, lithic debitage and two cores, grinding stone fragments as well as fragments of worked bone implements. In addition, chunks of red pigment, a stone bead and pieces of shells were found in Loc. C11:41.

Loc.C11:42, first recognized only adjacent to the room's walls, turned out to cover the entire room and contained many fragmented animal bones. Flint debitage and tools (*e.g.* the fragment of a projectile point and a drill), fragments of sandstone rings representing all production stages (among which is a small coin-shaped sandstone disc; Fig. 20), ostrich eggshell fragments and a complete bone awl and worked bone fragments were all found embedded into the compact plaster material. A complete whetstone, a fragmented and a complete small handstone were also part of the assemblage. Under the layer of stones, four concentrations of low-fired grit-tempered sherds showed up (*cf.* below: More on

Fig. 19 Room CR22.2, Loc. CR 11:42-43: Layer of compact plaster material, charcoal, big well-dressed stones presumably from a collapsed wall (Loc. 42); ashy silty deposit of orange to greyish colour (Loc. 43). (Photo: M.Benz)

Fig. 20 Room CR22.2, Loc. CR 11:42: Unusual coin-shaped sandstone disc (F.no 101210). (Photo: H.G.K. Gebel)

Plastic Vessels). In the south and southwestern room parts (Loc. C11:42) a stone slab was found. A larger part of an animal, interpreted as an intentional deposition, appeared immediately underneath the slab. Loc. C11:43 yielded many small pieces of charcoal, significant amounts of large fragmented burned and unburned bones, larger flint debitage, sandstone ring fragments in various stages of production, and fragments of worked bones.

Excavations in Area D (H.G.K.G., C.P.)

Rooms DR25/26.1

Excavations in Room DR25/26.1 showed that the space – formerly considered to be a large courtyard – was confined and segmented (Fig. 3). It comprised several small rooms and narrow corridors of a multi-level architecture. It also became obvious that high-energy impacts must have totally deformed the layout of this space. Walls were strongly tilted, deformed and displaced, often showing cracks running through several stone layers (Fig. 21). It is clear now that Wall Loci D22:17 (DR26:107), D22:19 and DR26:111 do not represent an earlier phase but are simply the lower *in situ* part of the heavily tilted Walls Loci D22:4, D22:5, and D21:5; they were displaced by 50 to 80 cm towards the south. The character of these deformations may point to typical earthquake damage which have also been observed in Areas B-South and C (Gebel and Kinzel 2007; Gebel 2009; Kinzel 2013). However, a systematic analysis and damage record is needed to exclude other scenarios. (although the room fill stratigraphy supports an earthquake thesis). The room fill of DR26.1 is marked by thick layers of wall collapse (wall debris, mortar/wall plaster) with embedded parts of collapsed, but still bonded wall fragments and patches or lenses of upper plaster floors/ceiling material which are distributed throughout the lower fill stratigraphy (*i.e.* Loci DR26:103, DR26:105, DR26:106, DR26:112). This collapse contains deposits of finds of different types. Most prominent are the remains of a deposited celt/adze workshop (*i.e.* a dozen unfinished celt/adzes of all production stages and high numbers of the typical thinning flakes; Fig. 22), found associated with numerous ground stone tools (n<20). Together with the remains of a sandstone ring workshop, these findings refer to domestic production. Other finds include a human molar, several shell beads, and dozens of small red pigment balls (Fig. 23). These finds partly may belong to a disturbed ritual environment, probably linked to the collective burial in Room DR26.2 (DR26:26; *cf.* Gebel and Hermansen 2001).

Fig. 21 Room DR25, Wall Loci D22:4 and D22:19: High-energy wall damage. (Photo: M. Benz)

Fig. 22 Room DR26, Loc. DR26:112: Remains of a redeposited celt workshop with hammerstones (F.no 102059; debitage not depicted). (Photo: H.G.K. Gebel)

Rooms DR19, DR22 and DR30

In the southern Rooms DR19, DR22, and DR30, the main and lower room fills were excavated. These room fills mainly comprised collapsed wall and roof material with poor evidence of later artefact or dump disposals. There was a concentration of sandstone ring production waste in association with a reamer-like pestle in DR19 (F.no 106067.2) which was either dumped here or entered the room fill while the roof was collapsing. A concentration of 8 ground stone tools (2 complete handstones, 6 fragments) were found in the upper main

Fig. 23 Room DR26, Loc. DR26:106: Selection of complete small red pigment balls (F.no 107918), most probably re-deposited from a ritual/ burial context (collective burial of 2001 in DR26.2). (Photo: H.G.K. Gebel)

fill of DR22 and may have been once stored on the roof. Floor levels were reached in DR22 and DR30, both representing compact mud floors. While in Room DR22, the Floor Loc. D32:50 was devoid of artefacts, Floor Loc. D32:42 in Room DR30 carried some artefact concentrations (animal bones, a handstone, a hammerstone) as well as installations. The latter comprised a small stone platform (D32:45) and opposite to it, a large grinding slab installation (D32:43) which had obviously been transformed into a second stone platform (D32:43a) at a later point in time. As a general feature, wall projections were found slightly above the level of the latest floor. Such projections have been noted in DR19 (Loci DR19:103 and DR19:104), DR22 (D32:51), and DR30 (D32:46-48). They may also indicate the presence of an earlier building level or are the relicts of beam supports of a multi-storied building, as similar situations can be created by modifying upper rooms into lower rooms (Kinzel 2013; *cf.* also Gebel 2006a; Gebel *et al.* 2006; Gebel and Kinzel 2007).

Ground Stones of the Season (B.H.)

Analysing the ground stone assemblage from Ba`ja is an integral part of the Household and Death - Project. The only previous analyses of the Ba`ja ground stone assemblages were 1) the surface finds studied by Karen Wright (Gebel *et al.* 1997: 247-249) and 2) a selection of handstones (*manos*) by Philipp Rassmann (2008).

There are ten seasons of ground stone materials to be identified and analysed. In 2018, the incoming ground stone finds were assessed and at the same time the evaluation of the stored assemblage also started. With only a small percentage of the overall stored ground stone assemblage analysed, we will highlight here the 2018 ground stone finds only (Table 4). In a second step, the assemblages' contextual significance within the site and within the entire PPNB period will become subject of a later study.

Tool Type	Quantity	Percentage of 2018 Ground Stone Assemblage (n=176)
Handstones (*mano*)	140	79%
Grinding slabs	12	7%
Rubbers	11	6%
Mortars	3	2%
Weights	1	1%
Miscellaneous/ unknown	9	5%
Total	176	100%

Table 4 Frequencies of ground stone tool types of the 2018 season.

The primary raw material of the heavily used ground stone items consists of local sandstone varieties. From the 2018 field season a total of 176 ground stone tools were unearthed and recorded.

The majority of ground stone tools from the 2018 assemblage are handstones, the upper moving grinding tool used in conjunction with a slab or mortar. Of the identifiable handstones, 62 are complete, 65 are fragments, and 3 are incomplete. The most common form of handstones from the 2018 assemblage has two working surfaces, a biconvex cross section, and were also utilized laterally. Additionally, handstones with subrectangular plans and cross sections are present in the assemblage.

Slabs, the stationary lower grinding implement, are larger and oblong with at least one flat or concave working surface. All of the slabs from this season are standard utilitarian slabs with the exception of one large slab that was used more likely as a basin. Mortars are also stationery lower grinding implements with the differentiation of having a deep indent as the working surface. The limited number of mortars recovered in 2018 indicates that slabs were more widely used than lower grinders.

The weights from the 2018 season are "pyramid" shaped with a biconically drilled perforation close to the flat-topped narrow end.

Searching for Household Use-Wear on Chipped Stones (D.Š.)

With the intention of reconstructing household and other activities by wear traces on chipped stone tools (potential traces of transportation/storage, hunting/defense and ritual activities), more than 800 tool samples from 9 different supposed domestic contexts, one grave (Loc. C10:408) and one blade depot from a household (B74:2) were selected during the 12th season at Ba`ja. Apart from the Neolithic chipped stone tools, local flint raw material groups were gathered in the region to support our holistic approach to chipped stone tools. It

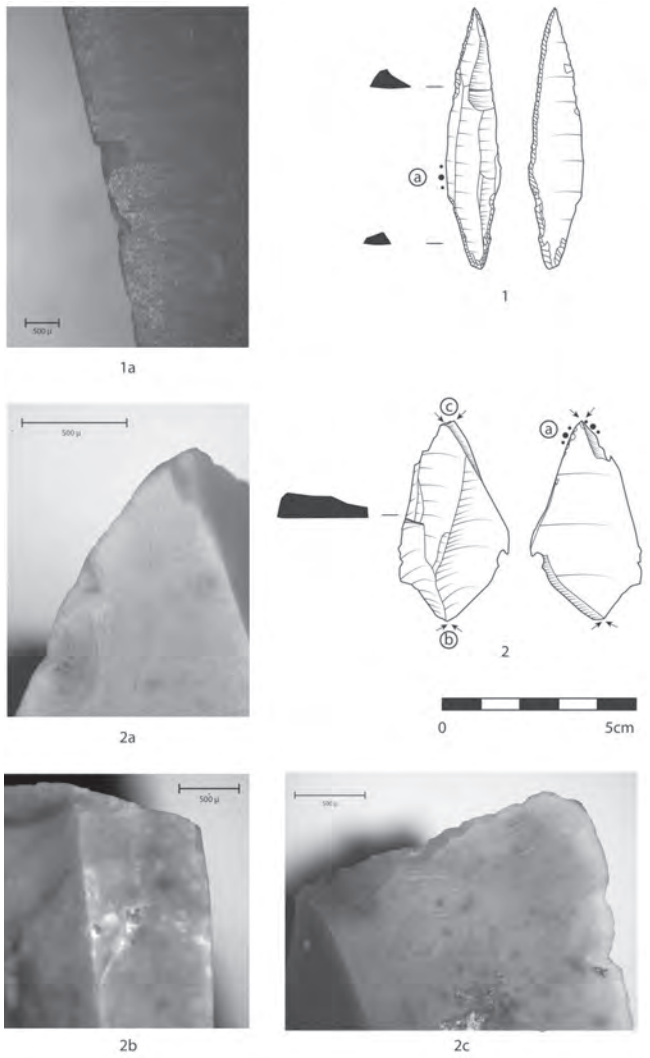

Fig. 24 Examples of common use-wear traces.
1 Sample Use-wear ID 441 (from F.no 52014; B22:18): Complete Byblos projectile point made of Flint Raw Material Group 2, using a bidirectional blank. Piece does not exhibit any use-wear traces related to intended projectile shape/ function; left dorsal edge: unretouched. 1a exhibits extensive damage (feathered irregular scaring accompanied by polish) which results from medium hard material such as wood. Since this damage is occurring only on one unretouched part, it is possible to relate it to either a previous use of the blank, or the wear of a longer transport. – 2a-c Sample Use-wear ID 413 (from F.no 22415; B12:27): Double dihedral burin made on a large blade-flake. Top working edge with several re-sharpening acts and extensive damage by large step fractures and rounding, possibly resulting from an engraving motion which also developed polish. This pattern is also visible on the basal part of the tool in 2c. (Photos/drawings: D. Štefanisko)

includes and combines replicative, techno-typological, raw material and use-wear and trace analysis with contextual analysis.

Numerous use-wear studies (*e.g.* Andrefsky 1997: 136; Stemp *et al.* 2015: 2; Van Gijn 1990: 144) have proven the chance to extract (real) functional information beyond the – often misleading – typo-, respectively morphological classification of tools. So far, only a small portion of Ba`ja's chipped stone tools collection had been analysed, using low-powered microscopy in order to screen assemblages for promising samples to carry out high-powered microscopy. The latter especially aims to record use-wear traces variability which is needed for a testable replication within the subsequent experimental program.

Although only a small number of samples has been analysed so far, a wide range of actually and possibly used areas has been identified already (Fig. 24). These traces represent results of expected activities such as bone engraving, projectile point utilization and extensive transport, wood processing, cereal and soft plant processing, ornament production, hide and meat processing, and other activities. Stone tools and their biographies are direct results of these activities and behaviours in the socio-economic system at Ba`ja. The everyday life of a household and its spaces/rooms is recorded in these stone tool biographies, yielding a notion on the variety or homogeneity with which we can distinguish or connect certain activity groups. Furthermore, such results have the potential to bring additional and substantiated insights into LPPNB craft specialization, labour division, commodification and the underlying social, economic and cognitive territories.

More on Vessels Made on Plastic Materials (L.M.)

More evidence on Ba`ja's baked "clay" industry (Gebel and Bienert 1997: 251; Gebel *et al.* 2017: 28-30) was uncovered during this season. Evidence again came from Area C, Rooms CR5 and CR22.2.

Room CR5 yielded a concentration of large body of chaff – (herbivore dung?) tempered sherds (101606.1-11) designated as Loc. CR5:36, embedded in Loc. CR5:38 (a plaster-mortar layer) (Fig. 25). In the middle of CR5 (Loc. CR5:35: thick ash deposit), single pieces of chaffed (un)baked clay sherds were found. Two pieces (F.nos 101612, 101615) had the shape of a rim or bottom (min. thickness: 24-28 mm), possibly belonging to a *tabūn*, a vessel or a container-like installation. On some fragments, the finger lines and brushing traces or traces of wet smoothing on both surfaces (*i.e.* remains of the manufacturing process) can be seen. All the pieces were heavily chaff-tempered, also showing angular limestone inclusions of some 2-20 mm. The "sherds" varied in colour from very light (pale yellow, reddish grey or light grey) to reddish brown, dark grey, pointing to an inconsistent exposure to fire and temperature. The thickness of the sherds varied (18-50 mm), and some of them showed black reduction cores.

In Room CR22.2, exclusively in Loc. C11:42 (a plaster-like deposit under a layer of stones), fragments of low-fired grit-tempered sherds (F.no 101601) appeared. They were made of the same material as the rim sherd found in the Room CR22.2 during the 2016 season (Gebel *et al.* 2017: 29-30). They were very fragmentary and survived only as slightly curved body parts with thickness of 6-12 mm. In the northeastern part of the room, two more clusters of these grit-tem-

Fig. 25 CR5, Loc. CR5:36 in Loc. CR5:38: Rim from a concentration of chaff - (herbivore dung?) tempered sherds (F.no 101606). (Photo: H.G.K. Gebel)

Fig. 26 CR22.2, Loc. C11:42: Grit-tempered sherds (F.no 101617). (Photo: H.G.K. Gebel)

pered sherds (F.nos 101605, 101617; Fig. 26) were unearthed; in the south and the southwestern parts of Loc. C11:42, another concentration (F.no 101620) appeared.

The manufacture process and the material's analysis of Ba`ja's baked/unbaked plastic vessel industry, or thermoplastic wares, are subject of an ongoing archaeometric analysis.

Body Ornaments 1997-2018 (H.A.)

The 2018' study season was dedicated to the preliminary examination of all the items from all Ba`ja seasons presumably attributable to body ornamentation. Except for the sandstone rings considered as "commodity coupons" (Gebel 2010), beads, pendants, shell rings, unfinished objects, raw minerals and unmodified shells generally used for ornaments (Bar-Yosef Mayer 1997; Abu Laban 2014; Alarashi 2014) were registered in a database. The assemblage (Table 5) consists of objects discovered in different contexts, including those of Burial Loc. C10:408 excavated in 2016 (Gebel *et al.* 2017). The child necklace (Loc. C1:46 in Room CR36.1) discovered in 2018 is presented elsewhere in this contribution.

Form	Material	Stage	Areas A	B	C	D	?	Total
Anatomic	Bone	Finished		1				1
	Shell	Finished		18	26	24	2	70
		Unfinished			1	1		2
		Unpierced		1	9	5	2	17
		?		1		2		3
Geometric	Shell	Finished		22	17	23	4	66
		unfinished?		1		1		2
		?		2	1			3
	Coral	Finished			1			1
	Stone	Finished	1	6	10	4	1	22
		Preform					1	1
		Recycled			1			1
		Unfinished			1	1		2
		unfinished?			1			1
		raw material			3	1		4
Singular	Shell	Finished		2				2
	Marl	Finished			2	1		3
Irregular	Ostrich shell	raw material			1			1
	Stone	Unfinished			1			1

Table 5 Assemblage of the studied ornament objects discovered at Ba`ja between 1997 and 2018.

The objectives of the study season were: the assessment of the preservation of state of the items, the documentation of the form, material and type diversity of the beads and the identification of bead-making activities at the settlement.

The good state of preservation of the surfaces (Fig. 27) allows microscopic analyses and a reliable taxonomical identification for those shells with their natural pattern preserverd (Fig. 27d, i). Items made of mother-of-pearl are quite fragile and in several cases the nacre is disaggregating in layers (Fig. 27q).

The elements of ornaments at Ba`ja are made of biogenic (shell, coral, bone) or mineral-based materials (rocks, minerals, clay). Shells are the most common (Fig. 28).

Although precise determinations of materials are ongoing, several aspects can already be mentioned. First, the shell species are remarkably divers. They belong to three mollusc classes, more than ten families, and several genera for some families (*e.g.* cowrie shells). Second, the shells predominantly originate from the Red Sea. Third, beside silificed limestones of various shades of red, which dominate in the newly discovered child grave (*cf.* above), green-coloured and exotic stones were favoured.

The objects were classified at the level of their forms: anatomic, geometric or singular (Alarashi 2014). The typological identification will be made through comparisons with objects from contemporaneous neighbouring sites (*e.g.* Basta). Yet, the typological diversity is obvious and represented by the typo-functional families of "beads" (Fig. 27s-w), "pendants" (Fig. 27m), "rings" (Fig.27n,o) and "lip plugs" (Fig.27r). The presence of two or more perforations of certain beads and rings suggests their use as "spacers"

Fig. 27 Ornaments from Ba`ja Seasons 1997*ff*: Shell (a-j, s, t), mother-of-pearl (k-q), marl (r), stone (u-z). Anatomic forms (a-g, i, j), geometric (h, l-p, s-w, y, z) and singular (q, r). (Photo: H. Alarashi)

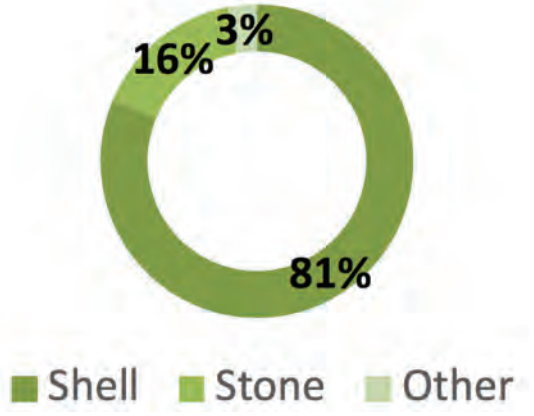

Fig. 28 General percentages of materials used for ornaments at Ba`ja. (Graph: H. Alarashi)

or buckles (Fig. 27i, l, p, y) within complex ornaments (*i.e.* several rows or strings).

Intensively excavated areas of the settlement have revealed relatively similar proportions of objects (Table 5) both finished and unfinished (Fig. 27i,w,y). Unpierced shells (Fig. 27g), large fragments of mother-of-pearl (Fig. 27k) and raw carnelian (Fig. 27x), malachite, and native copper are also regularly found. These elements attest bead-making activities at the settlement, ranging from simple piercing (shells) to an elaborate complex *chaîne opératoire* (mother-of pearl rings, some stone beads). The technological study will give clues regarding the quality of the production and the technological investments required. The detailed analysis of the contexts through in-depth comparisons between the buildings is also expected to identify differences/similarities in terms of types and accessibility/ acquirement of certain materials.

Worked Bone Industry (B.A.)

51 bone artefacts were found in the 2018 season, representing 4 categories. The assemblage includes the material retrieved from the "bones general" bags arriving from the dig; all specimens underwent archaeozoological analysis. The recording followed a parameters' list, and classification is based on the knowledge on Ba`ja's worked bones obtained from the 2016 season (Abuhelaleh in Gebel *et al.* 2017). Manufacturing and use-wear were documented by stereomicroscopy.

The four categories or classes into which items fall are: 1. Pointed objects including awls, needles, pins, perforation points, and flat pointed tools. 2. Spatulas. 3. Ornaments, and 4. other objects including manufacturing waste (Fig. 29).

Pointed objects show particular shapes and sizes. We included the pins in this category since the six respective pieces have long and thick cylindrical shafts similar to needles' dimensions. Of the 6 flat pointed objects, some have sharp pointed and some have arched ends (Fig. 30). The 6 needle fragments show section diameters between 3-6 mm. A special case is an extremely thin (1.4 mm) needle with a tiny eyelet and preserved length of 5.5 cm (F.no 105009) . This extraordinary piece will receive a special publication. Awls are most numerous, represented by 22 fragments of various portions of the tools, testifying also a wide range of dimensions and shapes in this tool class, some shorter than 50 mm in their latest stage (some objects show the re-sharpening of points). Two medium-size burnt awls have been used most intensively: They have a highly smoothed inclination in the medial part of the shaft, representing the use-wear impact of the hand. One most likely was used by a left-handed person, judging from the direction and location of smoothed area (Fig. 30:E, F.no 105025).

The 5 incomplete spatulas were made from large-size animals (Fig. 31). One of the spatulas is highly smoothed, has a thickness of less than 4 mm, and may have been used for highly delicate work; one spatula's end is pointed in a triangle's shape, which is quite uncommon for the site (Fig. 31.C).

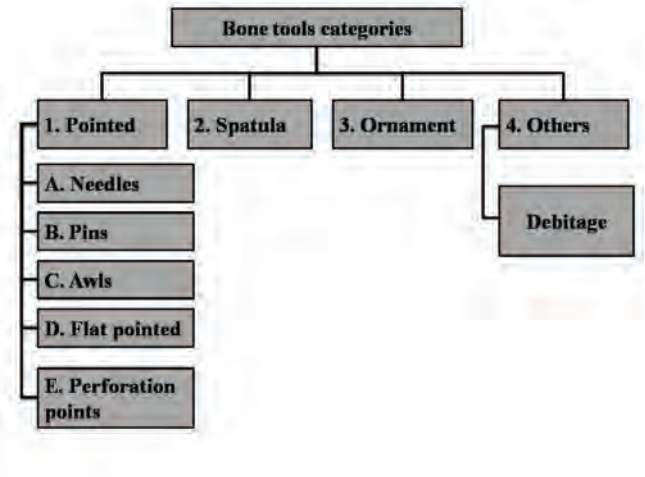

Fig. 29 Suggested worked bone categories of Ba`ja. (Graph: B. Abuhelaleh)

Fig. 30 Pointed bone tools. A pin F.no. 105000, B pin F.no. 105006. C needle F.no 105015, D small awl F.no 105010, E large awl F.no 105025. (Photos: B. Abuhelaleh)

The ornament category is represented by a bone ring fragment (surface not smoothed; lateral parts smoothed).

The 5 debitage items stem from O/C metatarsals and other fragments; some of this debitage is burned with resulting in dark brown to black colours. The debitage specimens will be subject to a later study when a statistically sufficient amount of material is available.

The small and unique tibia shaft (F.no 102028, 125 mm in length) still hafting a small bone (!) blade with sawing marks will be also subject of a separate publication of special bone tools from LPPNB Ba`ja.

The use-wear of Ba`ja's worked bone industry reflects quite diversified craft activities. Not only weaving, needle and leather working is attested: We have

Fig. 31 Bone spatulas. A F.no 105009, B F.no 105017, C F.no 105027, D F.no 105019. (Photos: B. Abuhelaleh)

now indications for more intricate work which up to now has been not identified for a Neolithic community.

Initial Phytolith Sampling (A.K.)

Phytolith analyses provide a way to understand better the usage of ground stones. Apart of stylistic or typological classification, the phytolith sampling can provide a deeper knowledge about which materials were grinded, helping to identify the exact use(s). In a first step, individual stones were to be sampled to define their usage. In a further step, the analysis of complete inventories can reveal, for example, if certain households were somehow specialized within the village.

To approach these questions, 130 samples from ground stones, especially grinding tools and stone vessels, were taken in the 2018 season in an initial step. The majority of the samples were taken infield during excavation: While the stone tool was still *in situ* soil samples were taken from above and – after removal – directly beneath the artefact. To eliminate/minimize the possibility of contamination, control samples were taken from the nearby surroundings to check if the sampled material attached to the stones is part of the fill or represents remains of use.

During further work, artefacts recovered in previous years were also sampled. For this, surfaces were washed with distilled water which were then collected and dried, resulting in the remains being attached to the ground stone.

Ba`ja's Neolithic Water Supplies. A Short Archaeo-hydrological Reconnaissance (K.W., M.S.)

During June 2018, a short reconnaissance of Ba`ja's hydrological setting took place. Previous considerations regarding Ba`ja's water sources were published by Gebel (2004). So far, no hydraulic installations were encountered with the Early Neolithic occupation on the intra montane basin/terrace, or the gorges below. Therefore, our hydrological reconnaissance was aimed at a more detailed understanding of the potentials of the inhabitants' possible water management and daily water supply, and to evaluate related archaeohydrological questions. As of yet, *siq al-Ba`ja* and the adjacent northern gorge are considered to be the water supply for the Neolithic site.

The site is located at *c.* 1150 m a.s.l. on the foothills of the outcropping fissured Ram-Sandstone formations which are principally a quite good aquifer (UN-ESCWA and BGR 2013). Due to topography, using groundwater directly on the intra montane terrace of the site can be ruled out. Theoretically, it seems possible to convey groundwater from springs in the upper catchment (Fig. 32) towards Ba`ja like the Nabateans of the region did.

Nevertheless, during the Early Holocene the yield of some springs in the upper catchment – when groundwater recharge was higher – may have contributed to *siq al-Ba`ja's* possible perennial or intermediate water flow. Depending on the springs' yield, it must have been either a continuous surface stream serving the settlement's water demand, or just an intermediate flow which is invisible in the *siq*'s gravels (*cf.* the suggestion in Gebel 2004). Today, the mean precipitation rate is 135 mm per year (Fick and Hijmans 2017). Considering climatic shifts since Early Holocene, we assume wetter conditions with higher precipitation for the time of the early Neolithic (Kouki 2006: 36), resulting in higher groundwater recharge rates.

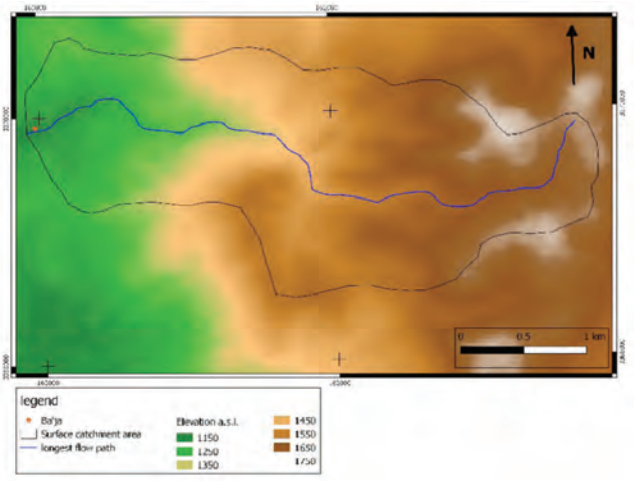

Fig. 32 Eastern surface drainage catchment of Wadi/*Siq al-Ba`ja*/ the Early Neolithic site of Ba`ja (elevations after SRTM 2004 – 2018/Consortium for Spatial Information, CGIAR-CSI). (Graph: K. Wellbrock, M. Strauss)

A detailed description of the narrow *siq al-Ba`ja* with widths as less as 1.60 m below the site and unknown gravel depths of several meters is provided by Gebel (2004: 28-29). The author suggests dams in the *siq* which have been maintained to retain surface runoff to create open reservoirs and/or to fill the gravel deposits, once an episodic or periodic flash flood occurred. In addition, we suggest considering the storage of water in the wadi sediments. Furthermore, the exploitation of perennial intermediate flow in the sediments' layers should be considered as a potential water supply.

Ba`ja's surface catchment area comprises about 6 km² according to remote sensing data (Jarvis *et al.* 2008). The highest peaks inside the catchment area are found at its eastern edges at elevations over 1700 m a.s.l. The longest flow path measures *c.* 5 km in horizontal and 550 m in vertical directions. Thus, the mean gradient of the catchment's surface is extremely steep, representing an average inclination of 11 %. The *siq*, or wadi gorge, next to the site has a moderate inclination of up to 3 %. At several spots, the *siq*'s sandstone bedrock also shows steps of up to 3-4 m in height while most parts of the *siq* are filled by gravels.

Hydrologically, the rain intensity[3] of a storm event having a return period of two years is about 9 mm/h (or: 25 l/s* ha) in present times. Considering the topography and an almost absent vegetation, a peak discharge[4] as high as 12.75 cbm/s should be considered every second year on a statistical base. In the narrow *siq*[5], this causes a runoff event having a flow depth of more than 2.5 m and a flow velocity of more than 3.3 m/s. The resulting shearing stress is then about 580 N/m² which allows for the easy transporting of stone blocks with a diameter of up to 1m. This indicates clearly that such events can change the sedimentary environments in the *siq* dramatically. Most likely, all sediment and gravel layers above the *siq´*s bedrock will be moving during such an event. Heavy flash floods can even cause a considerable change of the *siq*'s gravel and boulder topography making the access to the site in some years less or more difficult (observations by H.G.K. Gebel since 1984). Only when the flow rate reduces at the end of a flash flood, are sediments deposited. In this case, the pores between the sediments are saturated.

The surface runoff coefficient in the Early Holocene has to be expected lower than today's 0.85 due to the more semiarid conditions and more vegetation, especially in grass-covered areas/pastures of the catchment.

It is most likely – even obvious – that the *siq* has been crucial for daily water supply, despite its dangerous torrential flash floods. For a more sound understanding, further research has mainly to focus on 1) a hydrogeological survey of the upper catchment in order to identify former Early Holocene springs having contributed to an intermediate or even permanent surface flow in the *siq*; 2) excavations of *siq* fills to evaluate potential subsurface water storage; and 3) hydrologic-hydraulic modelling of storm events and related flash floods for the *siq*, considering changing surface-runoff conditions as a consequence of climate changes.

Household and Death. Socio-Neurobiological Potentials (J.B.)

The aim of our research stay at Ba`ja was to understand the site's potentials for socio-neurobiological research on its early Neolithic community, and to support the project's transdisciplinary Work Packages V.I (Cognition and Ethos at Ba`ja), V.2 (Identities of Active and Transformed Households) and V.3 (Identities of the Dead). By translating our theses and the results of previous socio-neurobiological, evolutionary and cognitive sciences research (Bauer 2008, 2011) into hypotheses applicable to findings reflecting the ethology and ontology of the Ba`ja community, we aim to reconstruct the levels of corporate behaviour as well as stress and conflict management in the Neolithic village. Since the unexpected frequency of intramural burials demands special attention in this framework, the inhabitants' thanatological dispositions have to become an important part of the novel transdisciplinary enterprise (Bauer and Benz 2013). Basically, our season's stay confirmed a clear potential of the site's discoveries for a research on socio-neurobiological and cognitive dispositions while it also showed how much this depends on archaeological interpretation (*e.g.* the commodification and territoriality models in use, or concepts like cultural memory, habitus society, transformation of household items, *etc*.).

From a social neurobiology perspective, the following major questions arose by personally experiencing the site's habitat and seeing the finds and findings:

1) Which motivations and dispositions are behind the choice of, and living at, the dramatic and secluded location during the beginning of sedentary lifeways?

2) What type of flat – or incipiently stratifying – social hierarchy dominated village life at Ba`ja, and were determinants of the socio-neurobiological frameworks?

3) Which evidences do we have for the corporateness and corporate identities (*sensu* Benz 2017; Gebel 2017) of Ba`ja's inhabitants, also explaining how they understood themselves?

4) How did the formation of identities process and manipulate the dead and death?

Motivations and dispositions: Excavation results illustrate that the community was living under spatially highly agglomerated conditions while crafts and commodities indicate accelerating diversifications. It cannot be excluded that self-protective behaviour was behind the choice of the remote location, protecting both fragile outside relations as well as wealth and tangibles of the settlement.

Social hierarchy: Since direct archaeological evidence for hierarchies is a difficult matter to trace, consequently the cognitive and socio-neurobiological foundations for hierarchies are difficult to state. However, the clearly different social statuses as well as ritual and symbolic treatments attested with the intramural burials and their removal are highly significant for hierarchical patterns and social differentiation. Their socio-neurobiological potentials appear quite promising, maybe even giving the chance for statements on childhood statuses (larger number of Infans I-II burials). Advanced crafts attesting structured labour may not be a signal for hierarchical structures: It might well have encouraged more corporateness and flat hierarchies in these sectors.

Corporate Identities: Seemingly, hard or direct evidence attesting corporate identities is missing at Ba`ja. The material inventory appears more of a conventional character than attesting corporateness. However, insights let us expect more the rule of implicit corporate identities following the understanding „we know who we are", not expressing this by tangibles. If that is correct, we should assume generally flat hierarchical structures at Ba`ja which already allow the expression of „elite" statuses like Burial Loc. C10:408 in Room CR35 (Gebel *et al*. 2017).

Sepulchral Identities: Ba`ja inhabitants' obvious thanatological dispositions appear to carry significant neurobiological and socio-neurobiological information. While research at Ba`ja has exposed the need to enter this field only now, and almost no prehistoric research is traceable for this yet, our project has begun – as a consequence of this season – to prepare the foundations for this research.

Room Biographies. Revision of Approaches to Ba`ja's Stratigraphies (C.P., M.B., H.G.K.G.)

Excavating Area C's lowermost occupations with its intramural burial ground, and by having full access to the walls' building, re-building, dismantling, and repair events, in this season, it became definitely clear that our current concepts of building phases at Ba`ja do not meet the complex reality of the site's "ever-vegetative" architecture and space use. For instance, neighbouring rooms offer contradicting information on related building sequences, or the two faces of one and the same wall show different contexts to very different building events. However, our new concepts do not affect the understanding of the general architectural sequence, or main building phases (*sensu* Gebel *et al.* 2006a; Kinzel 2013). For the understanding of general architectural stratigraphy, the supra-empirical approach by modelling of the general phases still appears as a reliable approach, at least area-wise. Especially, Ba`ja seems to offer good chances to separate such main phases through identifying cross-room rebuilding after an earthquake (Gebel and Kinzel 2007): Gaining insights into Ba`ja's building caesuras following at least one such high-energy event at Ba`ja is planned for the 2019 spring season.

Event	Activities
Event series 1	Initial Occupation
1-1a	*Preparation of building ground, probably clearance of surface and extraction of natural sediments construction material (mortar)*
1-1b	Construction of Walls C1:56, C11:32=C1:16, C10:411, and probably C10:68.
1-1c	Probably contemporary to 1-1b: Construction of Wall C10:117 which separates a 10m² space (4.4 by 2.25 m, includes space of Rooms CR34, CR35, and CR35.1)
1-1d	*Construction and organisation of floor or surface*
1-2	*Habitational events and daily use of space incl. maintenance*
1-3	Unknown event (probably resulting in damaging and/ or partial collapse of Wall C10:411)
Event series 2	Restoration and compartmentalization of space into three Rooms CR34, CR35, and CR35.1 (in the following only events of Room CR35 are considered; the exact position of events marked with * within Phase 2 is unclear)
2-1a	Partial dismantling of Wall C10:411
2-1b	*Clearance of space (including removal of depositions and surfaces of Phase 1) and probably also extraction of natural sediments as construction material*
2-1c	Reorganisation and compartmentalization of space into Rooms CR34, CR35, and CR35.1 by constructing Walls C10:78 and C11:34
2-1d*	Construction of Upper Storey Wall C10:76
2-1e	Construction of Floor C10:86=146=403
2-1f	Roofing of Room CR35 (and CR35.1)
2-2a	*Habitation and use (no evidence preserved)*
2-2b*	Construction of step-like feature (C10:124) to facilitate access to Room CR35.1
2-2c	*Cleaning of floor surface*
Event series 3	Reuse of room as collective burial ground (the exact sequence of events marked with * within Phase 3 is unclear)
3-1*	Constructing elite Burial C10:408, digging a pit through floor into natural sediments, constructing a stone cist and covering the cist by stone slabs and a coat of plaster (for a more detailed event sequence see Benz *et al.* 2019, Tab. 2)
3-2*	Inserting double Burial C10:405, digging a pit through floor into natural sediments, covering the pit by a stone slab (for more details see Gebel *et al.* 2017).
3-3*	Multiple burial C10:152, digging a pit through floor into natural sediments, covering the pit by a stone slab and placing a used grinder (F.no 47825), with traces of red liquids on top (for more details see Gebel *et al.* 2006a).
3-4*	Blocking of wall opening to CR34 (C10:78A), placing of an anthropomorphic clay figurine on or over the threshold
3-5	Continuing decay of roof and infiltration of very fine sediments in the NW room part of Room CR35 and in Burial C10:408 (equal to 2a-1k?)
3-6	Deposition of wall collapse, mortar/ plaster, roof material which filled the lower room up to 1.00 m; probably related to seismic high energy event/ earthquake
Event series 4	Restoration of settlement and reorganisation of space (the exact sequence of events marked with * within Phase 4 is unclear)
4-1a	*Clearance of damages; clearance of wall tops of phase 1-2 walls; recycling of wall stones from collapsed/ damages walls*
4-1b*	(Re)construction of Walls C11:3 and C11:16 (probably on top of wall remains of Phase 2 occupation)
4-1c*	Restoration of partly collapsed/ dismantled Wall C10:68.
4-1d*	Construction of the foundation of "monumental" Buttresses C10:64 and C11:14 on cleared tops of phase 1/2 walls (*i.e.* C10:78, C10:117; C11:34) and if not possible on (unconsolidated) collapse (*i.e.* C10:79=118 in CR34).
4-1e*	Deliberate massive backfills (c.1.80 m) of unrecycled building materials from collapse building to prepare the building ground and to adjust differences in levels
4-1f*	Completing western part of "buttress building" by construction of Walls C10:5=6=C10:114
4-1g	*Roofing of space?*
4-2a	Habitation and use of "buttress building" which includes the formation of temporary Floor C10:25a
4-2b*	Construction and use of Installation C10:19=C10:100
4-2c*	Digging of Pit C10:126
4-2d*	Use of Grinding Installation C1:7
4-3	Abandonment of building and beginning decay
4-4	Damages in walls and buttresses due to a seismic high energy event; vertical cracks in Buttress C11:14, heavy southernly inclination of Buttresses C11:14, C1:3 and Wall C1:17; probably collapse of roof and upper parts of walls and buttresses (*e.g.* C10:62)
Event series 5	Post occupation and site formation (events not included here)

Table 6 Reconstructed event sequence of Room CR35. Events and activities in *italics* have not been preserved in the archaeological record.

For the „ever-vegetative" building and fill events of rooms or connected rooms, however, our approaches by this season came under basic revision: We started to test if the densely agglomerated and terraced LPPNB building stratigraphies can be understood better and more realistically by an integrative and room-wise reconstruction of sequential wall building and fill events. Only in a second step, if possible at all, these room biographies should be merged into a more coherent picture for neighbouring rooms until – idealistically – a base is reached to identify a housing unit within the overall complexity of the building-and-fill stratigraphy. This room biographical approach would also serve to better integrate the understanding of building and depositional events (*i.e.* integrating the building and archaeological stratigraphies in a more detailed manner), thus helping an ontological understanding of sequential space use including the erosive processes involved. This approach can also be applied for a more honest treatment of vaguely identified or impossible attributions of wall and other spatial events in stratigraphical discussions.

As an example, we present in the following a summary on the reconstructed room biography of Room CR35 which demonstrates the aforementioned hypercomplexity of horizontal and vertical constructions, modifications and depositions (Table 6, Figs. 33-34).

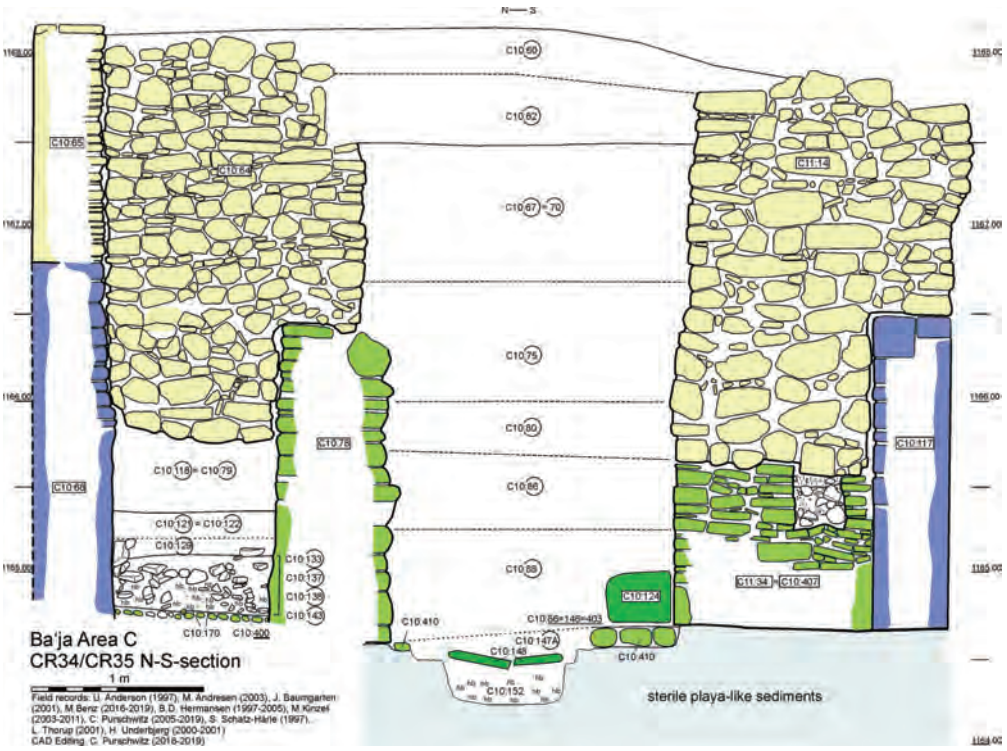

Fig. 33 Reconstructed room fill section of Rooms CR34 and CR35 (for general legend see Gebel 2006b: Fig. 1; hb refers to human bones). (Graph: C. Purschwitz)

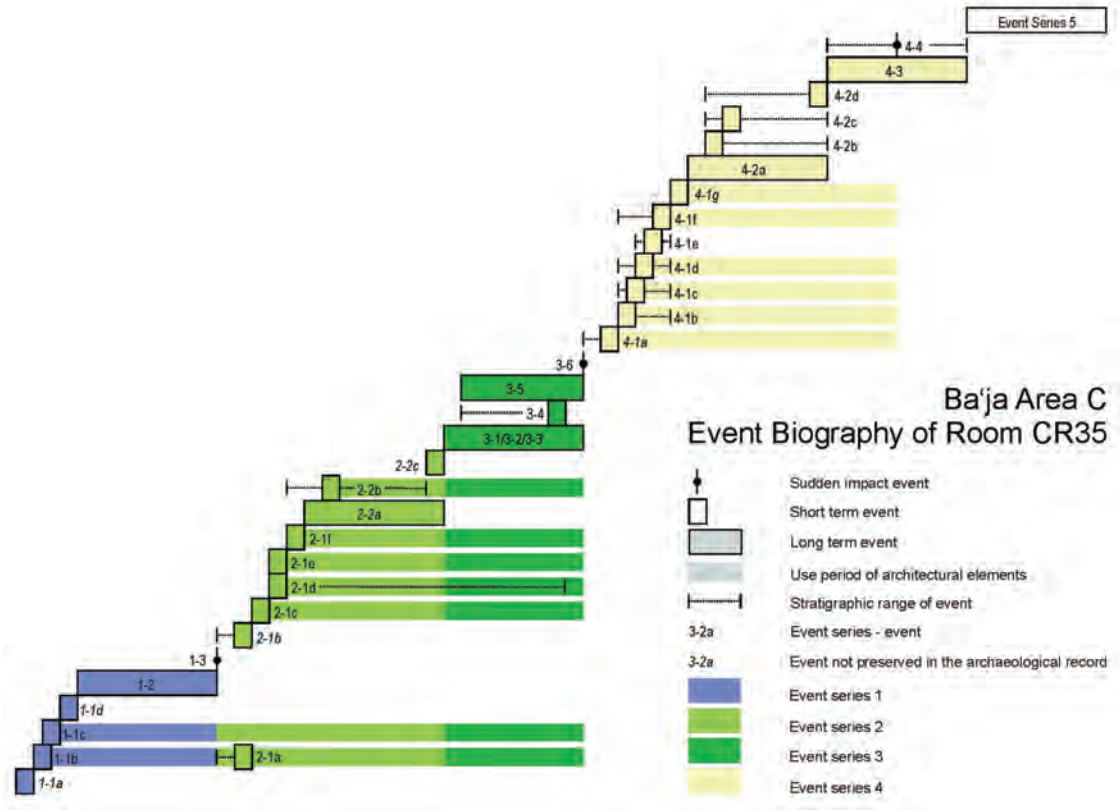

Fig. 34 Gant chart of event sequence interpretation (*i.e.* events' biography) of Table 6. (Graph: C. Purschwitz)

Needless to say, our biographic reconstruction of Room CR35 is not final. There are much more aspects to be considered (such as the biographies of other rooms and objects found therein). It aims not only to document and illustrate our ongoing discussion, but also to present the formation of research concepts and ideas for investigating, understanding and explaining the remains of the complex stratigraphy and "ever-vegetative" architecture as is typical for southern Levantine Mega-sites such as Ba`ja (for more details we refer to Purschwitz *et al.* forthcoming).

Season's Significant Results, Progressing Research (H.G.K.G., M.B., C.P.)

This season's discoveries advanced the research framework of the *Household and Death in Ba`ja* - Project considerably, but also created new questions and revealed gaps where more evidence is needed. Thanks to this recent research we are now closer to a deep-knowledge understanding of Ba`ja's and Jordan's late 8th millennium BCE. The new evidence confirms that. For the period in question, sedentary village life was characterised by acceleration, agglomeration and heterogeneity processes in architecture, crafts, social structures, value and cognitive systems. Being part of the Transjordanian LPPNB Mega-Site-Corridor, Ba`ja's lifeways were certainly embedded in, and depending to an unknown extent on the regional and supra-regional developments of settlement networks and hierarchies, including especially the socio-economic evolvements on the eastern steppe cultures (early pastoralism, productive kite economies, runoff water management, and other) and changing climate. These entanglements should be elaborated further and without which our most recent results remain premature.

Room Biography Approach

One of the most important results of the season is a fundamental re-framing of our previous understanding of houses in Ba`ja, both in terms of building stratigraphy and social structures. Our previous notion that the architecturally defined building units reflect social groups using room sets over longer periods by a continuous spatial re-structuring may not reflect the real social ontologies behind. Both the "ever-vegetative" horizontal and vertical alterations of room and floor networks by all sorts of construction, re-building, dismantling, repair, and depositional events – or: the interacting biographies of living, terminated and sepulchral spaces – deserve a more detailed, integrated, holistic, and room-/space-oriented consideration of all functional and stratigraphic features. In other words, the occupational data as represented by the layers' individual character and content have to be linked more cohesively with the respective wall phases. This need became more evident when the lowermost occupations with its intramural burial ground were excavated, and when full access to the walls' biographies above virgin soil was granted. Theoretically, the supposed earthquake(s) at Ba`ja and their building caesuras may help to identify contemporary layers and wall repairs which, otherwise, are very difficult to identify across rooms. The new approach (*cf.* the example in this contribution: Table 6, Figs. 33-34) considers reconstructing the biography of sequential wall phases and fill events room for room before such a room biography is linked with neighbouring ones in a second step. A third step would try to see if neighbouring rooms can be identified as jointly functioning domestic units at a given time. We should also thus keep in mind that our modern house concepts may possibly not apply to the housing concepts of habitus communities that we assume for Ba`ja (Gebel 2017).

Intramural Burial Ground and Burials C1:46 and CR17:117

The presence of an intramural burial ground in contact with the site's natural deposits was confirmed for Area C, yielding two more burials. 1) An elaborate and massive burial cist – inserted in Room CR36.1 – containing the burial of a *c.* 8-year-old girl (Loc. C1:46) endowed with a complex, presumably multi-string necklace of more than 2500 beads in the neck area. A large piece and some crumbles of red pigment were also found in the loose sandy and homogeneous grave fill. The grave's vertical side slabs were covered by 3 (!) layers of carefully placed stone slabs that were deliberately smashed prior to depositing, and one large complete oval stone plate. This child burial appears extraordinary for the Neolithic and contrasts much with the other children burials at Ba`ja (*e.g.* C10:405, *cf.* Gebel *et al.* 2017: Fig 10). Its preliminary and cautious understanding should consider intrinsic and ascribed characteristics of the girl as possible reasons for her special burial: on the one hand, a strong emotional relationship, ideological, social reasons or, on the other hand, pathological or outstanding cognitive capacities and skills of the child. The elaborate burial might also indicate an institutionalised status of children/girls.

2) The other inhumation (Loc. CR17:117) represents a hitherto incompletely excavated, less formal depositing of human bones. A headless sub-adult skeleton (lower mandible attested) seems to be related to another adult individual and child. Additional finds in the pit comprise animal and other human bones (including a red-stained finger; some heat-affected bones), two limestone celts with polished edges, few red pigment crumbles, a fragment of a marl ring, a possible basal "blade dagger" fragment, and another small flint blade (Fig. 11).

These new burials reassert that at Ba`ja we are dealing with a greater variability of graves types, ranging from individual burials with/without cists to collective room burials and rather "informal" depositions of hu-

man remains; grave goods are common. Resting above these burials, a series of household depositions testify the formal or ritual termination of household inventories, often connected with evidence of burning, as well as remains of living households. The nature of the intramural burial ground in Area C will be subject of further investigations.

Burnt Household of Room CR5 and the Buried Household Remains of Room CR 22.2

Excavations in Room CR5 revealed the remains of a burnt household. Large pieces of charred timber covered ashy layers containing a variety of household materials: extensive *in situ* scatters of the thick-walled ware representing *tabūn*-like installations, a plate, and a globular large vessel; bone tools; handstones and grinding slab fragments; an *in situ* oval sandstone basin or vessel (Fig. 15); and a trilith-type arrangement of ashlars (Fig. 15).

The continued excavation of Room CR 22.2 uncovered more material from a terminated (buried) household, including more fragments of a low-fired grit-tempered thin-walled ware which technologically is not yet pottery.

Both rooms are considered extremely important sources of information for the Ba`ja's inhabitants behaviour related to *Household and Death*.

Resumed Area D Excavations

Resumed excavations in Area D aimed at locating findings relevant for the project's *Household and Death* topic which should be addressed in the next season. A number of findings from this season exhibit/indicate the relevance to the topic. South of the collective burial excavated in 2001, the remains of a celt and blade workshop were found in a fill constituted also of material fallen from an upper floor (Fig. 7). Two new loci in Area D confirmed the practice of inserting celts in walls (Fig. 6); possibly representing a magic practice to "enforce" walls (Gebel 2002). Room DR32 gave *in situ* evidence of food processing while DR19 contained the refuse of a sandstone ring workshop deposed in the room's fills.

Social Neurobiology at Ba`ja

The participation of the project's social neurobiologist confirmed again Ba`ja's potential to apply socio-neurobiological, evolutionary and cognitive sciences approaches to reconstruct the ethos (*sensu* their ethological and ontological dispositions) of the Neolithic inhabitants. In that respect, not only the archaeological evidence for corporate behaviour is important:

The role of the intramural burial ground is becoming increasingly significant for understanding the inhabitants' thanatological dispositions in order to identify the social role of the dead and death in the community.

Ba`ja's FPPNB/PPNC

The stratified find of a Yarmoukian-type arrowhead in Room CR5 and previous testimony for a FPPNB/PPNC presence or occupation request a better understanding of Ba`ja's occupational end(s).

For the Yarmoukian-type arrowhead of CR5:34 (F.no 102020) a natural intrusion appears unlikely. Further excavation and radiocarbon dating, especially for its trilith context, is needed to exclude that we deal with a later *do ut des*-finding as recorded from Basta (Hermansen 1997).

Analyses of Flints and Ornaments

In 2018, we started a comprehensive program on the biographies of objects, from the procurement and *chaîne opératoire* to the use and discard of objects. Use-wear analyses as well as the identification of raw materials and phytolith analyses are an integral part of this focus. These analyses will provide promising information on the transmission of knowledge and household or community-based organization of crafts. It will also help to understand the regional wide networks in which the community of Ba´ja participated. Preliminary results underline the supra-regional character of the raw material procurement. Use-wear traces on ornaments will give important clues on grave goods, whether they represented used objects or were especially made for the burial ritual.

Backfilling Ba`ja's Trenches

An intense backfilling with stones and sediment sacks started this season, exceeding much such activities of the former years. Due to the insufficient on-site availability of soft sediments (small room - architecture filled with high share of stones) and the site's inaccessibility for large amounts of backfill material from outside we are forced to use also excavated stone rubble to fill rooms. A retaining wall inserted in Room CR6 helped both backfilling the Rooms CR6 and 7 as well as stabilizing the Neolithic architecture around.

Ba`ja's Community Spaces?

Hitherto, the coherent picture of domestic architecture in Areas B, C, D, and F led us away from expecting community buildings in the settlement. However, the results of the 2018 season provide more and more signals of "wealth" and hierarchy from the settlement's layers. We therefore see the need to more clearly verify the existence or non-existence of supra-household facilities (communal buildings, corporate spaces) which weren't encountered yet: Ba`ja's architectural heterogeneity and variability has to be evaluated to a greater extent. For communal buildings, most promising localities might be the upper parts of the site (*i.e.* the upper eastern part of Area D, or the upper part of Area G between the rocks). For a safer understanding of the

Ba`ja's social structures and future research strategy, we started to plan larger test units in the respective locations during the 2019 spring season (BJ19a). This is turning away from the previous concept not to open new squares at the site which now appears justified in the light of this highly important potential evidence.

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Endnotes

[1] The Ba`ja Neolithic Project continues by the „deep-knowledge project" *Household and Death in Ba`ja* in which different approach lines unite for the subject: Neolithic commodification and territoriality (responsibility Gebel), the dead and death (responsibility Benz), and household production (responsibility Purschwitz). The project represents a transdisciplinary enterprise on which some more than 15 specialist researchers cooperate.

[2] Due to a shift in locus designation standards, reference to Ba`ja's loci is made in two ways: either *e.g.* the square-wise designations like *e.g.* C22:6 (Area C Square 22: Locus 6), or our recent room-wise designations like *e.g.*CR17:104 (Area C, Room 17: Locus 104).

[3] Assuming an average flow velocity in the catchment of 1.5 m/s (related to the topography) and taking into account the maximum flow distance (5,000 m) as well as a duration of roughly 60 min. Rain intensities are deduced from Jordan's IDF-relationship of the time period 1983-2005 (CEC - Sajdi and Partners 2011).

[4] Assuming a peak runoff coefficient of 0.85 and the catchment size of 6 km².

[5] Assuming a width of 1.6 m, a slope of 2.5 % and a Manning´s n of 0.0333.

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The "Nahal Zippori Horizon": a new Entity Between the Lodian and Wadi Rabah Cultures

Nimrod Getzov, Ianir Milevski, and Hamoudi Khalaily

In this contribution[1] we would like to add a new complex to the cultural and chronological divisions of the Pottery Neolithic of the southern Levant: the "Nahal Zippori Horizon".[2] Extensive salvage excavations were carried out at the Yiftahel and Ein Zippori late prehistoric sites (Fig. 1). The excavations revealed rich assemblages from the Pottery Neolithic to the Early Bronze Age periods. Although limited, the assemblages under discussion are considered significant, in that they represent first-hand evidence for the transition from the Lodian Culture of the Pottery Neolithic period to the Wadi Rabah Culture. According to the different nomenclatures, the assemblages in question are to be dated to the Late Pottery Neolithic or the Early Chalcolithic, for the above-mentioned sites (see Table 1 for the chrono-stratigraphical record of this period).

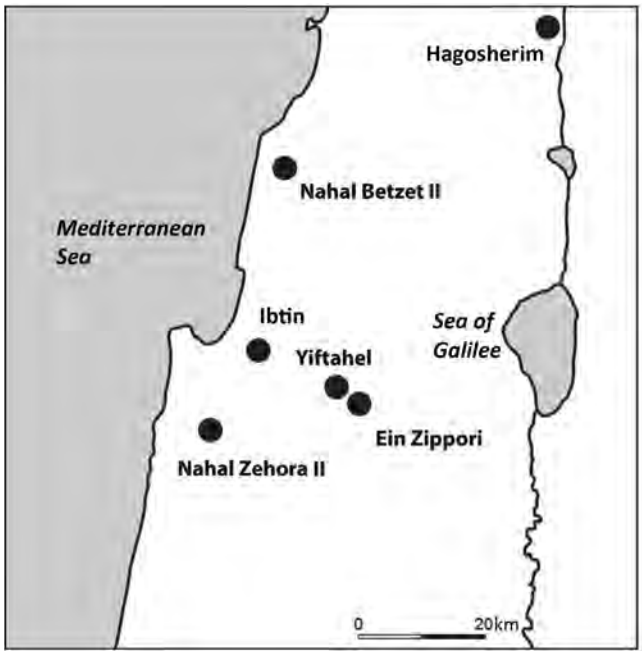

Fig. 1 Location map with sites related to the "Nahal Zippori Horizon". (Drawing: N. Getzov)

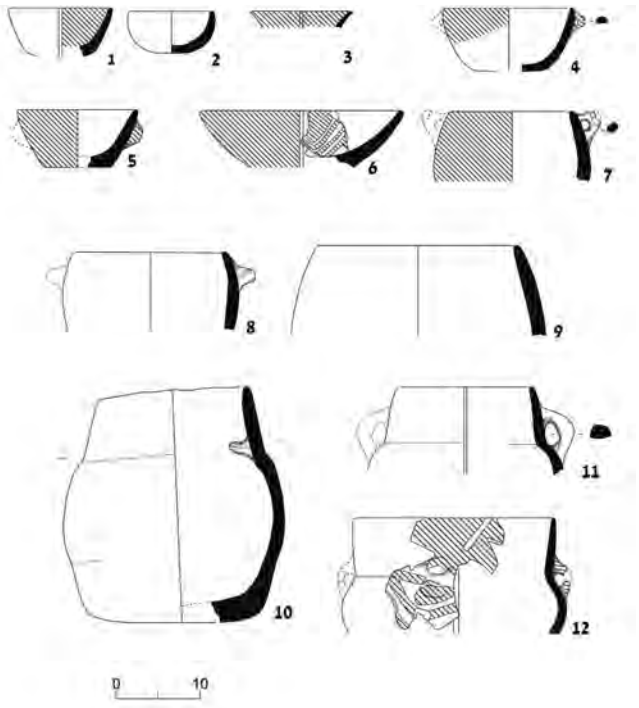

Fig. 2 Yiftahel. Pottery from Area G, Stratum G4: Lodian Culture. (Drawings: H. Tahan)

Yiftahel

The site is located on the east bank of Nahal Yiftahel (Wadi Khalladiyah), near a lush spring that flows directly into Nahal Zippori (Wadi el-Malik). Beginning in the 1980s, extensive excavations were carried out by various teams (Braun 1997; Khalaily *et al.* 2008; Garfinkel *et al.* 2012), revealing the remains of a large Pre-Pottery Neolithic B (PPNB henceforth) settlement, and the remains of an Early Bronze Age (EB henceforth) IA occupation. Ceramic sherds from the Pottery Neolithic period were exposed through the Braun excavations (1997: 122-131) and attributed to a chronological phase between Stratum III of the PPNB period and Stratum II of the EB IA period. Braun also suggests a similarity between the pottery recovered from this phase at Yiftahel to other ceramic assemblages that were assigned to the Lodian (Jericho IX) culture (Braun 1997: 124; and see Gopher and Blockman 2004). Clusters of pottery vessels dating to the EB IA were found in areas F and G during the 2007 and 2008 seasons of excavation of the site (Khalaily *et al.* 2008, 2012).

In Area G, located in the southern part of the site, remains of architecture and indicative pottery sherds (185 rim sherds) dated to the Lodian Culture, were found in Stratum G4 (Fig. 2). Discussed below are three characteristic features that indicate an affinity of the assemblage, recovered from Stratum G4, with this cultural entity:

1. Jars with inverted rims dominate the assemblage (85% of jars), displaying the characteristic rim with

Cultures	Gilead	Gopher	Getzov	Garfinkel	Years calBCE
Lodian	Early Pottery Neolithic	Early Pottery Neolithic	Pottery Neolithic	Pottery Neolithic	6,200-5,800
"Nahal Zippori Horizon"			Pottery Neolithic/ Early Chalcolithic		6,000-5,800?
Wadi Rabah	Late Pottery Neolithic	Early Wadi Rabah	Early Chalcolithic 1	Early Chalcolithic	5,800/ 5,500-5,000/ 5,200
Qatifian/ Besorian/ Nazurian/ Tsafian	Transitional Pre-Ghassulian	Late Wadi Rabah Post-Wadi Rabah/ Pre-Ghassulian	Early Chalcolithic 2 (Jericho VIII) Early Chalcolithic 3	Middle Chalcolithic ("Bet Shean XVIII")	5,200/ 5,000-4,800 4,800-4,500
Ghassulian (Golanian Timnian)	Chalcolithic Early Late	Chalcolithic	Late Chalcolithic	Late Chalcolithic	4,500-3,800/ 3,700?

Table 1 Chrono-stratigraphy of the Pottery Neolithic and Chalcolithic periods of the southern Levant according to different authors (Garfinkel 1999; Getzov *et al.* 2009a; Gilead 2009; Gopher 2012: Fig. 41.1)

a diameter that is smaller than the diameter measured at the base of the neck (Fig. 2:11-10). Additionally, these jars dominate the assemblages recovered from the site of Lod (88%; Gopher and Blockman 2004: 10). Contrastingly, in the Yarmukian assemblages preceding the Lodian, the everted jars are in the majority, such as at Ard al-Samara where only everted rim jars were found at the site (Getzov *et al.* 2009b: 129).

2. In Area G of Yiftahel, two ceramic jars displaying a shelf in the inner wall of each vessel were found (Fig. 2:10). Jars with this distinctive feature were also identified in other important Lodian complexes (Kaplan 1958a: Fig. 8:11; Gopher and Blockman 2004: Fig. 10:3).

3. Geometric-style paintings, captured in red on the surfaces of the ceramic vessels, illustrate triangles, as well as horizontal and diagonal lines, often framed with a conspicuously dark painted border. This decoration style is characteristic of the Lodian cultural entity (PNA) in Jericho (Ben-Dor 1936: Pls. XXX:13, 15; XXXI:1-19; Kenyon and Holland 1982: Figs. 1, 2, 5, 22, 13, 18) and in Lod (Gopher and Blockman 2004: Fig. 14:11-12, 27-28). It is also worth mentioning that at Yiftahel, no pottery was discovered to be decorated with engraved motifs – which is a typical feature of the Yarmukian culture (*e.g.* Stekelis 1966: Pls. 42-46; Garfinkel 1999: Figs. 25-26; Photos 22-25). Additionally, when it came to the flint tool assemblage of Yiftahel, Stratum G4 provided several pressure-flaked sickle blades, which are also characteristic of the Lodian culture (Gopher and Blockman 2004: 31-34).

In Area I however, located in the northern region of the site, Stratum I2 contained sparse remains of walls and archaeological accumulations containing pottery similar to that of the Wadi Rabah assemblage of Area G (75 rim fragments, Fig. 3). This stratum testifies a distinct difference in pottery decoration, as no ceramics typical of the Lodian style were found within it, and many potsherds recovered (85 items; Fig. 4) were decorated with engravings and incisions characteristic of the Wadi Rabah Culture (*cf.* Garfinkel 1999: Fig. 90; Khalaily *et al.* 2016: Fig. 8)

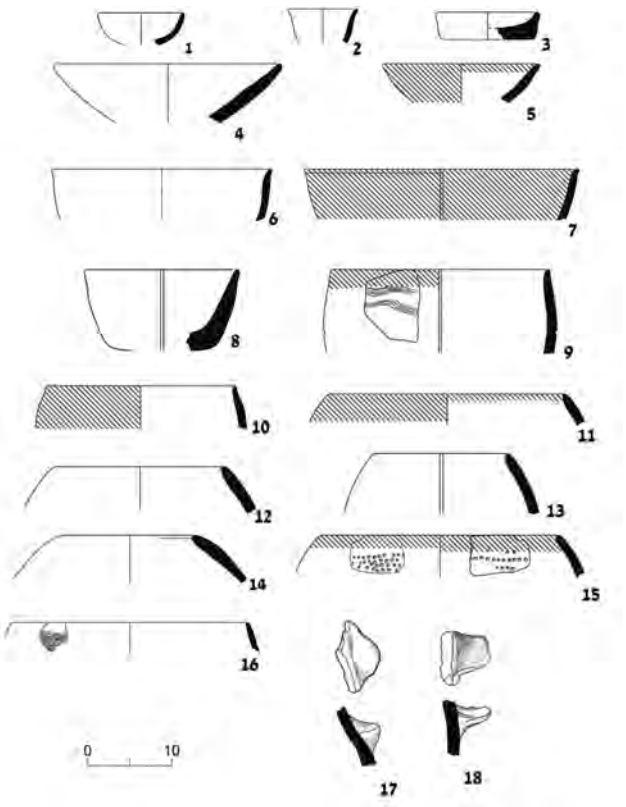

Fig. 3 Yiftahel. Pottery from Area I, Stratum I2: "Nahal Zippori Horizon". (Drawings: H. Tahan)

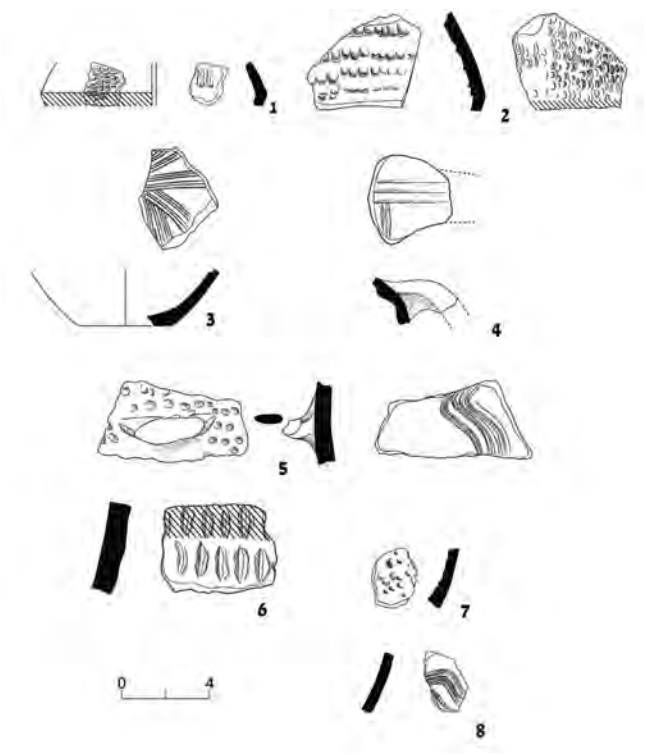

Fig. 4 Yiftahel. Decorated pottery from Area I, Stratum I2: "Nahal Zippori Horizon". (Drawings: H. Tahan)

In Stratum I2, the ceramic assemblage was found to be comprised of several bowls and holemouth jars, displaying either a slightly pointed (Fig. 3:15-16) or rounded rim (Fig. 3:12-14). Pottery surfaces appeared to have been worked without "strictness"; occasionally appearing painted in red and in other cases burnished. Knobs are common features of these vessels (Fig. 3:17-18), while some bases appear rounded and even covered with a geometric, "honeycomb" style pattern (Gopher and Eyal 2012: 364) (see below Fig. 6:8).

The flint assemblages from Stratum I2 (in preparation for publication) show short and rectangular sickle blades with a triangular or trapezoidal cross-section. Truncations and backs were shaped by pronounced stepped retouch, and active edges revealed deep denticulations. Such blades are typical for the Wadi Rabah culture (Gopher and Gophna 1993), or more precisely, what Gopher (2012: Fig. 41.1) refers to as the Early Wadi Rabah (*e.g.* Khalaily *et al.* 2016: Fig. 12:2-9) and other scholars have suggested as Early Chalcolithic 1 (Getzov *et al.* 2009a).

The presence (and absence) of such culturally distinctive ceramic and flint artefacts, in a homogenous layer – that cannot be further stratigraphically divided – contradicts the notion of a mixture from both the Lodian and Wadi Rabah cultures being present in the stratum. This theory has been rejected due to the lack of representation of several key, cultural features in the assemblage. As has been mentioned previously, there is a clear absence of both, vessels baring the typical Lodian-style decoration, and those characteristic of the Wadi Rabah culture; including holemouth vessels, jars with bow-rims (Fig. 5:4-3; Kaplan 1958b: Fig. 5: 8-9) and *pithoi* with flattened rims, like those from Ein Zippori (Fig. 5:1-2; and see Kaplan 1958b: Fig. 5:1-3). Thus, it seems that Area I of Yiftahel, Stratum I2, represents a homogeneous archaeological assemblage which incorporates characteristics of both the Lodian and the Wadi Rabah cultures, and can therefore be regarded as representative of a late cultural phase between the Lodian and the Wadi Rabah culture.

Ein Zippori

The site is located about 4.5km southeast of Yiftahel in a similar topographic setting. Situated atop a broad slope that runs down the southern bank of Nahal Zippori (Fig. 1) and adjacent to several natural springs; the area was initially referred to as `Aynot Zippori' (Gal 2002: 48-49). Extensive excavations have been carried out at the site in recent years (Milevski and Getzov 2014; Yaroshevich 2016; Getzov and Milevski 2017). Archaeological remains dated to several different time periods, including the remains of massive settlements dating from the PPNB to the EB II, were found at the site. Most impressive are the Wadi Rabah and post-Wadi Rabah layers of the Late Pottery Neolithic/ Early Chalcolithic, and the discovery of a walled EB-IB town. However, excavations did not reveal remains from the Yarmukian and Lodian cultures.

During the 2013 excavation season, while excavating below the base of the Early Chalcolithic layers, an archaeological accumulation was found directly above the virgin soil in Area N5, Locus 7727 (southeastern part of the site).

The Ein Tzippori pottery assemblage is similar to that of Area I in Yiftahel, Stratum I2 (Fig. 5). Excavations revealed pottery decorated in the style of Wadi Rabah, found alongside characteristic vessels of the Lodian culture. Noteworthy, is the lack of stylistic decoration characteristic of the Lodian culture; a phenomenon also noted in the pottery assemblage of Stratum G4 in Area G at Yiftahel (Fig. 4). Once again a ceramic assemblage has been identified as both very late for the Lodian culture and very early for the Wadi Rabah culture.

Carinated Holemouth Jars From the "Nahal Zippori Horizon"

Easily distinguished among the Wadi Rabah-style decorated pottery, are the holemouth jars, boasting characteristically carinated walls and simple rims (Figs. 4:1-2; 6:6). Examples of decoration on these vessels reveal a repetitive system: on the outer wall, under the carination, the vessels were painted red and burnished; a red stripe was also painted on the interior and exterior of the rim; and, above the carination and under the color stripe, a punctuated decoration traced the surface and the inside of the vessels. Marked incisions

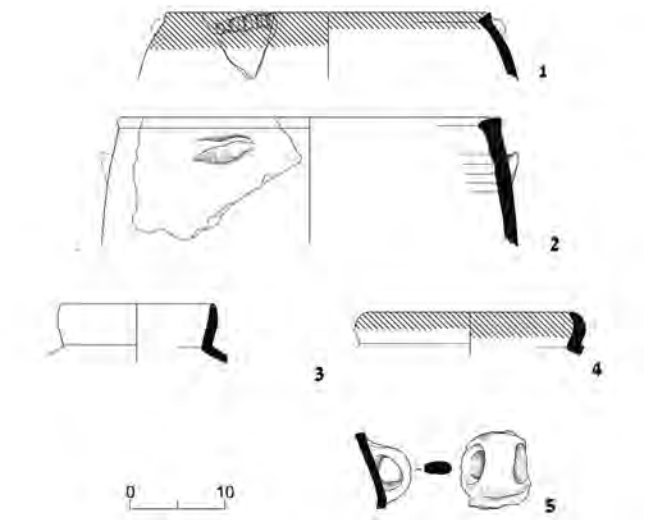

Fig. 5 Ein Zippori. Selected pottery from the Wadi Rabah Culture. (Drawings: H. Tahan)

sometimes replaced the punctuated decoration, often appearing in conjunction with an engraving located on the interior of the base of the jar (Fig. 4:3).[3] Very similar to these vessels is the holemouth jar found in Ein el-Jarba (Kaplan 1969: Fig. 7:1; Milevski *et al.* 2016) significantly bearing a two-figure relief.

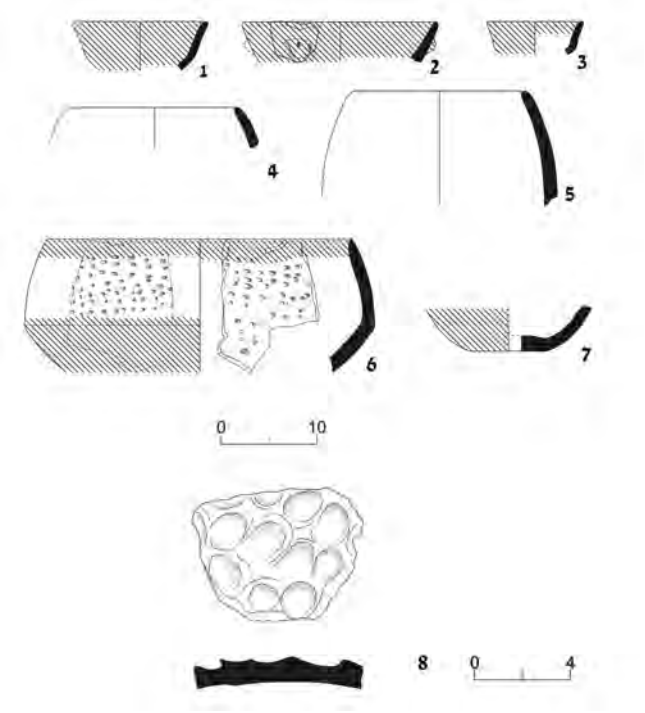

Fig. 6 Ein Zippori, pottery from Area N5, Locus 7727: "Nahal Zippori Horizon". (Drawings: H. Tahan)

Moreover, it would appear that body sherds, likely belonging to these vessel-types, were found in Stratum II at Nahal Zehora II (Gopher and Eyal 2012: Fig. 10.55:1-12).[4] Sherds decorated with these same patterns were also found in Stratum IV from the Pottery Neolithic period (Gopher and Eyal 2012: Fig. 13.3:1) yet these were later concluded by the excavators to be intrusive. Fragments of carinated and unpainted vessels were likewise found in Tel Abu Zureik (Garfinkel and Matskevich 2002: Fig. 11:1-2). Furthermore, a fragment of a holemouth jar that was found in Nahal Betzet II, displays a decoratively incised interior and exterior of the vessel (Getzov *et al.* 2009b: Fig. 11:5). Examination of thousands of decorated ceramic sherds, depicting the style of Wadi Rabah, and recovered from Ein Zippori, show that a large part of this assemblage can be identified as holemouth jars. Significantly, it appears that these vessels are a typical component of Wadi Rabah ceramic complexes and moreover, their first appearance in the southern Levant seemingly occurs in the pottery assemblage of Stratum I2 at Area I of Yiftahel.

Discussion: Searching for Other Sites

In conclusion, new evidence has come to light indicating that both at Yiftahel and Ein Zippori similar ceramic assemblages were uncovered; both appearing to combine characteristic features of the Lodian and Wadi Rabah cultures, while also lacking key elements of these two cultural entities. Therefore, it seems that they should be regarded as a separate entity entirely. Standing alone, we hereby identify it as the "Nahal Zippori Horizon".

However, it is important to note that due to the small size of the assemblages recovered from these sites, and subsequently discussed here, a total identification of all the features directly related to this cultural entity, cannot yet be fulfilled. Questions continue to arise regarding the nature of these ceramics, including: What are the visually defining features typical to this style of pottery? Are all the formal elements of the Lodian culture still present and recognizable in this assemblage? Did these excavated ceramic jars portray similar outlines to one another? Furthermore, questions have arisen surrounding the key lithic features of this horizon. In this regard, the data from Yiftahel indicates that typical Wadi Rabah-style sickle blades were already in use before the official onset of the entity. However, no other recognizable components of the flint tool kit have been identified thus far. Any architectural evidence or organic archaeological data (flora and fauna) that could illuminate the socioeconomic lifeways seem to be lacking.

In order to better prove the existence of the "Nahal Zippori Horizon", it is necessary to locate other sites where this horizon is also present. Currently, we do not have any *fossiles directeurs* for the "Nahal Zippori Horizon" assemblages, however we hope that these will be revealed through further research. The definitions we have thus far presented, are based on the composition of the ceramic assemblage and also to a large extent, on the components that appear to be missing from it. In this way, it is proving to be extremely difficult to identify the existence of the "Nahal Zippori Horizon"

at multilayer sites that were previously excavated without knowledge of the possibility of such a horizon existing. Therefore, we will consider the possibility of identifying it at two other sites only.

One of these sites is Nahal Betzet II (Getzov *et al.* 2009b: 84-104), a late Prehistoric site in the Western Galilee (Fig. 1). Remains of the PPN, the Pottery Neolithic and the Late Pottery Neolithic/ Early Chalcolithic period were found at this site. These included typical Wadi Rabah-style vessels, such as bow-rim jars (Frankel and Getzov 1997: Fig. 5.80.2:16-17) and flat-rim *pithoi* (Frankel and Getzov 1997: Fig. 5.80.2:13-15). In a very limited excavation in Area D, an archaeological accumulation was discovered containing a small assemblage of pottery. It was divided into two groups, based on typological considerations: bowls showing a clear connection to Neolithic assemblages of the Yarmukian and Lodian cultures; and pottery decorated in the typical Wadi Rabah style.

In view of the "Nahal Zippori Horizon" complexes described above, it is more likely that in Area D of Nahal Betzet II, a homogeneous assemblage of that horizon is also present. The lithic assemblages contain flint sickle blades found in various excavation areas of the site, includes blades typical of both the Yarmukian and the Wadi Rabah cultures. The former was identified as a likely remnant of a Yarmukian settlement that once occupied part of the site. Due to the obvious lack of characteristic Lodian blades, and the predominance in the lithic assemblage of Wadi Rabah-type flint blades, suggests that a "Nahal Zippori Horizon" complex is found at Nahal Betzet II (and see above the description of the blades from Yiftahel, Area I).

The second site is Nahal Zehora II (Gopher 2012) (Fig. 1), also a late Prehistoric site, located in Ramat Menashe. Through large-scale excavations, archaeological remains of the Yarmukian culture (Stratum IV), the Lodian culture (Stratum III) and the Wadi Rabah culture (Stratum II) were found at the site. A detailed study of the intrusive constituents, identified by the excavator, shows that Stratum III contains a higher percentage of intrusive material compared to the other strata. Additionally, the intrusive artefacts appear to have penetrated the layer from Stratum II and appear mainly in the form of decorated pottery sherds, which appear to be noticeably less frequent within the safe context of Stratum III (Gopher and Eyal 2012: 611). Some of the features that intruded into Stratum III are also quite surprising, considering the generally accepted idea that residual components are likely to be more numerous in earlier strata than in later ones (*e.g.* Getzov 2006: 104-112). Gopher and Eyal (*ibidem*) suggest that the presence of this anomaly at the site, is due to the proximity between Strata II and III.

We offer an alternative explanation. Based on analyses of the Stratum III deposits, we suggest that included in the layer are remains of the "Nahal Zippori Horizon". Therefore, the many pottery sherds that bare Wadi Rabah decorations (originally considered to be intrusive), should be viewed as having existed contemporarily with the sherds associated to the Lodian culture. Another indication for the presence of the "Nahal Zippori Horizon" in Stratum III at Nahal Zehora II is the large proportion of recovered sickle blades demonstrating characteristics typical of the lithic technologies of the Wadi Rabah culture (Barkai and Gopher 2012: 811-816).

In our opinion, there are other sites which should also be investigated for the possible presence of the "Nahal Zippori Horizon". Firstly, in Stratum V at site Hagosherim, located in the Hula Valley, (Getzov 1999) we argue for the presence of key components of this entity there. Thus, we should divide the stratum, identified by the excavator as Pottery Neolithic, into two phases; the earlier phase belonging to the Korenian culture (a northern entity contemporaneous with the Lodian culture); and the later phase to the "Nahal Zippori Horizon" that is located in a small area, in the western part of the site. In addition to the data discussed above, Eli Yannai recently showed us a small pottery assemblage recovered from the Neolithic layers at the site of Ibtin, in the Western Galilee. Excavated by Massarwa (2018), in our opinion, there exists a distinct component of the "Nahal Zippori Horizon" in this ceramic assemblage.

Summary

The findings of the excavations at Yiftahel and Ein Zippori provide evidence for the existence of a phase of settlement having occupied the site at a time of the end of the Lodian culture or postdating it, and/ or preceding the Wadi Rabah culture or existing at the very beginning of it. As discussed above, we propose the possibility of classifying the material assemblage reflected in this settlement phase at both sites, as the "Nahal Zippori Horizon". This entity appears to represent the blending of characteristic elements known in the Lodian culture (such as hand-made bowls with pointed rims; widespread use of knob handles and "honeycomb" bases) with styles of decoration typical of the Wadi Rabah culture. A change in the flint assemblage to include short denticulated blades with upright backs, characteristic of the Wadi Rabah culture, is also indicative of this 'blending'.

The assemblages described here are highly limited and therefore more research is required in order to provide a broad definition for this entity. Future research should focus on identifying additional components of this horizon, particularly regarding the definition and classification of the *fossiles directeurs* in order to allow for the identification of the presence of the "Nahal Zippori Horizon", even within assemblages from multi-period sites. With the definitions provided here, we hope that with the help of *fossiles directeurs*, other sites with similar complexes will be encountered, and the geographical area of the "Nahal Zippori Horizon", will be defined more properly.

At any rate, the above phenomenon of 'blended' assemblages, acts as a probe for the dialectical developments in archaeology and the development of cultures in prehistory and history, predominantly seen in the transitional periods of the southern Levant.

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Endnotes

[1] This is an English updated version of a previously paper published in Hebrew in honor of Prof Isaac Gilead (Getzov *et al.* 2019).

[2] At this stage of research, we use the term horizon because we are unable to address these distinct assemblages as a culture of its own right.

[3] In Locus 7727 there is one vessel that bears a carinated section underneath the rim. In the Wadi Rabah deposits at other spots in Ein Zippori additional and similar items occurred.

[4] Occasionally, the carinated items were painted so that the stitched decoration appears under the carination.

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Conference Reports
Struggles to Make Sense: Two Recent Gatherings on Arabia's Neolithic, and the Question of Outdated Concepts of the Near and Middle Eastern Neolithic
Kuwait City, Dec. 2018, and Leiden, July 2019

Hans Georg K. Gebel

This contribution is less a report on the outcome of the Kuwait and Leiden gatherings (*cf*. the lists of contributions to both conferences documented below) than it is a reaction to a basic question of Neolithic research in Arabia's Early-Mid Holocene: What makes up the Neolithic in the present-day arid regions of the Arabian Peninsula? The new findings even trigger a more fundamental question: Is our understanding of the Middle Eastern Neolithic becoming antiquated, outdated, and inappropriate for future holistic Neolithic research?
The two gatherings referred to are the

- 3rd International Conference on the Archaeology of the Arabian Peninsula: *The Neolithic in Arabia*, organized by the National Council for Culture, Arts and Letters (NCCAL) of Kuwait and by the French Center for Archaeology and Social Sciences (CEFAS) at Kuwait, held in Kuwait City from 20th – 22nd December 2018. Individuals organising the conference were Sultan al-Duwaish, Farah al-Sabah, and Rémy Crassard (Figs. 1-2);
- Special Session on *Stone Tools in Arabia* at the 53rd Seminar for Arabian Studies, held at Leiden University, July 14th, 2019. Individuals organising the session were Knut Bretzke, Yamandú H. Hilbert and Rémy Crassard (included contributions on Palaeolithic and post-Neolithic materials).

The Current Research Situation

It is quite difficult to summarise general outcomes of such gatherings, since the hitherto dispersed and fragmentary information and the weak chronologies from the distant and very diverse climate-sensitive natural regions represent a complexity that cannot be easily approached by comparative means. Main fields of obstacles and fallacies are the preservation and accessibility of sedimentary environments; the very restricted, isolated and quite fresh field research; and the persistent influence of preconceptions brought in by perspectives from the Fertile Crescent and the Neolithic Package model. We deal with surprise, confusion and perplexity in the face of steadily incoming new empirical data and the constant novelty of findings whereever we step out of the four-wheel truck, survey, and dig. The more data we collect, the less "clear" things get. But one thing became clear by this recent research in the Arabian lands: They are a challenge to the conventional concepts of the Neolithic and the Neolithisation in the Fertile Crescent, and that our "unidirectional" outpost explanations reflect only part of the stories.

I see a fundamental problem in the use of the term Neolithic for the Arabian lands if the reflection of "What is Neolithic in Arabia?" remains at current levels. Few contributions to either meeting discussed or justified their application of the term "Neolithic", as if these problems had already been solved by the contributions to the special issue of Arabian Archaeology and Epigraphy 24 (Crassard and Drechsler eds. 2013).

Moreover, scholars inside and outside Arabia have very different understandings of the Neolithic: And the term itself may not be applicable any more in the light of recent findings from both the moderate regions of the Near East and present-day arid Arabia. I recall the Neolithic features in the southern Levant's Epipalaeolithic, the late hunter/ gatherer societies of the North Mesopotamian grasslands, or Arabia's Early-Mid Holocene productive management of wild food sources (*cf.* below). What has been helpful to characterise the Neolithic during the last decades, may have become inapplicable today: Is the term Neolithic already outdated? I would say yes for much of its current meaning and concepts, but I would like to stress that the term will remain useful when new and fundamental updates or redefinitions are received in order to manage the new evidence. The latter especially applies to the more holistic approaches that attempt to integrate the regional blends of Neolithic ingredients for general pictures. In a number of coming publications, I will promote a certain reconsideration (*cf.* next paragraphs), especially to integrate better the research on Neolithic features from outside the core areas and pre- and post-Neolithic periods (!), starting with Gebel (2019). I admit that the following is highly provoking to most of the colleagues working inside the moderate zones of Near East, while asking: How about testing perspectives on your Neolithic from outside and from its deeper foundations in time?

The Neolithic: To be Defined Exclusively as Productive Dispositions and Lifeways?[1]

In short, I argue that our future understanding of the Neolithic should be restricted to only one, the most profound characteristic of the Neolithic, that of incipient human productive behaviour and resource management (as opposed to foraging behaviour and resource management). While this *per se* might be nothing new, it is new to define the Neolithic by exclusively these basic socioeconomic (and subsequent cognitive) dispositions and lifeways, and not simply as a period/ periods. In a way, this is also an ethological-ontological

definition of the Neolithic, referring to the new social phenotype, that of the productive human ("*Homo neolithicus*"). The argument may sound simple and populistic, but its consequences would lead directly into the interpretative frameworks of Neolithic complexities and pathways, and the chances for their epistemic management.

After considering for years new and "unsuitable" evidence related to the Near Eastern Neolithic, I found that productive behaviour always remains as the common feature when comparing Neolithic and "para-Neolithic" societies. Neither sedentism nor storage, craft specialisation/ labour division, social differentiation, and other aspects appear to be primary characteristics of the early Neolithic; they are secondary expressions of productive behaviour. By using productive behaviour as the sole feature of Neolithic conditions, Neolithic complexities become better approachable and understandable. Neolithic processes outside the assigned periods' millennia and regions become identifiable and holistically treatable; and they become freer of the doctrinal academic interpretation forcing to explain what cannot be explained anymore by the conventional understandings of the Neolithic.

Arabia's Early Productive Lifeways[2]

More than other greater regions in the Middle East, the Arabian Peninsula offers environmentally isolated, different and specially equipped areas and refugia (*e.g.* hydrologically favoured localities, resource areas), always potentially connected by long-distance and/ or transhumant networks exploiting rich marine and mineral resources, migrating ungulates, and (seasonal) grazing lands. Neolithic hot spots must have been connected by inland corridors and characterised by steppe economies such as (mobile) caprine pastoralism with niche agriculture, surplus hunting stations, and even permanent settlements. These economies most likely flourished by conservative socio-hydraulic competencies and aggregates adapting to climatic shifts in different ways than in the Fertile Crescent. And: Neolithic trajectories on the Arabian Peninsula were the result of an interplay between polylinear incursions and autochthonous adaptations.

Most interesting are productive lifeways that do not fit to the foraging - food producing dichotomy but appear to be characteristic of the Arabian Neolithic: the productive management of "wild" resources, such as migrating ungulates (*e.g.* the kite economies of the steppes: *e.g.* the works of Wael Abu-Azizeh in the southeastern Badia of Jordan); of (shell-)fish grounds (*e.g.* the Omani early Holocene coastal shell middens); or of runoff and aquifer waters (*e.g.* water harvesting systems at the potentially arable land: W. Abu-Azizeh and M. Tarawneh, S. Fujii, and L.G. Marcucci *et al*.). Obviously common examples of hunter-gatherers "familiar" with domestic animals (*e.g.* the works of M.P. Maiorano *et al*. and J. Zarins) are also part of these ostensible dichotomies.

The L-FPPNB kite economies of Jabal Khashabiyeh east of al-Jafr (Abu Azizeh 2019) are a good example for a potential failure of conventional Neolithic binarythinking in the face of the new evidence from the "margins": What if this industrial/ surplus hunting represents an autochthonous development of indigenous late hunter-gatherer societies in the steppes who were in an exchange arrangement with demands of settled areas, and not only shared – as attested – their chipped stone technologies with hunters and herders arriving in their steppes from the settled areas? What if these late hunter-gatherers quickly adopted risk-reducing pastoralism from the latter during the later LPPNB and FPPNB, a time when their hunting grounds became frequented by intruding herders in need of grazing land? Why should the industrial hunting of late hunter-gatherers not be seen as a truly productive Neolithic behaviour? Things may become even more interesting if these hypothetically autochthonous hunters were co-responsible for the collapse of the Transjordanian mega-sites, offering – together with the emerging mobile pastoralism in the steppes – alternative lifeways to the crowded mega-site aggregates.

Arabia's Neolithic: Epistemic Needs of Future Research

It is suggested to structure arid Arabia's future Neolithic research along guiding holistic ideas/ principles and epistemic procedures, using productive behaviour and lifeways as the sole characteristic of its Neolithic; implicit and explicit perspectives from the Fertile Crescent on Arabia's Neolithic are to be controlled or excluded. Trajectories are seen as developing between the poles of polylinear incursions and autochthonous adaptations, influencing the socio-economic and cognitive behaviour of interacting mobile non-local and local late hunter-gatherers, long-distance pastoralists and other productive resident or otherwise philopatric groups.

Since fragmentary information must be processed to form a necessary holistic framework, formal epistemic procedures must guarantee the testability, traceability and management of the growing complexity of the results and that of revised hypotheses. Preferably, this is done by a system or set of constantly updated and tested hypotheses (*e.g.* as those suggested in Gebel 2019), constantly amended by new data and allowing testing of new information. There are not many other testable procedures in humanities to deal with fragmentary information serving a holistic approach from the beginning than this thesis approach (Gebel 2019 and references therein). In all this, research on Arabia's Neolithic requires for its ill-preserved sedimentary environments the utmost scientific input as well as multi- or transdisciplinary research agendas, and especially archaeohydrological fieldwork.

As said before, these efforts need the merging as well as differentiation (!) of the perspectives on the Neolithic, jointly promoted by the hitherto seggragated researchers working in Arabia and the moderates zones of the Middle East.

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Endnotes

[1] Primary characteristics of Neolithic productive behaviour and lifeways are: sustainably available and sustainably used and managed biotic and abiotic resources; evidence for surplus production and a planning economy; confined reciprocity and commodification regimes; related processes of socio-economic growth including the development of social hierarchies based on rules not yet attested with foragers; progressive population dynamics; and sustainable wealth.

[2] Many of the general statements made here are explained in more detail in Gebel (2019), including by the references presented there.

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2019 Polylinear incursions and autochthonous adaptations: Neolithisation and sustainable sedentarisation of the Arabian Peninsula. *Arabian Archaeology and Epigraphy* 2019:1-9. https ://doi.org/10.1111/aae.12146

Programme of the 3rd International Conference on the Archaeology of the Arabian Peninsula: *The Neolithic in Arabia,* Hold at the National Council for Culture, Arts and Letters, Kuwait City, 20th - 22nd Dec., 2018

SESSION 1. Origins and dispersals of the Arabian Neolithic

Yamandú H. HILBERT (CNRS, France): Stone tool use in Arabia during the Terminal Pleistocene and Early Holocene human occupation: trends and their impact on human demography

Fig. 1 Group photo of the conference participants and organisers at the National Council for Culture, Arts and Letters (NCCAL) of Kuwait, Kuwait City, at the opening on November 20th, 2018. (Photo: staff member)

Rémy CRASSARD (CNRS/CEFAS, France/Kuwait): A Neolithic influence from the Fertile Crescent? 'Naviform' technology from Saudi Arabia

Cheryl MAKAREWICZ (University of Kiel, Germany): The emergence of pastoralism in the Arabian Peninsula: Zooarchaeological and isotopic perspectives from the Jordanian highlands and steppe 'periphery'

Hans Georg K. GEBEL (Freie Universität Berlin, Germany): Sustainable sedentarisation and the establishment of food production on the Arabian Peninsula

SESSION 2. Latest results from United Arab Emirates and Qatar

Mark BEECH (Abu Dhabi Department of Culture and Tourism, UAE): New results from excavations at MR11 Marawah Island, Abu Dhabi, United Arab Emirates

Kevin LIDOUR (Paris University Panthéon-Sorbonne, France): Analysis of the fish remains from the Neolithic stone house of Marawah Island (MR11), United Arab Emirates

Sophie MÉRY (CNRS, France): UAQ36, a fifth millennium BC site in Umm al Quwain

Richard CUTTLER (Abu Dhabi Department of Culture and Tourism, UAE): Neolithic occupation at Wadi Debay'an, North West Qatar

SESSION 3. Latest results from Saudi Arabia

Abdullah ALSHAREKH (King Saud University, Saudi Arabia): Scientific and stylistic approaches to dating the earliest rock art in Arabia: An evaluation

Niklas HAUSMANN (Foundation of Research and Technology, Greece): Marine food sources from the Farasan Islands and their relation to the Arabian mainland and the southern Red Sea

SESSION 4. Latest results from Oman

Jean-François BERGER (CNRS, France): First contribution of the excavation and the chronostratigraphic study of Ruways1 Neolithic shell middens (Oman), in terms of Neolithization, palaeoeconomy, social-environmental interactions and site formation processes

Anaïs MARRAST (National Museum of Natural History, France): Ancient exploitation of coastal resources during the Arabian Neolithic: the settlements of Ra's al Hamra 6 and 5 (Sultanate of Oman)

Olivia MUNOZ (CNRS, France): Neolithic coastal populations from South-Eastern Arabia: the ontribution of funerary and bioanthropological data

Ash PARTON (University of Oxford, UK): Holocene drainage and wetland development in the Batinah Region of Northern Oman

Marcin BIAŁOWARCZUK (University of Warsaw, Poland): New prehistoric sites in the Qumayrah Valley, Oman. Preliminary results of two seasons of investigations

Maria Pia MAIORANO (Naples University, Italy): Projectile points of Southeastern Arabia: quantitative approach to regional issues

SESSION 5. Neolithic in Kuwait

Piotr BIELINSKI (University of Warsaw, Poland): Bahra 1 - an Ubaid culture related settlement in Northern Kuwait and its possible functions

Agnieszka PIEŃKOWSKA (University of Warsaw, Poland): The earliest settlement remains at the Bahra 1site.

Robert CARTER (University College London, UK): The Arabian Neolithic in Ubaid Mesopotamia? Cross-cultural interactions in Northern Kuwait and Southern Iraq during the 6th and 5th millennia BC

SESSION 6. Ubaid Ceramic from the Gulf

Hasan ASHKANANI (Kuwait University, Kuwait): A characterization study of Late Neolithic ceramics from As-Sabbiya, Kuwait, using non-destructive pXRF

Eleanor PRESTON (University College London, Qatar): The Ubaid in the Arabian Gulf: Petrographic and compositional analysis of ceramic material

Fig. 2 Session 1 participants (Y.H. Hilbert, C. Makarewicz, R. Crassard and H.G.K. Gebel) with their chairman R. Carter (at the lectern). (photo: staff member)

Anna SMOGORZEWSKA (University of Warsaw, Poland): Pottery traditions in the Neolithic Gulf. New evidence from Bahra 1, Kuwait

FINAL SESSION. Questions and discussions. Concluding remarks, publication

EXCURSION. Site visit to Bahra 1 on 22nd, November 2017 (organized in cooperation with the Kuwaiti-Polish team)

CHAIRMEN: Abdulhadial-Ajmi, Piotr Bielinski, Robert Carter, Moawiyah Ibrahim, Sayid Mahfoudh, Fahad al Wohaibi

Programme of the *Stone Tools in Arabia* Special Session Hold at the 53rd Seminar for Arabian Studies, Leiden University, July 14th, 2019*

*includes here the contributions on Palaeolithic and Post-Neolithic materials

Stéphanie BONILAURI and Amir BESHKANI: The variability within bifacial technologies found in Adam Region, Oman

Vitaly USIK and Yamandú H. HILBERT: What makes a Levallois core Nubian, type-list or classification?

Rémy CRASSARD and Yamandú H. HILBERT: The Middle Paleolithic of central and northern Saudi Arabia and their implications on demographic dispersals

Beshkani AMIR: The extent of the normalization of Nubian cores and the use life of Nubian debitage

Knut BRETZKE: On the diversity of the Paleolithic record in Sharjah, UAE

Anthony SINCLAIR: Palaeolithic or Stone Age: exploring a language for the archaeological record of the first hominins in Arabia

Yamandú H. HILBERT: Technological and typological variability of Upper and Late Palaeolithic stone tool assemblages from South Arabia

Inna MATEICIUCOVÁ *et al.*: A new lithic site at the sediment-filled depression Ḥayl Al-Āja on the eastern side of Jebel Kawr, North Oman

Heiko KALLWEIT and Mark BEECH: Lithics from Dalma Island excavations - remarks on the lithic collections from Dalma Island excavations 1992-2014

Denis ŠTEFANISKO: Behind the Border: The chipped industry of ‘Ainab 1A. Early Pre-Pottery Neolithic B (8500 -8100 cal. B.C.) site at Jabal ‘Ainab (South-east Badia, Jordan)

Anne JÖRGENSEN-LINDAHL: Micro-wear analysis on Epipalaeolithic and PPN chipped stone assemblages from southwest Asia – past and present

Maria MAIORANO *et al.*: Living and moving around the area of Maitan: Neolithic workshops and regional exchanges in Southern Rub al Khali (Sultanate of Oman)

Hans Georg K. GEBEL: The Hamrian Punch. Cone shell meat extraction in coastal Oman’s later prehistory. A Replicative system analysis

Norbert BUCHINGER *et al.*: Early Bronze Age knapped lithics from Hili 8 – a first technological assessment

Ullrich OCHS: A Hafit Period stone tool assemblage from al-Khashbah, Sultanate of Oman

Mark W. MOORE *et al.*: Bronze Age microlith technology at Saruq-al Hadid, Dubai

Silvia LISCHI and Yamandú H. HILBERT: Preliminary investigation of the lithic industry from the Iron Age coastal settlement at Inqitat (HAS1), southern Oman

Discussions / Conclusions / Publication planning

Workshop Report
The Pathways of the Neolithic in Southern Levant
A Marie Curie Actions Workshop Organised by Jonathan Santana
Durham University, 30th October 2019

Hans Georg K. Gebel

This seminal workshop united fresh and critical PhD research with novel field and desk research on Southern Levant's Neolithic pathways; it was organised by Jonathan Alberto Santana Cabrera, the Marie Curie research fellow hosted by the Department of Archaeology, Durham University, and took place in the Lindisfarne Centre of St Aidan's College at Durham University. At the same time the workshop was completing the efforts of J. Santana's Marie Curie-Project ISONEO at Durham: *Isotopic evidence for diet and mobility during the Neolithic transition to farming in the Near East.*

In his invitation letter, J. Santana states that "traditional hypotheses explaining the advent of farming stress the enhanced security and predictability of food procurement, due to the nutritional complementarity and productivity of combining crops and livestock." He highlighted also that "the invention of agriculture and stock-keeping, and their substitution for hunting and gathering, are widely acknowledged to have been slow and regionally and chronologically uneven. As this was not a conscious process — no models of farming were available — a transitional stage is assumed, with partial dependence on domesticates, and variability between site economies." Referring also to the selection of speakers, J. Santana stated that the pathways' evidence has become subject to "varying degrees of complementarity and compatibility", asking that contributions should approach questions like trigger factors in plant domestication; innovations in early animal domestication; social structures necessary to sustain densely populated permanent farming villages; and the significance of various sorts of migration in establishing and sustaining Neolithic village life.

The workshop again exposed a basic feature of Neolithic research: Inconsistencies in cross-regional and cross-period comparison are taken as indications of Neolithic diversity and temporality; but then – instead of working with the evidence of polycentricity and impermanence and take findings as evidence of its own right – arguments are formed to make things matching again, leading to more confusion. However, it is most promising to see how research advances by the critical attitudes and questions of the young and younger colleagues (Fig. 1), challenging in this workshop conventional understanding of the Neolithic from their fields of research (A. Arranz, E. Fernández, J. Santana, E. Boceage, but also C. Makarewicz and F. Bocquentin).

Amaia Arranz questions the cereal centers-/ founder crops-concepts, and sequential domestication concepts of wild plant gathering (late Epipalaeolithic) to pre-domestication cultivation (PPNA) to plant domestication (MPPNB) to agriculture, asking: How single-evidence plant remains can be interpreted as founder crops while abundantly attested species are interpreted as unwanted?

Eva Fernández questioned the quality of many aDNA samples. Among other, she stated that the start of the Neolithic seems to be characterised by divided genomic structures, with a clear difference between the southern Levant and Anatolia/ South Zagros.

Jonathan Santana (Fig. 2) provided data from his isotope research on `Ain Mallaha, Tell Qarassa, Kharaysin, and `Ain Ghazal, stating that there was a basic difference between limestone and volcanic regions. Significant evidence for population aggregation are attested for the Natufian while human migration appears to be insignificant for the PPNB-C (non-local individuals below 10%).

Ferran Borrell (Fig. 3) doubted that the MPPNB hunters of Nahal Efe represent "real" foragers and compared its architecture with Shakārat al-Musay'id, `Ain Abu Nukhaila, Nahal Reuel and Issaron. A small pit containing the bones of birds-of-prey was an intriguing finding at the site.

Cheryl Makarewicz remembered that „a goat is a goat!", stressing that it is highly problematic to distinguish between bezoar and ibex without having horncores. For the southern Jordanian Highlands, in addition, ibex and bezoar were sympatric. On the Near Eastern level, multiple and divergent wild goat sources contributed to domestic species and managed early herds; the bezoar rapidly dispersed from north to south. And: Evidence has become safe for the translocation of domestic Ovis-Capra into the eastern steppes, starting by the LPPNB.

Emmy Bocaege presented results from Shubayqa on the basis of 10 individuals, attesting a high child mortality (80% of the up to three years) with burials inside the residential space. While red and yellow pigmentation of post-cranial bones and skulls appears rare in the Natufian, they are attested for an adult of Shubayqa.

Fanny Bocquentin spoke about diet transition attested with the shift from foraging to producing lifeways, and how this is reflected in dental health. She stated that caries ratios (and oral pathology) remain stable from the Natufian to the PPN (under 10%), and that the carbohydrate diet likely relates to higher reliance on cereals. She reclaimed the hypothesis that the Neolithic „fertility explosion" is the result of high calorie food.

Juan J. Ibánez presented most recent and comparative results of the architectures from Central Jordan's Kharaysin and Sueida area's Tell Qarassa North, discussing also stratigraphical relationships between

curvilinear and rectangular structures throughout the PPNA - MPPNB.

Hans Georg K. Gebel concluded the one-day lecture series by revisiting the LPPNB Transjordanian Mega-Site Phenomenon. He claimed that the new evidence of contemporary kite-economies in the eastern steppes (works of Wael Abu Azizeh and Muhammed Tawaneh) as well as the incipient pastoralism entering the steppes from the mega-sites may have contributed to the collapse of the crowded mega-villages within few generations: A developing and possibly autonomous pastoral social paradigm of the steppes became an attractive and less „stressful" alternative lifeway, most likely promoted by a fusion with remaining late hunter-gatherers of the steppes.

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Programme of the *The Pathways of the Neolithic in Southern Levant* Workshop held at Durham University, 30th, October 2019

Old tales, new perspectives: Revisiting the origins of agriculture in SWA. *Amaia Arranz, Copenhagen University*

Ancient DNA of Near Eastern Neolithic populations: the knowns and the unknowns. *Eva Fernández, Durham University*

Neolithization processes in the Levant: Nahal Efe and the case of the Negev and Sinai deserts (10th-8th millennia cal. BC). *Ferran Borrell, CSIC*

Nascent animal management, domestication and translocation in the southern Levant. *Cheryl Makarewicz, Kiel University*

Reconstructing mobility of Neolithic people in southern Levant: evidence from strontium, oxygen and carbon isotope analyses. *Jonathan Santana, Durham University*

Natufian human remains from Shubayqa 1 within the context of mortuary practices, health and biological diversity in the late Epipalaeolithic Near East. *Emmy Bocaege, University of Kent*

Subsistence and foodways transition during Neolithization process: glimpses from a contextualized dental perspective. *Fanny Bocquentin, CNRS*

Early Neolithic architecture in Tell Qarassa North and Kharaysin: understanding innovation and regional interaction processes. Juan J. Ibáñez, CSIC

The Jordanian Highlands' LPPNB Mega-Site phenomenon: Promoters of rise and collapse revisited. *Hans Georg K. Gebel, Free University of Berlin and ex oriente, Berlin*

Fig. 1 Participants of the Workshop organised by Jonathan A. Santana Cabrera at the Department of Archaeology, Durham University, October 30th, 2019. (Photo: Gebel)

Fig. 2 Jonathan Santana at his lecture on strontium, oxygen and carbon isotope evidence for the mobility of southern Levant's Neolithic people. (Photo: Gebel)

Fig. 3 Ferran Borrell at his lecture on Nahal Efe. (Photo: Gebel)

Conference Report
9th International Conference on the PPN Chipped and Ground Stone Industries of the Near East (PPN9) University of Tokyo, 12th -16th of November, 2019

Hans Georg K. Gebel

More than 100 participants (Fig. 1) attended the ninth International Conference on the PPN Chipped and Ground Stone Industries of the Near East (PPN9) at the University of Tokyo from 12-19 November 2019. The meeting was hosted by Yoshiro Nishiaki of Tokyo University, assisted by Masashi Abe (Tokyo National Research Institute for Cultural Properties), Chie Akashi (The University Museum, University of Tokyo), Makoto Arimura (Tokai University), Sumio Fujii (Kanazawa University), Seiji Kadowaki (Nagoya University), Osamu Maeda (University of Tsukuba), and Takahiro Odaka (The University Museum, University of Tokyo).

While welcoming new results of lithic studies and theoretical considerations from Levantine areas in their invitation letter, the organisers particularly encouraged contributions on the Neolithization of the Zagros and Central Asia, aiming to support the PPN8 trend to increase research from regions beyond the Levant. This "trend undoubtedly contributes in turn to Neolithic research in the Levant", and "permits the interpretation of the Neolithic of the Near East from a more balanced perspective." In addition, contributions were specifically invited on the Neolithization Processes in the Fertile Crescent and Beyond, as well as on the Introduction and Development of Pressure Techniques in the Neolithic.

Despite the distant location of the conference, the number of participants was high due in no small part to the attractiveness of Tokyo. However, the PPN9 participant number may say little about an increasing number of PPN stone technology specialists: Because the organisers opened the meeting this time for non-lithic topics, approximately 25% of the 62 lectures and 16 poster presentations (Fig. 4) were substantially or exclusively devoted to non-lithic topics. While it is always highly interesting and necessary to have recent news from excavations or share new ideas on the Pre-Pottery Neolithic, this at least would demand an open discussion to where we go from here. Is it possible that non-lithic topics were invited to balance an expected reduced registration for the conference, due to the long distance for most participants from Tokyo, and the feature not stands for a shift of the conferences' policies?

There certainly is a back-to-the-roots faction among us whose aim is to concentrate only on the technological, chronological, and regional complexities of stone technologies. While this is justified we should not forget that stone technologies are embedded in and connected to larger socio-economic and cognitive systems of a site/ of cultures, requiring at least a minimum of contextual evaluation for lithic industries, including meta-theoretical levels of interpretation. While topics not immediately connected to lithic industries may dilute the aims and productivity of future gatherings, a balanced input of observations on general Neolithic developments is imperative for interpreting the developments and trends of lithic technologies. A new section in the PPN gatherings, assembling site and general news and not necessarily becoming part of the proceedings, might provide such essential information.

As the topics of the PPN Chipped and Ground Stone Industries of the Near East conferences widen, perhaps this requires a revision of their title (for instance "PPN stone technologies"). Many artifact classes share technologies, *e.g.* ground and building stones, beads and flint borers, whetstones and grinding slabs. Accordingly, additional fields of stone technologies have joined the original chipped stone orientation of the conferences (Gebel 2011), starting early with the groundstone and including presently mineral bead production (see contributions by Alarashi and Bar-Yosef Mayer/

Fig. 1 PPN9 group photo of participants and staff. (Photo: Jammo)

Groman-Yoaroslavski/ Porat; Fig. 2), stone rings, and building stones. Another trend becoming more visible than before but still hasn't gained the needed momentum are biographic approaches to stone tools and stone tool production. A missing trend – in my understanding – are the still needed studies of Neolithic stone commodification (Gebel 2013).

Traceological studies are gaining increasing importance in chipped, ground and ornament stone research, as also attested with the PPN9. It will be necessary to apply these approaches and techniques to more concrete or systematically followed research questions, and to leave the current levels of randomly selected samples (also raised by Frank Hole as a critical issue). However, we should keep in mind that in this field we are still in a testing and experience-gaining phase, especially when it relates to high-power microscopy.

Presently Arabia's chipped stone specialists have their own meetings (*cf.* the contribution "Struggles To Make Sense" in the current issue of *Neo-Lithics* 2019), with a research not yet connecting with the Near Eastern approaches. While this segregation is understandable and good for sorting out Arabia's local lithic traditions and their chronologies as developments in their own right, the time has come for joint conferences and discussions to integrate efforts to create the general pictures of interacting socioeconomic and cognitive stone-use developments of the entire region Middle East.

Among the many new material assemblages and data analyses presented in Tokyo (*cf.* the contributions listed below), and impossible to record here, most interesting "non-lithics" ideas, hypotheses, and results included:

- The increase of arrowheads in Early Neolithic times a signal of increased violence? (Barzilay and May);
- Site areas reserved for cemeteries in the Late Natufian? (Grosman and Belfer-Cohen);
- Ba`ja flint daggers biographically pass through 3-4 types of commodity statuses before buried in a grave (Gebel *et al.*);
- LPPNB bird-of-prey catching/ hunting stations: Nahal Roded 110? (Birkenfeld *et al.*);
- Evidence for a hunting accident at Jabal Khashabiyeh? (Crassard *et al.*);
- Nahal Yarmouth's "houses of the dead" (Ackerfeld *et al.*);
- Apart of attest knowledge transfer and learning in lithic production: Do debitage samples testify children playing with flint? (Purschwitz)
- Motza a FPPNB mega-site (Vardi and Khalaily);
- Rise of female life expectancy in the PN? (Eshed and Gopher);
- Gradual return of microliths a result of the 8.2 ka event? (Abe *et al.*);
- Asiab (9600-9300) a non-residential (ritual?) hunter-gatherer center? (Darabi and Richter);
- Gradual increase of pressure technique from the Pre-Mlefatian to the Mlefatian (Richter and Darabi);
- "Manuports" (geofacts) neglected by research show human ethological relations to nature products understood for their symbolic meaning (Szymczak);
- Motza's limestone rings a significant element of cultural inventory (Milevski *et al.*);
- Use of specific gestures in grinding tools' represent technological choices (Pedersen);
- ventilation shafts in Balıklı! (Goring-Morris *et al.*); etc.

In addition to the poster session (*cf.* the contributions listed below), the conference included a hands-on session in which a number of Japanese and foreign colleagues presented lithic assemblages and replicative demonstrations (Figs. 5-6) during which chert and obsidian cores were prepared and reduced by hard and soft hammer percussion as well as pressure techniques (see list of demonstrators in the caption to Fig. 5).

In the closing session Yoshiro Nishiaki presented a lecture on Japan's Jomon culture (Fig. 7), after which a short discussion took place on the location of the next meeting, PPN10. As has happened before, potential hosts could not firmly issue invitations – prior to negotiations with their institutions – for the next gathering in 2022. A prime option already offered at the PPN8 gathering is Copenhagen. Osamu Maeda suggested Berlin,

Fig. 2 Hala Alarashi introducing stone bead technologies in the first conference section. (Photo: Gebel)

Fig. 3 Frank Hole, Hans Georg K. Gebel, Karol Szymczak and Yoshihiro Nishiaki at the conference's welcome dinner which was also Frank Hole's 88th birthday eve. (Photo: Babazade)

proposing a kind of restarting of the cycle; Baku and Jerusalem were also mentioned. The departing organising committee will take care for the negotiations about the next meeting while preparing the proceedings of the Tokyo meeting; the deadline for the submission of contributions is July 31st, 2020.

An opulent Japanese welcome (Fig. 3) and Italian farewell dinner was served to participants, with long post-dinner social interaction. An excursion concluded the conference on November 16th, taking participants to the Yamanashi Prefecture Archaeological Museum with its focus on the Jomon Culture, to a lunch at Lake Kawaguchi (Fig. 8), and to a pilgrim centre near hot springs at the foot of Mount Fuji.

This gathering's intimacy and cosiness, vivid and fundamentally esteeming personal exchange crossing the intangible borders set by our own governments' aggressive policies, brought together again the colleagues and friends from 17 countries on a truly warm family's level. Maybe more than ever. It was touching to have seen and felt this, and maybe we have in this the real benefit of our meetings. For Tokyo, this, of course, also relates to the considerate policies of the organisers and staff around Yoshihiro Nishiaki, whom we deeply thank for their devoted and efficient organisation of the meeting, and the flair and taste they gave to it.

Fig. 4 Scene of the PPN9 poster session. (Photo: Gebel)

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Gebel H.G.K.

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2013 The Neolithic commodification of stone. In: F. Borrell, J.J. Ibáñez, and M. Molist (eds.), *Stone tools in transition: From hunter-gatherers to farming societies in the Near East.* 7th Conference on PPN Chipped and Ground Stone Industries of the Fertile Crescent: 191-205. Bellaterra (Barcelona), Universitat Autònoma de Barcelona. Servei de Publicacions.

Presentations and Sessions at the 9th *International Conference on the PPN Chipped and Ground Stone Industries of the Near East*, Hold at Tokyo University, November 12th – 16th, 2019

PRODUCTION AND USE OF TOOLS

T. YASHUV and L. GROSMAN: Drilling tools and perforated items at cultural crossroads

H. ALARASHI: Lithic tools involved in stone bead-making during the Pre-Pottery Neolithic: a beads' perspective

D.E. BAR-YOSEF MAYER, I. GROMAN-YOAROSLAVSKI and N. PORAT: The stone beads of Nahal Hemar Cave

H. KHALAILY, K. VARDI, A. KARASIK and O. BARZILAI: Morpho-metric analysis of arrowheads from Motza and continuity and change in PPNB assemblages

O. BARZILAI and H. MAY: Weapons or hunting tools? Evaluating the role of Pre-Pottery Neolithic B projectile points

F. ABBÈS and F. PICHON: Arrows and archery during the PPNB, an experimental approach: points production and use

H.G.K. GEBEL, C. PURSCHWITZ, D. STEFANISKO and M. BENZ: The flint daggers from LPPNB Ba`ja

YEGOROV, O. MARDER, H. KHALAILY and S.A. ROSEN: The heat treatment of flint in the Early Pre-Pottery Neolithic B site of Motza (Judean Hills, Israel)

NATUFIAN HORIZON: A PPN PREDECESSORS

A. YAROSHEVICH, E. BOARETTO, N. GREENBAUM, Y. ROSKIN, N. PORAT and V. CARACUTA: Aurochs horns in Natufian occupational context at Ein Qasish South, Jezreel Valley, Israel: implications for the understanding of site function and symbolic behavior of the last hunters-gatherers in the Levant

Fig. 5 PPN9 replicative session with demonstrations by Frédéric Abbès, Theresa M. Barket, François Briois, Fumika Ikeyama and Miho Suzuki, Masoyoshi Oba, Karsuhiko Ohnuma, Juan Antonio Sánchez Priego. (Photo: Gebel)

L. GROSMAN, A. BELFER-COHEN: The Natufian: burials as a cultural marker

A. JÖRGENSEN-LINDAHL: Preliminary results from a functional analysis of Natufian chipped stone tools from Shubayqa 1, Jordan

NEW DISCOVERIES IN THE ARID AREAS

L. EDELTIN, O. MARDER and J. VARDI: On the edge of sedentism at the northwestern Negev dune-fields and subsistence strategies during the Middle to Late Epipaleolithic: the Ashalim chipped stone assemblages

F. BORRELL and J. VARDI: The lithic industries of Nahal Efe and the PPNB of the Negev

M. BIRKENFELD, L.K. HORWITZ and U. AVNER: Investigations at Naḥal Roded 110: a Late Neolithic ritual site in the southern Negev

R. CRASSARD, J.A. SÁNCHEZ PRIEGO, W. ABU-AZIZEH and M. TARAWNEH: A Late PPNB lithic assemblage associated to kite hunters from Jibal al-Khashabiyeh, southeastern Jordan

Fig. 6 PPN9 replicative session: participants' children imitating chipping, as if they want to support Christoph Purschwitz' claim that our debitage samples include material from children's activity. (Photo: Gebel)

S. FUJII: Wadi Sharma 1 and the Hijaz PPNB: new insight into the Neolithization in NW Arabia

OUTLOOK FROM THE WEST: LEVANTINE LITHIC TRADITIONS (chair: M. Arimura)

J.J. IBÁÑEZ, F. BORRELL and I. CLEMENTE: PPNA and PPNB lithic industries at Kharaysin (Jordan)

M. ULLMAN: A new Early Pre-Pottery Neolithic B site at Nesher-Ramla Quarry, Israel

T.M. BARKET: Different strokes for different folks? Comparing the flaked-stone assemblages from the Neolithic sites of 'Ain Ghazal and Wadi Shu`eib

A. LEVY: Intra-site variability in the Pre-Pottery Neolithic B site of Yiftahel: lithic techno-typological analyses

A. EIRIKH-ROSE, K. ZUTOVSKI, H. ASHKENAZI and A. GOPHER: Nahal Yarmuth 38: a new PPNB and PN site in central Israel

K. ZUTOVSKI: Aspects of techno-typological change in sickle blades from the PPNB to the EBA: a socio-economic view based on Ha-Goshrim, Nahal Zehora II, Ein Zippori, and Nahal Yarmuth 38, Israel

D. ACKERFELD, A. EIRIKH-ROSE, H. ASHKENAZI, K. ZUTOVSKI and A. GOPHER: Entangled in lime: a contextual materialistic examination of the multi layered plaster floors at PPNB Nahal Yarmuth 38

C. PURSCHWITZ: Household-level lithic production and knowledge transfer at LPPNB Ba`ja, southern Levant: first results

D. ROKITTA-KRUMNOW: The lithic assemblage of Eh-Sayyeh and the PPNC of northern Jordan

Fig. 7 Yoshihiro Nishiaki gives his lecture about the Jomon Culture in the closing session. (Photo: Gebel)

J. VARDI and H. KHALAILY: The Final Pre-Pottery Neolithic B mega site of Motza (Judean Mountains)

L. BRAILOVSKY and D. SHALEM: The elusive Neolithic occupation of 'En Asur, central Israel

PPN SOCIETIES BEYOND LITHICS

G. HAKLAY and A. GOPHER: Architectural planning and geometric regularities in Natufian and PPN architecture: case studies from the southern and northern Levant

M. KINZEL: Building Göbekli Tepe. New insights and results

A. GOPHER, S. ABBO and S. LEV-YADUN: The cultural distinction between plant domestication and crop evolution: comments on the archaeological process and resolution

V. ESHED and A. GOPHER: Agriculture and life style: a paleodemography study of Pre-Pottery and Pottery Neolithic farming populations in the southern Levant

A. BELFER-COHEN and N. GORING-MORRIS: Social turmoil: 'Us and Others' in the Pre-Pottery Neolithic

EGYPTIAN CONNECTION IN LITHICS

N. SHIRAI: A lithic perspective on the Neolithisation of Egypt

Y. TRISTANT, F. BRIOIS and B. MIDANT-REYNES: Go west: new discoveries concerning the PPNB in the Eastern Desert of Egypt between the Sinai and the Nile Valley

EXTENDED VIEW FROM THE EAST: LITHICS FROM THE CAUCASUS TO ZAGROS

M. ARIMURA, K. MARTIROSYAN-OLSHANSKY, A. PETROSYAN and B. GASPARYAN: What are the differences between the Mesolithic and Neolithic sites in Armenia? A comparison of the chipped stone tools from Lernagog and Masis Blur

L. ASTRUC, D. GUILBEAU, B. GRATUZE, B. LYONNET and F. GULIYEV: Neolithic chipped stone industry of Mentesh Tepe, (Middle Kura Valley, Azerbaijan): technological markers and relations to eastern Anatolia

S. KADOWAKI Spatial analysis of Neolithic chipped and ground stone artifacts at Hacı Elamxanlı Tepe in the southern Caucasus

H. FAZELI NASHLI and M.W. GREGG: Pre-agricultural plant and animal management and the emergence of a low-level, food-producing society in the southern Caspian basin during the early Holocene

Fig. 8 Excursion lunch at the Lake Kawaguchi on the gathering's last day. Standing: Chie Akashi, one of the organisers. (Photo: Gebel)

M. JAYEZ and H.V. NASAB A brand new thing: bladelet production techniques and methods in Caspian Mesolithic and Neolithic chipped stone industries

D. BAIRD: The development of early Neolithic chipped stone industries in the northern Zagros: the Palegawra and Karim Shahir assemblages

J. THOMALSKY: Lithic pathways between the Zagros and S-Caucasus (and beyond)

H. DARABI and T. RICHTER: Re-investigating Neolithic transition in the central Zagros as seen from recent excavations at Asiab and Ganj Dareh

T. RICHTER and H. DARABI: The chipped stone industries from the new excavations at Asiab and Ganj Dareh: dating, comparisons and insights

B. MILIĆ, B. HOREJS and L. NIAKAN: Towards the understanding of the Early Neolithic in the Zagros Mountains: results of new investigations in the Ilam province, Iran

M. ZEIDI, J. LINTON and N.J. CONARD: Lithic use-wear analysis from the Early Neolithic site of Chogha Golan in western Iran

M. ABE, S. ARAI and M. KHANIPOUR: Returning to hunting and re-microlithization during the Mushki phase in Fars, the southern Zagros

LITHIC TRADITION IN SOUTHEAST ANATOLIA

Ç. ALTINBILEK-ALGÜL, S. BALCI, D. MOURALIS and N. KARUL: A PPNA settlement in the upper Tigris basin (southeastern Anatolia): Gusir Höyük

O. MAEDA: Change and continuity in the lithic industry of Hasankeyf Höyük: a PPNA hunter-gatherer site on the upper Tigris

J. SCHLINDWEIN: The chipped stones of Göbekli Tepe: new insights into the PPNA and PPNB

Hands-on and Knapping Session

USE OF GROUND, POLISHED AND UNWORKED STONES

K. SZYMCZAK: The symbolic meaning of the Neolithic manuports: the examples from Nemrik 9, northern Iraq, and Ayakagytma 'The Site', Uzbekistan

I. MILEVSKI, H. KHALAILY and J. VARDI: The stone rings from Motza

P.N. PEDERSEN: Initial use-wear analysis of ground stone from two Natufian-PPN sites in the Qa' Shubayqa of Eastern Jordan: ground stone and changing foodways

CHIPPED AND GROUND STONES IN CYPRUS

A. MCCARTHY: Flaking or grinding as preform ground stone reduction techniques: habits of stone tool production in prehistoric Cyprus

C. MCCARTNEY: Blade technology at Ais Yorkis, social and cultural associations

PROCUREMENT AND USE OF OBSIDIAN

E. HEALEY, S. CAMPBELL and O. MAEDA: Big data! Obsidian in the Levant

R. MOIR, T. CARTER and O. MAEDA: Hasankeyf Höyük: preliminary results of the geochemical sourcing of obsidian from a southeastern Anatolian, PPNA site

H.C. SCHECHTER: Late Neolithic Çatalhöyük: lithic procurement, production and use in a pan-regional perspective

D. GUILBEAU: Tepecik Çiftlik (Turkey) and the exploitation of Cappadocian obsidian during the 7th millennium: preliminary results

NEW PERSPECTIVE FROM CAPPADOCIA

A. VINET, D. GUILBEAU and M. GODON: The exceptional chipped stones and pottery assemblage from the "BY space" at Tepecik Çiftlik (Cappadocia, Turkey, ca 6000 cal BC): a techno-functional study

N. KAYACAN, G. DURU, M. ÖZBAŞARAN and N. GORING-MORRIS: Integrating the processes of sedentism atop the Central Anatolian Plateau in light of the Cappadocia Prehistoric Survey (CAPs)

N. GORING-MORRIS, G. DURU, M. ÖZBAŞARAN, M. ERGUN, N. MUNRO, M. STINER and N. KAYACAN: Introducing Balıklı: an early Holocene settlement in Cappadocia

Lecture at the Intermediatheque Y. NISHIAKI: A Levantine view of the Jomon culture of the Japanese Archipelago

Discussion and Closing

POSTER PRESENTATIONS

D. ACKERFELD, A. EIRIKH-ROSE, H. ASHKENAZI, K. ZUTOVSKI and A. GOPHER: The lithic assemblages of Nahal Yarmuth 38: a new PPNB site in central Israel

H.C. SCHECHTER, K. ZUTOVSKI, A. EIRIKH-ROSE, H. ASHKENAZI and A. GOPHER: Shells from Nahal Yarmuth 38

H. PAROW-SOUCHON and C. PURSCHWITZ: Diachronic change in raw material procurement and use during the Upper Palaeolithic and Early Neolithic of the southern Levant

F. PICHON: Traces and function: the case of "ergot" blades and proximal notched blades, EPPNB Dja'de el-Mughara (northern Levant)

M.R. IOVINO: Practical and symbolic obsidian function(s) in PPNB societies: interpretative insights through a revision of technological and traceological approaches

E. HEALEY and S. CAMPBELL: Innovation, adaptation or development? The non-tool use of obsidian in the PPN

S. BALCI and Ç. ALTINBILEK-ALGÜL: A new site in the volcanic Cappadocia (Anatolia): Kayırlı-Değirmenyolu

B. MILIĆ, A. TIMPSON, B. HOREJS and M.G. THOMAS: Results of the pilot study on the computer modelling of the spread of pressure technique from the Near East to Aegean

F. IKEYAMA, F. GULIYEV and Y. NISHIAKI: Regional variability of obsidian pressure blade technology in the Neolithic of the South Caucasus

Y. NISHIAKI, A. ZEYNALOV, M. MANSUROV and E. BABAZADE: The Mesolithic and Neolithic flaked stone assemblages from Damjili Cave, west Azerbaijan

T. ODAKA, O. MAEDA, K. SHIMOGAMA, Y.S. HAYAKAWA, Y. NISHIAKI, N.A. MOHAMMED and K. RASHEED: Late Neolithic in the Shahrizor Plain, Iraqi Kurdistan: a new evidence from Shakar Tepe, the excavations in 2019

A. YAROSHEVICH, D. KIRZNER, E. VAN DEN BRINK, E. BOARETTO and N. GREENBAUM: Technological variability during the early Pottery Neolithic of the Levant: a view from Tel Izhaki, a recently discovered early PN site in the Jezreel Valley, Israel

M. KHANIPOUR and S.J. YEGANEH: Investigation of ground stone function in Hormangan, a Neolithic site in the south of Iran

I. MILEVSKI: The evolution of basalt bowls from the Late Pottery Neolithic to the Chalcolithic period in the southern Levant

H.G.K. GEBEL: LPPNB building stones: craft and cognition

S. JAMMO and A. TSUNEKI: Gender-based division of labour between household members: an investigation from Tell el-Kerkh, northwest Syria

Chairpersons of sessions were: T. Richter, S. Kadowaki, M. Arimura, M. Barzilai, F. Borrell, D. Rokitta-Krumnow, B. Milic.

Jammo, Sari
2018 *Beyond Death: The Tale of a Neolithic Society and the Study of an Outdoor Communal Cemetery at Tell el-Kerkh, Northwest Syria.* PhD thesis, University of Tsukuba. Supervisors: Akira Tsuneki, Yutaka Miyake, Shigeo Yamada, and Yoko Taniguchi.

Abstract

People in Near Eastern Neolithic societies buried their dead in various locations. Most often the deceased were buried within the settlement boundaries and associated with certain building structures and in courtyards. Through the long process of transition into agricultural societies and settled-farmer villages, major changes related to social structure, funeral practices and the role of the deceased in the life of the living were notable. Various complicated funeral practices including the disposal of the dead and the manipulation of the remains suggests that the inhabitants were involved in spirituality. Further, the relationship between the deceased and living influenced the spiritual dimension of human societies. Thus, the deceased were always buried close to the living or interred in structures that were used in daily life suggesting a spatial tie between the living and space.

Throughout the long period of development in the ancient societies from the hunting- gathering nomadic way of life in the Natufian period to the settled farming way of life in the Neolithic period, the location of graves and the interment pattern varied. In this research, a number of sites were selected from each period in order to ascertain the spatial context of the grave location in the settlement and the role of the dead in the lives of the living. Analyses have shown that the burials in the Natufian period took place in the fill of structures or were associated with dwellings and occasionally in abandoned houses. Further, some sites were used exclusively for burials before the construction of the settlement such as Hilazon Tachtit and Raqefet Cave, which indicate that the grave played a role in the settlement foundation. In contrast, the burials in the Pre-Pottery Neolithic period were tied to the settlement's residential areas and took place in some instances in actively used structures. However, non- residential structures bearing religious meaning were also used as the final place for burials. Hence, a spatial relationship between the venue where the communal activities took place and the burials is obvious. Further, the deceased were buried in close vicinity to the residential structures where ritual practices were undertaken. The human remains were ultimately placed in their final deposit and were in general associated with building structures. Thus, the building structure played a role by linking the living to their ancestral lineages indicating a place-based identity.

Excavations in the PN period have revealed a completely altered image of life ways in PPN societies. The northern Levantine sites revealed the existence of cemeteries for the first time during this period, which indicates a major transition in this period. In this context, the excavations at Tell el-Kerkh in northwestern Syria revealed a unique outdoor communal Pottery Neolithic cemetery. This cemetery was utilized for inhumation of the deceased regardless of age and sex. A limited number of individuals were buried in the structure after it was abandoned.

The transition in the burial location during the PN period and the major changes related to the funeral practices and the concept of expressing of identity demonstrates a high degree of social complexity. The common custom of interring the deceased in association with buildings, widely prevalent in the PPN, became less obvious. It is strongly argued that the houses in the PN became increasingly related with economic activities rather than ancestor-based rituals. The spatial relationship between the dead and the location of the grave in the PN period is linked to particular places that formed a bridge connecting the generations to each other. These locations were in close vicinity, in active-use or abandoned houses or on the designated land that allowed communal sharing activities and construction of a collective identity.

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TABLE OF CONTENTS

List of Figures
List of Tables
Abstract

CHAPTER 1: Introduction
1. Research Background: Burial Customs/ Location in the Near East
2. Objective of this Research
3. Thesis Outline

CHAPTER 2: Burials in Archaeological Contexts in the Natufian and the Pre-Pottery Neolithic Period
1. Natufian Period
2. Pre-Pottery Neolithic A Period (PPNA)
3. Pre-Pottery Neolithic B Period (PPNB)

CHAPTER 3: Tell el-Kerkh and its Pottery Neolithic Cemetery
1. Archaeology of the Rouj Basin
2. Research History and Excavation at Tell el-Kerkh
3. Tell el-Kerkh Neolithic Cemetery
4. Burial Types in Kerkh Cemetery
5. Burials at Tell el-Kerkh Cemetery
6. Stratigraphy of the Kerkh Cemetery and the Distribution of Burials
7. Skull Removal Practice and Cycling of Human Body Parts at Tell el-Kerkh

8. Circulating Human Bones
9. Grave Goods at Tell el-Kerkh Cemetery

CHAPTER 4: Burials in the Pottery Neolithic Period
1. Introduction
2. Settlement Patterns
3. Burials and Funeral Practices
4. Further Investigation of Burials in the Pottery Neolithic Period
5. The Significance of PN Sites: Similarities, Differences and General Characteristics
6. Final Remarks

CHAPTER 5: Discussion – Reasons for the Emergence of Tell el-Kerkh Cemetery
1. Environmental and Natural Contexts
2. Social and Organizational Contexts
3. Economic and Private Property Perspective

CHAPTER 6: Conclusion

Reference List

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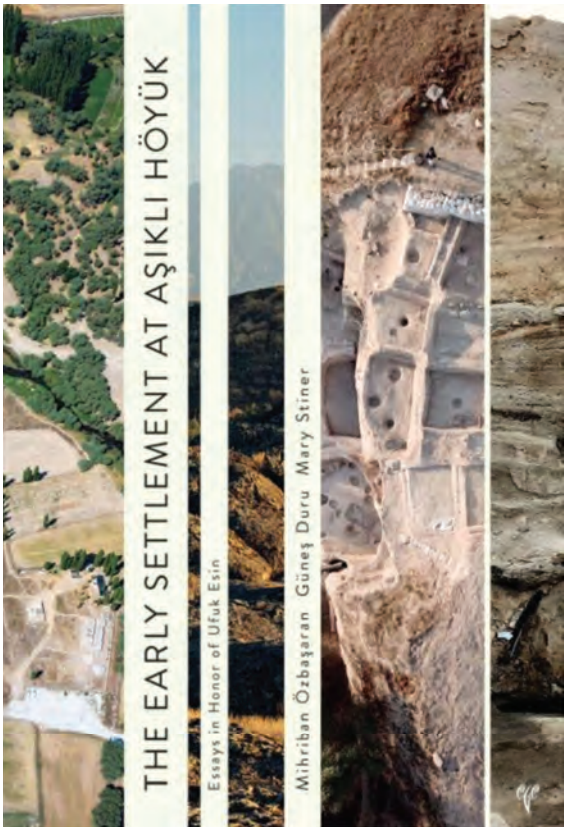
Review of Mihriban Özbaşaran, Güneş Duru, and Mary C. Stiner, 2018. *The Early Settlement at Aşıklı Höyük. Essays in Honor of Ufuk Esin.* Istanbul: Ege Yayınları. ISBN: 978-2-271-08740-9.



"*We began organizing a new program of investigation at the site in 2006, and we commenced new excavations in 2010 with the aim of pursuing a more detailed understanding of trends first identified by Prof. Esin and exploring more deeply what remained to be learned about Aşıklı. We attempted to understand the individual actions and 'snapshots' from the daily life of the inhabitants with our revised approach and methodology [...] The revival of the project has also allowed younger generations to be trained in many aspects of archaeology.*"

These sentences at the beginning, at the end of the second paragraph of the preface summarise the aim of the international, third-term excavations and studies at Aşıklı Höyük under the direction of Mihriban Özbaşaran. (Our friend and colleague Prof. Ç. Nur Balkan-Atlı, former director of the second-term Aşıklı Höyük excavations, passed away on 10th, April 2019. We are deeply sorry.)

The monograph starts with a broad introduction to the Aşıklı Höyük Project and is followed by fifteen essays on different areas of research. A comprehensive conclusion and a rich bibliography are completing the volume.

The volume contains the results of scientific investigations by international teams on the site's geomorphological setting, ^{14}C dating, architecture, micromorphology, multi-element characterization, phytolith analysis, archaeobotany, zooarchaeology, chipped stone industry, beads (ornament materials), and physical anthropology. As attested by the team members, Aşıklı Höyük seems to be "*one of the most intensively studied early Pre-Pottery Neolithic sites in Southwest Asia*" (437 and back cover).

- M. Özbaşaran and G. Duru, "Introduction to the Aşıklı Höyük Project" (1-14) is divided, after a short introduction, into three sub-titles as: History of Research; The Core Team and Participants; Support for the Aşıklı Höyük Project.
- C. Kuzucuoğlu and her team, J.-P. Dumoulin, and S. Saulnier-Copard present the "Geomorphological and Paleoenvironmental Setting of Aşıklı Höyük" (15-42). The essay on this long-term study increases our knowledge about the formation of the Melendiz River valley during the Late Quaternary, and the impact of the river system and the surroundings on Aşıklı Höyük's early Pre-Pottery settlement.
- J. Quade, M.C. Stiner, A. Copeland, E.E. Clark and M. Özbaşaran's "Summary of Carbon–14 Dating of the Cultural Levels of Aşıklı Höyük" (43-56) deals with earlier and newly obtained 77 radiocarbon dates, mostly from the deep soundings of Area 4GH and from the west face Area 2JK. As a result of these dates, the duration of the early Pre-Pottery occupation of the site (Levels 2-4) has been fixed from 8350 to 7350 calBCE.
- M. Özbaşaran, G. Duru, and M. Uzdurum, "Architecture of the Early Settlement and Trends Through the Cultural Sequence" (57-103): The aim of Aşıklı Höyük's third term investigations (2010-2017) is summarized as: "*The new program of fieldwork and research, begun in 2010, seeks to understand the whole developmental process at Aşıklı, gathering as much information as possible about the early habitation levels while ensuring data comparability to the Level 2 settlement*" (57). Under "Methods" a discussion of the excavation system of Prof. Ufuk Esin is presented, followed by the explanation of modified excavation and recording methods and strategies applied by the new program's team. The stratigraphical and chronological discussion concentrates mostly on the architectural and contextual formation of Aşıklı's early Levels 5-4 subterranean buildings, external and extramural activity areas at the deep soundings in Area 4GH, and on the west face of step trench Area 2JK. Beside the deep sounding and the step trench on the west side, elsewhere on the mound, the early levels of the habitation are buried under the accumulation of Levels 3-2 (59, Fig.1). For the reader's better understanding, this chapter is divided into sub-chapters: Area 4GH architectural characteristics in Levels 5, 4, and 3; Level 5 in Area 4GH; Level 3 in Area 4GH; Area 2JK architectural characteristics: "Lower Early Habitation" levels in Area 2JK; "Upper Early Habitation" levels in Area 2JK; discussion and concluding remarks.

There are three innovative archaeometrical studies in this volume:

- "Micromorphological Analyses of Anthropogenic Materials and Insights into Tell Formation Processes at Aşıklı Höyük, 2008-2012 Field Seasons" by S.M. Mentzer (105-128): "*Micromorphology is a well-established technique for investigating anthropogenic sediments and materials, as well as their depositional processes and post-depositional transformations*" (105).
- "Multi-Element Characterization of Floors at Aşıklı Höyük: Contribution to the Identification of Activities and Activity Areas" by F. Kalkan and R. Özbal (129-145): "*…the research conducted here as part of the chemical characterisation of floor sediments contributes to a growing picture of how spaces may have been used by the Aşıklı inhabitants*" (129).
- "The Microscopic Record of Aşıklı Höyük: Phytolith Analysis of Material from the 2012-2016 Field Seasons" by G. Tsartsidou (147-189): "*Phytoliths are microscopic mineral particles composed of amorphous silica (opal), which developed in the cellular system of living plants (Piperno 2006). Opal impregnates the cell walls, intercellular spaces, or even whole cells of the plants and replicates the cell morphology. When the organic material is lost, this mineral replica constitutes an invaluable record of the plants used at a site*" (147).

An essay by M. Ergun, M. Tengberk, G. Willcox and C. Douche, "Plants of Aşıklı Höyük and Changes through Time: First Archaeobotanical Results from the 2010-2014 Excavation Seasons" (191-217) throws light not only on the early form of plant, respectively cereal and pulse domestication, but also on the collection of wild plants like fruits and nuts which were supplementary to the daily diet.

"Phytolith analysis" and "Plants of Aşıklı Höyük" are complementary papers and assist a better understanding and modelling of the PPN surroundings/ natural setting of Aşıklı Höyük.

For the site's early PPN socio-economy, the understanding of plant and animal domestication is crucial. In this volume, four principal papers by four teams concern zooarchaeological studies:
- M.C. Stiner, K.S. Bailey, N.D. Munro and R. Christidou, "Spatial and Zooarchaeological Evidence of Human-Animal Interactions in the PPN Settlement at Aşıklı Höyük" (219-257). The best summary of this research is given in the sentence: "*A holistic consideration of human–animal interactions based on taphonomic, ecological, zooarchaeological, and spatial data provides unique information on how human alterations to the domestic environment set the stage for a complex future of biotic interactions with a wide range of animal species*" (220).
- K.S. Bailey, "The Taphonomic Context of the Aşıklı Höyük Microfaunal Assemblage: Emergence of Pest-Host and Commensal Relationships*"* (259-280). Bailey summarizes the goal of her research as: *"My research investigates the distribution and taphonomic context of small rodent and amphibian remains in a formative village setting. The goal is to inform our understanding of changes in human subsistence practices, from predominantly wild to cultivated resources, and changes in the human-built environment during the Pre-Pottery Neolithic*" (260).
- H. Buitenhuis, J. Peters, N. Pöllath, M.C. Stiner, N.D. Munro and Ö. Sarıtaş, "The Faunal Remains from Levels 3 and 2 of Aşıklı Höyük: Evidence for Emerging Management Practices" (281-323): "*In conclusion the Aşıklı faunal record testifies to the development of a stable long-term exploitation pattern of sheep and goat that qualifies as intentional management. Although some of the data suggest that sheep and goats at Aşıklı were on the way to being domesticated […]"* (322).
- J. Peters, F. Neuberger, I. Wiechmann, M. Zimmermann, M. Balasse and N. Pöllath, "Shaping the Sheep: Human Management and Decision-making at Aşıklı Höyük, Central Anatolia" (325-344). The interim result of the investigation is summarized as: "*In sum, with its possibility of statistical hypothesis testing using single osteological as well as biomolecular markers or combinations thereof, the large well-dated caprine bone assemblage excavated at Aşıklı Höyük is destined to become a cornerstone for ungulate domestication research in general and for the cultural history of sheep and goat domestication in Central Anatolia in particular. Further work is needed to confirm or refuse our model that the early Neolithic inhabitants of Central Anatolia paved the way for successful husbandry of caprines in western and north-western Anatolia and ultimately in Europe as well*" (343-344).

Two contributions are concerned with obsidian studies:
- L. Astruc presented "Obsidian Use during Level 4 Occupations at Aşıklı Höyük" (345-362).
- N. Kayacan and Ç. Altınbilek Algül present "Aşıklı Höyük Obsidian Studies: Production, Use and Diachronic Changes" (363-382).

Both papers discuss the recourses, tool production practices, typology, and use ware. Kayacan and Altınbilek–Algül also direct special attention to "The new program of obsidian studies" at Aşıklı Höyük (365-366).
- "The Beads from Aşıklı Höyük" by S. Yelözer (383-404) is another important paper about use of organic and mineral raw materials. The author explains the aim of the study as: "*The present paper summarizes evidence on the raw materials, colours and types of beads, and it discusses the implications of changes in ornamentation through time at Aşıklı Höyük*" (383).

The last two papers of the volume are on physical anthropology:
- Ö.D. Erdal, "Lifestyle and Health Conditions of the Neolithic People of Aşıklı Höyük" (405-423);
- B. Hassett, "Childhood Growth Disruptions at Aşıklı Höyük" (425-436).

Aşıklı Höyük is very rich in intramural burials. Formal burials, human skeletal remains and burial gifts provide principal insights for demography and other fields. Reflections on sedentism, change of lifestyle, increase of population, and new nutrition habits are presented and discussed in these papers.

- M.C. Stiner, M. Özbaşaran and G. Duru, “Conclusion” (437-443) - Bibliography (445-484).

Where and when Neolithisation started remain recurrent questions of the Near East/ Southwest Asian Prehistory. Did it really begin, as many archaeologists claim, in the “Fertile Crescent” and expanded from there westwards as a colonisation? Was Central Anatolia a secondary nucleus of this movement, a bridge on the way to Europe? Without giving a clear answer, the studies of Mihriban Özbaşaran and her team at Aşıklı Höyük add new aspects to these questions. They can rely on a long tradition of pioneers who set major milestones for the Neolithic research in Turkey.

Beside national and international research in conventional archaeology, in 1963 the Department of Prehistory with the Joint Project between the Istanbul University (H. Çambel), and Chicago Oriental Institute (R. J. Braidwood) (Surveys and Çayönü Excavation) combined not only the natural sciences with archaeology but opened the door for the PPN studies in a greater frame (Çambel *et al.* 1980).

Starting in 1989, the large scale excavations at Aşıklı Höyük under the direction of Ufuk Esin threw light on the Central Anatolian PPN with solid archaeological results for the first time. With her early works on archaeometallurgy and Neolithisation, Esin is also one of the pioneers on these subjects in Turkey.

During her own excavations at Niğde Kömürcü Kaletepe and at Aşıklı Höyük, Nur Balkan, who directed the second term excavations at Aşıklı Höyük, trained many young students like N. Kayacan and Ç. Altınbilek-Algül, partly with the help of her French colleagues on chipped stone industries. During the early years of the excavations, Güneş Duru came as a young student to Aşıklı and became later member of the research team. Many young students (M. Ergün, Ö. Sarıtaş, S. Yelözer) have also been supported during the third term Aşıklı excavations. The new publication continues this tradition of long-term researches which made Aşıklı Höyük one of the key-sites for the Neolithisation in Turkey and in the Near East.

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Conference Report on Session 85 "Tracking the Neolithization Processes on Both Sides of the Sinai: a Bridge Between the Near East and North-Eastern Africa"

25th Annual Meeting of the European Association of Archaeologists.

University of Bern, 6th, September 2019

Fanny Bocquentin, Katarína Kapustka, Julien Vieugué, and Eric Huysecom

At the 25th Annual Meeting of the European Association of Archaeologists in Bern (4th – 8th September 2019), the Session 85 entitled "Tracking Neolithization Processes on Both Sides of the Sinai: a Bridge Between the Near East and North-Eastern Africa" was organized by K. Kapustka, J. Vieugué, F. Bocquentin and E. Huysecom. Its main objective was to bring together researchers working in the Near East with those working in North-Eastern Africa. Based on various topics such as settlement patterns, architecture, graves, pottery, lithic, fauna, botanical remains *etc*., authors were requested to provide syntheses regarding the type and pace of changes as well as related transformation mechanisms occurring with the shift from hunter-gathering to farming communities in a wider chronological frame from their own field of interest. Rather than tracing ways of diffusion, long-distance contacts or cultural exchanges, the intention of this session was to identify in a better way the major steps of the processes involved from different approaches and perspectives. It is clear that typical characteristics and aspects of Neolithization occurred in different order and at different times in the two larger regions. The main question was to understand differences and similarities of these processes.

As an introduction, the four organizers of the session presented a short history of understanding the Neolithization process over a century of animated debates. Today, Neolithization is seen as a long process taking its roots possibly as far as the beginning of the Epipaleolithic and therefore implies an evolution in successive stages linked to each other, not without discontinuities, however. Cultural (namely economic, demographic, social and symbolic) and ecological (climatic, environmental) factors are considered simultaneously. The notion of a unique zone of influence (or origin) has given way to the hypothesis of polycentric evolution. In the Levant, though exchange networks are still roughly known, the accurate nature of contacts between the different regions remains only very partially understood. However, it seems likely that a mosaic of cultural entities participated at their own pace, in a common dynamism that contributed to the rooting and stabilization of the new Neolithic lifeways. Our knowledge of the hunter-gatherer/ farmer-herder transition in North-Eastern Africa is extremely unbalanced when compared to the Levant. First, the absence of sites along the Egyptian Nile valley is of real concern for understanding evolutionary trends. Second, although surface collections have witnessed a dense network of Mesolithic and Neolithic sites further south in Sudan, extensive excavations remain too scarce yet for drawing a general picture of the phenomenon. However, exceptional sites provide robust data that will hopefully be expanded in the future with increasing field work in this area. The chronology is divided in three major economic steps: Epipalaeolithic which refers to hunter-gatherers without pottery (Early Holocene); Mesolithic (9th-6th/ 5th millennium calBCE) which refers to hunter-gatherers with Pottery; Neolithic (6th/ 5th-4th/ 3rd millennium calBCE) which refers to agro-pastoral communities (with or without pottery). The dates of transitions differ greatly between ecosystems and become more recent towards the south of the Nile Valley.

Fourteen 15-minutes presentations were given by researchers covering a variety of topics. Three talks focused on archaeo-anthropological data given from different perspectives. L. Varadzinová *et al.* presented the exceptional cemetery of Sphinx located in the Jebel Sabaloka (Sixth Cataract, central Sudan). The burial ground, located within the settlement but separated from the living, started around 6600 calBCE. 47 individuals have been unearthed so far. Half of the skeletons were directly dated; the great majority were adults. Emphasis was given to burial types and the evolution and diversification of burial rites over time; major changes were observed for the beginning of the 6th millennium by the appearence of grave goods. M. Honneger and I. Crevecoeur compared the Mesolithic (7800-6700 calBCE) and Neolithic (6000-5500 calBCE) burial practices and human remains from the major site of El Barga (Northern Sudan). Between 2001 and 2014, 47 Mesolithic individuals and 108 Neolithic individuals were excavated. The important discrepancies observed between these two occupations (funerary recruitment, burial positions, and grave goods) suggest profound social changes and a possible replacement of the populations. Dental and cranial morphometric analyses strongly support this hypothesis, with the Mesolithic showing stronger affinities with Late Pleistocene populations. F. Bocquentin on her side proposed a synthesis on burial practices in the Levant. She emphasized the changing relation between dead and living over time, witnessed by their spatial proximity and/ or practice of long-term handling of corpses or skeletal remains through complex treatments. In the southern Levant, the evolutionary scheme is far from being linear but shows, generally speaking, a greater variability of funerary treatments from the Early Natufian onward. It reaches its peak during the Middle and Late PPNB. Major changes in funeral practices

during the 7th millennium testify a slow decline of the major active role that the dead played in the community, likely linked to new beliefs.

Three talks focused on settlements and facilities. The presentation on Sai Island by E. Hildebrand and T. Schilling was an in-depth comparative study of storage features and their importance during the Neolithization process. The potential variation of storage facilities or related mechanisms (social and environmental storage) was presented together with their archaeological evidence. A review of storage facilities known in the Nile valley shows a development from robust pits to above ground storage. M. Jórdeczka *et al.* and P. Bobrowski *et al.* presented the results of recent field work at Khor Shambat, Khartoum District, and Nabta Playa; Khor Shambat was explored through four test trenches (approximately 60 m²). About 30 burials have been unearthed as part of a multistage cemetery (Mesolithic, Neolithic, Meroitic and post-Meroitic period) dominated by Neolithic burials. Moreover, a rich Mesolithic (7th and 6th millennium) and Neolithic (5th and 4th millennium) occupation was explored. Pottery, stone tools and fauna were numerous and presented in detail. The preservation is excellent and allowed residue analysis. Recent work in Nabta Playa Basin permitted the discovery of several sites covering the complete Mesolithic and Neolithic chronology from the 9th to the 4th millennium. It highlights the Early Holocene colonisation of the Western Desert. The domestication of *Bos* is likely, and the early population are considered to represent hunter–gatherer - cattle–keepers. Features such as pits, hearths, tumuli and seasonal huts have been reported as rich in lithic, pottery and faunal assemblages.

About lithics, N. Shirai presented a study on the main characteristics of the Fayum Neolithic assemblages where it is possible to question a Levantine influence, especially from the 6th millennium onwards. His analyses of continuities and discontinuities in the development of arrowheads and sickle blades suggest two different kinds of transmission/ innovation processes: Arrowheads characterized by frequent loss and replacement would have been more variable and experienced a rapid evolution of new forms. On the contrary, sickle blades of seasonal use over several years would demonstrate less variability over time. Consequently, the latter were a better marker for exogenous influences. K. Kapustka's presentation was about lithic production from several sites in Sabaloka area, with an emphasis on the production of gouges. Most types of artefacts do not change significantly during Neolithization in central Sudan, however, gouges were characteristic for the Neolithic period. During the Mesolithic there is no clear link between raw material and tool types while gouges are made of rhyolite exclusively. One source is known at Rhyolite site near Fox Hill where production took place. Gouges are however spread over long distances showing well organized networks of manufactured tools. Experimentation and use-wear analyses are ongoing, in order to better understand their function which remains unclear. B. Jakob talked about Upper Nubia lithic assemblages, more specifically about the typological developments observed on the site of Wadi El-Arab (8300-5400 calBCE). Products are mainly flakes obtained from single and opposed platform cores. Debitage does not show a major break between Mesolithic and Neolithic. However, the sudden appearance of bifacial points in Upper Nubia at the end of the 7th millennium suggests an influence from Egypt. It coincides with the early phase of the Egyptian Neolithic and the arrival of livestock.

J. Vieugué and A. Eirikh-Rose presented a critical review of the beginning of pottery production in the Southern Levant. Based on the analyses of ten major pottery assemblages attributed to Early Pottery layers, they conclude that incised (so called *Yarmoukian*) and red painted pottery (so called *Jericho IX*) were in fact manufactured and used by the same people. Based on percentages of decorated vessels, techniques and designs, they distinguished four main entities which correspond to four distinct geographical areas. Through functional analysis (typometry and use-wear) various usages of ceramic vessels linked to food activities were identified. E. Garcea *et al.* presented the pottery variability of late foragers and early herders in the Jebel Sabalok; assemblages come from surface collections and test pits. Large quantities of pottery were found from the lowest levels onwards at Sphinx dated to 8800-8600 calBCE. In contrast, sherds at some Neolithic sites are rather scarce and may represent temporary settlements. An evolutionary pattern is observed in the frequencies of different decorative techniques and motifs. The possibility that impressed decorations were exported to the Northern Levant through maritime trade was suggested.

A. Emery-Barbier and M.C. Jolly-Saad presented palaeobotanical remains from Kadruka 1 and 23 cemeteries (Upper Nubia, end of 5th millennium calBCE). Abundance of chaff remains indicates that they were spread under and/ or around the skeletons; cereals may have been used as bedding, offerings or perhaps ornamentation. Cultivation of Poaceae, mainly Panicoideae, is probable but not certain. Wheat phytoliths have a very low frequency. Triticeae, and in particular barley, are well attested in tombs and may provide evidence of the social status of the deceased. I. Vella Gregory and M. Braas presented the new excavation project by UCL taking place since 2017 at the site of Jebel Moya (Southern Gezira, Sudan). It is a multi-phase site with deposits dating back to 5000 calBCE. Five trenches were excavated. Trench 2 has yielded Mesolithic and Neolithic sherds and animal clay figurines; a burial was found in Trench 3. All trenches were sampled for archaeobotanical remains.

Lastly, L. Gourichon and L.K. Horowitz presented a review of archaeozoological Levantine data and the domestication process. Goat, sheep and cattle husbandry was in progress since the EPPNB in the North whereas it appears in the South by the MPPNB. Data are less reliable for pig but at least by the LPPNB its domesti-

cation is proven in both regions. Parallel to that, a very marked drop in gazelle hunting occurred during the MPPNB in both regions, even it remains predominant at some sites in the Mediterranean Hills and the Eastern Jordanian desert. Except for sheep introduced into the South, zooarchaeological and genetic data support evidence for independent, local domestication events.

In conclusion, talks were extremely interesting and diversified in terms of topics and the scales of study they represent. Direct and detailed comparisons between the Near East and Africa remained, of course, premature because the history of research is much more extended in the Near East where syntheses are flourishing. However, session discussions were very intense and fruitful in a convivial atmosphere giving everyone the feeling that such gatherings are essential and should be repeated in the future. In fact, the Nile valley's Mesolithic seems quite disconnected from contemporaneous cultures of the Levant, the Neolithic, on the contrary, let us all suppose that connections might emerge during the mid-7th/ 6th millennium... discussions to be followed!

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Programme of Session 85 *Tracking the Neolithization Processes on Both Sides of the Sinai: a Bridge Between the Near East and Northeastern Africa*. 25th Annual Meeting of the European Association of Archaeologists, University of Bern, 6th September 2019

On the eve of Neolithisation: Social, economic and spiritual strategies of late hunter-gatherers buried at the sixth Nile cataract. *Lenka Varadzinová, Charles University, Prague*; *Ladislav Varadzin, Charles University, Prague*; *Petra Havelková, Natural History Museum, Prague; Isabelle Crevecoeur, CNRS; Stanley H. Ambrose, University of Illinois Urbana; Matthew A. Fort, University of Illinois Urbana*

The evolution of funerary practices and population from Epipaleolithic to Neolithic: The emblematic case of El-Barga (Sudan). *Matthieu Honegger, University of Neuchâtel; Isabelle Crevecoeur, CNRS*

What place for the dead in the Levantine Neolithic process? *Fanny Bocquentin, CNRS*

The role of storage in the Neolithisation process: Perspectives from Sai Island and beyond. *Elisabeth Hildebrand, Stony Brook University; Timothy Schilling, United States National Park Service*

Life on the river bank. View from the Mesolithic and Neolithic Khor Shambat. *Maciej Jórdeczka, Polish Academy of Sciences; Przemysław Bobrowski, Polish Academy of Sciences; Marek Chłodnicki, Archaeological Museum Poznań; Marta Osypińska, Polish Academy of Sciences; Iwona Sobkowiak-Tabaka, Polish Academy of Sciences;* Łukasz *Maurycy Stanaszek, State Archaeological Museum Warsaw; Lucy Kubiak-Martens, Biax Consult*

Neolithic in the western desert in light of research conducted in the Area of Berget el Sheb and Nabta Playa. *Przemyslaw M. Bobrowski, Polish Academy of Sciences; Maciej J*órdeczka*, Polish Academy of Sciences*

Local development and Levantine influence seen in the lithic technology of the Fayum Neolithic in Egypt. *Noriyuki Shirai, University Colledge London*

Visibility of Neolithisation within lithic collections from Central Sudan. *Katarína Kapustka, Academy of Sciences, Prague*

Nubian lithic industries between the 9th and the 6th millennium BC in the context of the Neolithisation of North-Eastern Africa. *Bastien Jakob, University of Neuchâtel*

The beginning of the pottery productions in the southern Levant (7th millennium calBCE): A critical review. *Julien Vieugué, CNRS; Anna Eirikh-Rose, Israel Antiquities Authority*

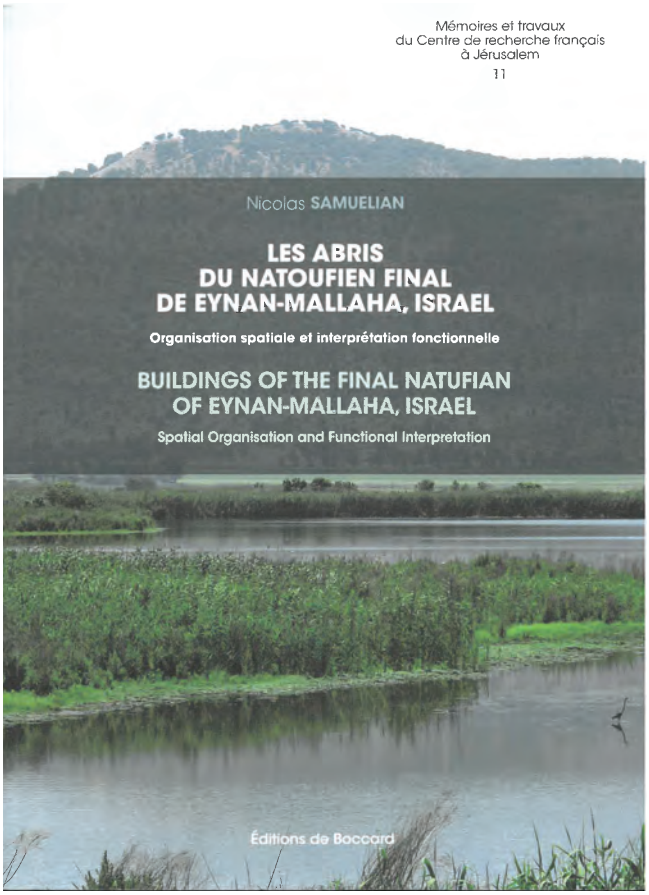
Hierarchical settlement systems and pottery variability of late foragers and early herders at Jebel Sabaloka, Sudan. *Elena A.A. Garcea, University of Cassino and Southern Latium; Lenka Varadzinová, Charles University, Prague; Ladislav Varadzin, Czech Academy of Sciences, Prague; Stanley H. Ambrose University of Illinois, Urbana*

Results of paleobotanical analyses carried out at the Kadruka site in upper Nubia. *Aline Emery-Barbier, CNRS; Marie-Claude Saad, CNRS*

Pastoralists who practice agriculture: New perspectives from Jebel Moya (Sudan). *Isabelle Vella Gregory, University of Cambridge; Michael Braas, University College London*

Landmarks in early animal domestication: An inter-specific and inter-regional study of the Levantine record. *Lionel Gourichon, CNRS; Liora Kolska Horwitz, The Hebrew University of Jerusalem*

Nicolas Samuelian
Les abris du Natoufien final de Eynan-Mallaha, Israël. Organisation spatiale et interprétation fonctionnelle. Mémoires et travaux du Centre de recherche français à Jerusalem 11. Paris: Boccard. 2019, 418 p., ill. n&b, br. – 89 ISBN 978-2-7018-0429-3



La reprise des fouilles du gisement d'Eynan-Mallaha (Israël) par F.R.Valla et H. Khalaily en 1996 s' est concentrée sur le dernier niveau d'occupation du site : le Natoufien final, jusqu'alors compris comme un retour à un mode de vie plus mobile. Les fouilles ont mis au jour plusieurs constructions auxquelles sont liées des structures domestiques, un matériel abondant et des sépultures qui s'inscrivent dans la continuité des phases précédentes. Tous ces abris ne semblent pas avoir eu la même fonction. Certains sont compris comme des unités d'habitation, d'autres ont pu avoir des fonctions plus spécialisées qui demeurent énigmatiques. Notre recherche s'est concentrée sur deux constructions bien conservées dont l'organisation paraît similaire et que l'on considère comme des structures d'habitation.

Afin d'observer les possibles contrastes entre l'intérieur et l'extérieur des abris, nous avons étudié aussi le mobilier d'un échantillon de la couche encaissante (le cailloutis). L'étude spatiale détaillée de tous les matériaux (silex, basalte, faune, *etc.*), y compris les plus petits fragments, associée à celle des structures évidentes, aboutit à une approche dynamique des sols dans la tradition de l'ethnologie préhistorique. Elle a permis de reconnaître des postes de travail et aide à comprendre l'organisation de l'espace au sein de ces constructions. On y distingue des ateliers de taille de silex, des espaces liés aux activités de mouture, au traitement des carcasses animales, *etc*. L'activité semble avoir été moins intense à l'extérieur des abris et l'espace moins structuré.

Sommaire
INTRODUCTION: Le problème du mode de vie au Natoufien final.
PREMIERE PARTIE : I- Présentation de la culture natoufienne: Bilan de plus de 80 ans de recherches sur l'habitat (1928-2012) ; Introduction chrono-culturelle : II- Eynan-Ain Mallaha : du natoufien ancien au natoufien final ; 1- le contexte ; 2- l'occupation des niveaux natoufien ancien et recent de Mallaha ; 3- l'occupation du niveau natoufien final de Mallaha ; 4- la notion du sol au natoufien final de Mallaha: problèmes et méthodes.
DEUXIÈME PARTIE : I- Introduction ; II- L'étude de l'abri ;1- le silex ; 2- le calcaire ; 3- l'obsidienne ; 4- le basalte ; 5- la parure en pierre ; 6- la faune ; 7- l'industrie osseuse ; 8- les coquilles ; 9- les matériaux transformés par le feu ; 10- la structure 226 ; 11- la structure 224 ; 12- la structure 222 ; III- L'étude de l'abri ; 1- le silex ; 2- le calcaire ; 3- l'obsidienne ; 4- le basalte ; 5- la parure en pierre ; 6- la faune ; 7- l'industrie osseuse ; 8- les coquilles ; 9- les matériaux transformés par le feu ; 10- la structure ; IV- L'étude de la bande test ; 1- le silex ; 2- le basalte ; 3- la faune.
TROISIÈME PARTIE : I- L'étude comparative des abris 200 et 203 ; 1- le silex ; 2- le calcaire ; 3- l'obsidienne ; 4- le basalte ; 5- la parure en pierre ; 6- la faune ; 7- l'industrie osseuse ; 8- les coquilles ; 9- les matériaux transformés au feu ; II- L'étude de la bande ; 1-le silex ; 2- le calcaire .

In recent times, we lost three dear friends and colleagues of the Neolithic Family, leaving us in grief and teariness but also appreciation of their work. They inspired our research and gave so many young students their knowledge. Their publications will continue to enrich our prehistoric Near Eastern research, yet we will miss their humour, tireless efforts and their valuable advice.

Avraham Ronen

4th July 1935 – 15th Dec. 2018

Nur Balkan-Atlı

2nd Jan. 1953 – 10th April 2019

Olivier P. Nieuwenhuijse

16th Nov. 1966 – 15th Jan. 2020

Left Avraham Ronen at Tabun Cave, his major project between 1975 and 2003. (Photo: R. Shimelmitz)

Centre Nur Balkan-Atlı during her Göllü Dağ Survey. (Photo: Archive of Göllü Dağ Survey)

Right Olivier P. Nieuwenhuijse analysing pottery in the Shir Dig House at Hama. (Photo: D. Rokitta-Krumnow)

Editorial (continued from page 2)

Furthermore, the impact of all this is that we are flooded with articles. While it was the difficulty of the 20th century to obtain remote publications, the greatest challenge today is to separate important information from redundant publications. Valuable research time is lost for authors and readers alike. To make matters worse: What is not published online does not exist. Knowledge that has been collected meticulously over centuries in books disappears from the scene – "selective amnesia" as Paul Connerton would probably call it.

However, the most fatal consequence of mass publishing is that it endangers or even destroys direct academic exchange. Since everything seems to be available online, it has become easy to consume articles without frequenting libraries or contacting authors. Many libraries – once meeting points for informal knowledge exchange – resemble haunted castles. Specialists have become unable to follow publications even in their restricted own fields while joining hypertrophic publishing behavior to gain attention. If we are unable to identify relevant publications in time and react to them with original own research, have we not reached the end of academic exchange? Critical reflection, development of ideas in conversations and discussions are sacrificed to glossy presentations and convenient knowledge consumption.

Direct contacts between young and experienced researchers, cooperation, and the promotion of young colleagues falls victim to the pressure to succeed and to the supposed lack of time. *Neo-Lithics* and *ex oriente* explicitly sets a counterpoint here: more than ever, it avoids participating in the aforementioned problems but aims to be a platform for discussion and exchange, to foster young colleagues and bring up new results and topics, lines of thought, and unconventional ideas. With its rapid open-access online publication of contributions and news and the expansion of the editorial board, we hope to have taken the right steps to support this direction.

From 2020, we are welcoming new co-editors in the *Neo-Lithics*' editorial board: Emmy Baysal, Fanny Bocquentin, Ferran Borrell, Osamu Maeda, and Ianir Milevski join us in the efforts to make *Neo-Lithics* a more transdisciplinary and rapid source of information. Anna Belfer-Cohen and Necmi Karul have joined the advisory board (see the new Masthead). We are grateful to all of them. Our most sincere and respectful thanks go to Dörte Rokitta-Krumnow for her editorial work and commitment to *Neo-Lithics* for so many years. Without her unselfish devotion of a great deal of time and energy our newsletter would not have reached its standing.

We look forward to your creative, courageous and exciting contributions that will stimulate new ideas beyond the mainstream and will give fresh impetus to the joint promotion of Neolithic research in the Near East.

Marion Benz and Hans Georg K. Gebel

Masthead

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