II Workshop on Late Neolithic Ceramics in Ancient Mesopotamia: pottery in context

Edited by
Anna Gómez-Bach **Jörg Becker** **Miquel Molist**

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Museu d'Arqueologia de Catalunya

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II WORKSHOP ON LATE NEOLITHIC CERAMICS IN ANCIENT MESOPOTAMIA: POTTERY IN CONTEXT

BARCELONA 2018

Edited by
Anna Gómez-Bach Jörg Becker Miquel Molist

Collaborators
Adrià Breu Sílvia Calvo

SUMARI

II WORKSHOP ON LATE NEOLITHIC CERAMICS IN ANCIENT MESOPOTAMIA: POTTERY IN CONTEXT

PREFACE

At the beginning of 2017, the Autonomous University of Barcelona (UAB) and the Archaeology Museum of Catalonia (MAC), which is part of the Catalan Cultural Heritage Agency, signed a collaboration agreement. This partnership has since blossomed, and we now have a consolidated research group, which also includes the University of Girona. Our first foray into the world of university education was hosting the presentation of the UAB Degree in Archaeology at the Museum, and teaching on the Master and Degree course. In this way, we have published a MAC monograph of the seminar, we collaborate it, thus reaffirming our inter-institutional commitment to academic research.

The publication titled *II Workshop on Late Neolithic Ceramics in Ancient Mesopotamia: pottery in context*, is one of a new specialized series which focuses on both national and international issues. Regional issues, with international recognition, will be published in the corresponding monographic series.

With this new series of publications, the MAC seeks to project itself internationally, while at the same time still working to catalan archaeology. This project will also be helped by reformed journals of MAC: *Empúries* and *Cypsela*.

Recently, the Museum has been carrying out extensive work on the Neolithic period. We are participating in the excavation of the Neolithic site called La Draga, where we have held an exhibition and published its catalogue. We are also planning to publish a book on the Neolithic in Andorra. In April 2018, we held a seminar in Girona on the Early Neolithic period, the proceedings of which will be published next year in this new monographic series. Likewise, a monograph is currently in course for Serra del Mas Bonet settlement (Vilafant, Girona), whose collections are housed at the museum.

This has considerably boosted research on the Neolithic period and has attracted significant attention from influential research groups. We also want to contribute to this knowledge as we have two highly regarded specialists on the period: Dr. Ramon Buxó and Dr. Antoni Palomo.

This new monographic series bestows the MAC with an important scientific tool for the dissemination of knowledge, which we hope will receive international recognition. This tool is essential for national museums such as the MAC, or the Museum of Art of Catalonia and the Museum of Science and Technology of Catalonia, which play the same role. A national museum needs to be able to swing between the service of the population and the dissemination of the knowledge generated. I insist on using the word generate, because this means that research is one of our museum's basic aims, and this dissemination needs to be on both a national and international level.

The Archaeology Museum of Catalonia aims to be an indispensable tool for transmitting our country's

culture and scientific knowledge. It contributes rigorously, in the line with the Catalan research system, to generate new knowledge within the field of archaeology.

Allow me, therefore, to greet this new monographic series and thank the organizers of this international seminar: Dr. Miquel Molist, Professor at the Autonomous University of Barcelona; Dr. Anna Gómez, professor associate at UAB, Dr. Jörg Becker, researcher at Martin-Luther-Universität Halle-Wittenberg (Germany); and Dr. Antoni Palomo, the edition and monographic series coordinator.

Barcelona, September 14th 2018

Josep Manuel Rueda Torres
Director of the Catalan Cultural Heritage Agency

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II WORKSHOP ON LATE NEOLITHIC CERAMICS IN ANCIENT MESOPOTAMIA: POTTERY IN CONTEXT

INTRODUCTION

Anna Gómez-Bach, Jörg Becker and Miquel Molist

The second workshop focused on the study of Neolithic pottery production in the Near East aiming to consolidate and demonstrate the research carried out by various international teams in the Middle East, a wide geographical area covering Anatolia, Levant, the Taurus and Upper Mesopotamia and the foothills of the Zagros. The technological contribution implied by pottery knowledge and its technological development is shown by the technical skills and know-how of Neolithic artisans and also by the complex networks of circulation and distribution of ceramic vessels as well as materials, and the symbolic value reached by these productions from the seventh to fifth millennia BC.

The first meeting held in Brno and Rejvic (Czech Republic) in January 2012 revealed the need to consolidate meetings between specialists which could go beyond the research provided in specialized conferences and journals. The opportunities offered in this type of activity were patent both in its research side and in a more formative aspect.

The participation of 31 researchers from 13 nationalities, with a long history of fieldwork and, therefore, of treatment and obtention of primary archaeological data, along with the presence of students and new researchers undergoing training, showed a wealth and diversity of methods and registries. (Fig. 1). They shared the same objective, to make solid contributions to the knowledge of ceramic production; an activity materialized in the recent publication by W. Cruells; I. Mateiciucová; O. Nieuwenhuyse 2017. *Painting pots, painting people: Late Neolithic Ceramics in Ancient Mesopotamia*. Oxbow books.

The workshop held in Barcelona and Empúries from October 14th to 17th 2015, was conceived and executed in two main areas of action. Firstly, in an open session at the Archaeological Museum of Catalonia in Barcelona with lectures by four invited researchers, summaries of work and an updated state of research were given by renowned researchers such as Prof. Frank Hole, Dr. Walter Cruells and Dr. Rana Özbal, with the following titles:

Figure 1. Participants on the second workshop. Up, right to left: M. Molist, C. Moulhérat, C. Breniquet, F. Hole, J. Becker, W. Cruells, A. Gómez-Bach, Y. Gallet, H. Plug, O. Nieuwenhuyse, R. Ozbal, I. Matiecuciova, A. Hazelkova, L. Grimbergen, down right: M. Erdalkiran, E. Gabrielli, T. Odaka, Y. Tonoike, X. Li, S.Akimova, S. Amirov, S. Calvo, A. Breu.

Figure 2. Dr. Cruells presenting his conference during the open session at Archaeological Museum of Catalonia-Barcelona.

Figure 3. Participants visiting Empúries site, during brief open air sessions thanks to the Archaeological Museum of Catalonia-Empúries.

Dr. Walter Cruells (GRAMPO, UAB): The emergence of the first pottery productions in the Near East. (Fig. 2).

Dr. Rana Özbal (Koç University, Turkey): Pots for Cooking: A Developmental Overview.

Prof. Emeritus Frank Hole (Yale University, USA): The Creative Centuries (6000-5500 BC): Variability and Innovation in Neolithic Ceramics.

The second part of the workshop, at the Empúries archaeological site headquarters, focused on the presentation of case studies with 21 communications and 4 posters. Finally, a workshop concentrated on archaeological material from excavations in the East in the SAPPO collection at the UAB.

This conference was organized by the Autonomous University of Barcelona and the Martin Luther University Halle-Wittenberg, with the invaluable collaboration of the Archaeology Museum of Catalonia and its director, Josep Manel Rueda, and the support of the team at the headquarters at Empúries led by Marta Santos.

The stay at the Empúries headquarters allowed delegates not only to enjoy and visit the Greco-Roman site but also to use the facilities and the library, which greatly facilitated the work and the exchange of data and results beyond the presentations and numerous debates initiated. (Fig. 3).

The dissemination of the activity was carried out from both the Autonomous University of Barcelona, with the support of Silvia Gili[1] (http://blogs.uab.cat/potteryworkshop2/pagina-exemple/), and the headquarters in Empúries and Barcelona.

CONTRIBUTIONS IN THE SESSIONS

The session for specialists was organised on four main axes where the results of their work were presented. These four parts can be briefly summarized as follows:

PART I: EXISTING TOOLS FOR COMPREHENSIVE COMPARISONS

The session presented by Inna Mateiciucová and Frank Hole provided new tools for the work of comparative studies. With the contributions by Russian, Japanese, Dutch and Catalan teams, methodological approaches were presented, such as practical implementation studies, and the need was expressed for unified, useful and realistic comparative data for the studied sets.

The contribution by Shahmardan Amirov, on *The Morphology of Halafian Painted Pottery From Yarim Tepe II, and the Process of Ubaidian Acculturation,* introduced difficulties in identifying cultural transfer through Neolithic culture material, mainly pottery.

1. Because of her loss, we would like to make a special acknowledgement of her work and the support offered during the workshop organization. She would surely have liked to see the final publication of this work.

Regional particularities were introduced by Takahiro Odaka with a contribution called *Neolithic Pottery With Horizontal Applied Bands From Tell El-Kerkh, The Rouj Basin.* His capacity of synthesis let us approach Northwestern Mesopotamian traditions.

New residue analysis was presented by Adrià Breu *et al.* The paper called *Investigation Into The Preservation Of Lipids In Pottery Samples From Tell Halula (Syria) Using The Acidified Methanol Extraction And GC-MS* demonstrates, once again, the possibilities of organic conservation and identification. Diversity and culinary strategies will help to identify Neolithic cooking and storing strategies.

The possibility to develop new archaeological fieldwork in open regions such as Iraqi Kurdistan will let us approach new assemblages and new subjects. In that sense, Olivier Nieuwenhuyse's contribution is essential to identify new productions linked to upper Mesopotamian traditions but with strong particularities. Their identification, chronology and regional development will be increased and contextualised with new sites and global studies. In that case, the Shahrizor area will be studied in depth by this researcher.

Finally, Hannah Plug presented an interesting contribution on specific archaeological stratigraphy, the funerary context: *Pots in burials: the case of Tell Sabi Abyad,* an emblematic site.

PART II: HOW TO CROSS CHRONOLOGY AND ARCHAEOLOGICAL STRATIGRAPHIC SEQUENCES USING POTS

The second thematic session was conducted by Shahmardan Amirov and Catherine Breniquet. The sessions were centred on chronology and stratigraphy during the Pottery Neolithic.

A well-known sequence from Chagar Bazar, excavated during more than 10 years of continuous research, has enabled an understanding of a long sequence from the Proto-Halaf to Late-Halaf. Pottery production was analysed and presented by Anna Gómez-Bach and Walter Cruells with the aim of establishing a referential dataset for the Khabur area.

New assemblages were presented by Claudia Beuger and Konstantinos Kopanias in *Prehistoric Pottery from Tell Nader (Erbil) and Ashur (Qal'at Sherqat).* Both presentations show the methodological difficulties in approaching new pottery materials, more specifically for the iraqui Kurdistan.

The characterization of other assemblages is studied by Inna Mateiciucová and Maximilian Wilding in the contribution *Pottery Sequence from the Late Neolithic Site Tell Arbid Abyad in the Upper Khabur Region (Syria).* The possibility of publishing such as interesting site will be very helpful to understand variability in the upper Khabur basin.

The interdisciplinary research carried out at Tell Halula, Middle Euphrates valley, has become essential to date and identify the first pottery productions. The paper presented by Miquel Faura and Miquel Molist, titled *VII millennium pottery sequence at Tell Halula: New lights focused on stratigraphical and chronological aspects of sector 30* is an example of a large analytical program which has obtained a huge amount of data.

Finally, the results of survey projects will increase in value with new approaches. The contribution of Sona Krollová is an example of this type of research in the Khabur valley.

POSTER PRESENTATION

A poster presentation session made other research known. Some of this work comes from on-going PhD and MA theses. These contributions demonstrate the progress of young researchers and the vitality across teams and projects.

a) Anna Hanzelková; Maximilian Wilding. *Strainers: Observations On A Distinct Type Of Neolithic And Chalcolithic Pottery In The Khabur Valley (Northeastern Syria).*

b) Adonis Wardeh; Anna Gómez-Bach; Miquel Molist. *Decorative Tehcniques On Pottery At Tell Halula (Euphrates Valley, Syria) In The 7th Millennium Cal BC. Contribution Of An Experimental Method.*

c) Lonneke Grimbergen. *Animals in Halaf Ceramic Art.*

d) Silvia Calvo; Anna Gómez-Bach; J. Miquel Faura; Miquel Molist. *Technological approach to Ceramic manufacture in the Pre-Halaf at Tell Halula (Syria).*

PART III: MANUFACTURING TECHNIQUES, NETWORKS AND IDENTITIES

The last thematic session was directed by Walter Cruells and Olivier Nieuwenhuyse. The session examined contacts though manufacture and techniques.

Interesting contributions such as *Local Matters: Pottery Production at Tell Halaf and Tell Tawila* by Jörg Becker *et al.* provided an understanding of regional strategies in profound research. This exercise is an example of an intensive and accurate investigation.

Other contributions, like the one by Eva Gabrieli titled *At the periphery of the oikoumene: the Halaf and Ubaid 'bichrome ware' tradition in the Levant,* offered an interesting wide perspective of traditional interpretations in an specific production such as bichrome ware.

In the same direction, the contribution by Anna Gómez-Bach *et al.* on another specific production called "red ware" offered another approach to exogenous pottery productions during the 6th millennium cal BC.

The richness of the Halaf production was presented by Mücella Erdalkiran, in reference to the Tigris region and focused on painted decoration. The comprehension of this region will be essential to understand the circulation of ideas and products between Anatolia and the upper Mesopotamia (Syria and Iraq).

Other contributions are essential in terms of symbolic interpretations. The paper named *Why pots eat their mother? A General Overview On the Near Eastern Late Neolithic anthropomorphic pottery* by Catherine Breniquet and Béatrice Robert were an example of new approaches to specific containers.

Finally, another contribution, referring to Anatolia, presented by Rana Özbal and focused on Tell Kurdu, approached painted designs with a social and innovative interpretation.

PART IV: CERAMIC TECHNOLOGY AND RAW MATERIALS

New archaeometric methods were the topic of the last session under the direction of Inna Mateiciucová.

One of the contributions was presented by Christophe Moulhérat, Béatrice Robert and Catherine Breniquet. It described 3D techniques that go beyond the sphere of research and enter the field of conservation. We consider that these tools are very useful in view of the current situation in the near East.

The use of archaeometric data was presented by Stanislava Akimova, Yves Gallet and Shahmardan Amirov under the title *New archeointensity data from Yarim Tepe II: How archeomagnetism can help synchronize Halafian sequences.* As it is well-known, these new data must be developed using interdisciplinary research and this is an example of its implementation.

Finally, Yukiko Tonoike's presentation of the petrographic data from the Khabur survey was titled *Preliminary Results of Technical Analyses of Late Neolithic Ceramics from the Khabur Basin Survey Project.* This important contribution focuses on sampling strategies and the formation of collections and is a part of a strong project leaded by Frank Hole partially published at Hole, F.; Tonoike, Y. (2016) Homesteads on the Khabur, Tell Ziyadeh and other settlements. BAR International Series 2827.

A total of 20 contributions are presented in this volume. All the authors made a huge effort to prepare these papers. Even if not all of them have been included we consider these contribution as a great success.

PART V: CONCLUDING DISCUSSION

The final consideration by Jörg Becker, Anna Gómez-Bach and Miquel Molist highlighted the importance of these meetings in three ways. One of them is related to updating research in a double direction, working with specialists and with real materials and other unpublished documents. The second is the formative and pedagogic experience, working with unpublished collections and sharing terminology and learning from other colleagues, especially for young researchers and other specialists, and the final one is centred on transferring methodologies and database creations across countries and across sciences.

ACKNOWLEDGEMENTS

This workshop could not have been held without the collaboration of many people and institutions. First of all, this activity could not have been carried out without the collaboration of the Archaeological Museum of Catalonia and its management. Their support has reached the present final publication that we can today hold in our hands. The joint collaboration between the SAPPO-GRAMPO Autonomous University of Barcelona and the Martin-Luther-Universität Halle-Wittenberg and its Middle East Department make possible the present workshop and their publication.

Also to the pioneers of the initiative, all of them from different institutions, such as the Centre of Prehistoric Archaeology of the Near East (PANE) at Masaryk University, the Neederlands Institution for Scientific Research (NWO) in the Faculty of Archaeology of the University of Leiden and the Seminary of Prehistoric Archaeology of the Near East in the Department of Prehistory of the Autonomous University of Barcelona.

In addition to thanking all the participants from as far away as Japan, Moscow, Turkey or the United States for their contributions, we would like to thank the support team, composed of Silvia Calvo and Adrià Breu, for their work and implication in the edition. The use of English in these papers was revisited by A. Breu and P. Smith. Likewise, Xian Li, Irene Peix, Ricard Arnaiz and Roger Alcántara should be thanked for their support and logistical help. Finally, we would like to thank the reviewers and all the researchers who have helped improve the texts in this book.

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THE MORPHOLOGY OF HALAFIAN PAINTED POTTERY FROM YARIM TEPE II, AND THE PROCESS OF UBAIDIAN ACCULTURATION

Shahmardan Amirov*

La descripción formal de las cerámicas pintadas Halaf de Yarim Tepe II permite aproximarnos a los conjuntos cerámicos de Neolítico final del Próximo Oriente. Si bien la aparición de un nuevo grupo morfológico exógeno asociado a la tradición cerámica Ubaid afectó a la tradicional producción Halaf. Este proceso fue básico para entender la naturaleza del fenómeno de aculturación Halaf – Ubaid.

Cerámica a mano Halaf, Variedad formal, Tecnología de la rotación, Halaf-Ubaid, Aculturación Halaf-Ubaid.

The formalized description of the Halaf painted pottery at Yarim Tepe II allows us to approach Late pottery assemblages from Middle East. The appearance of a new exogenous morphological and technological group related to an Ubaid pottery tradition' affected the Halafian pottery tradition is a core fact to understand the nature of the process of the Halaf-Ubaidian acculturation.

Halaf handmade pottery, Stable Variety of Shapes, Pottery rotating technology, Halaf-Ubaidian acculturation.

INTRODUCTION

Yarim Tepe II is a Halafian site that was excavated by a Russian team in 1969-1976, directed by R. Munchaev. The settlement is located in the Sinjar region of Iraq, in a valley about 7 km south-east of the Sinjar mountain range. This is the isohyet region of traditional dry-farming agriculture with a modern annual rainfall between 300-250 mm. (Fig. 1).

The Yarim Tepe II settlement presents a Tell with approximately 7m of cultural deposits. Almost half of the site was destroyed by spring water flows. It is important to note that, immediately adjacent to Yarim II, the bigger tell of Yarim Tepe III also had contemporary Halaf cultural deposits. (Fig. 2).

Therefore, two tells could present an extraordinary single halafian settlement with a kind of complicate two core social organization.

The uppermost part of Yarim Tepe II is damaged, to a depth of one meter from the surface, by erosion and burial activity from some historical periods. The site was excavated to the virgin soil over 500m^2. The cultural deposits of Yarim Tepe II were divided by excavators into nine general levels (or building horizons).

YARIM TEPE II ASSEMBLAGE

The main object of our analysis was the study of the morphology of mass painted pottery from Yarim Tepe II. Painted ceramics comprise approximately 24% of all pottery unearthed on the site. Among other ceramic groups, coarse cooking vessels (10%), thick-walled storage vessels (15%), and thin-walled non-painted pottery (51%) should be noted. The painted pottery collection from Yarim Tepe II excavations amounts to approximately 25000 fragments. Among these, about

*Archaeology Institute of Russian Academy of Sciences, Dm. Ulyanov str. 19, Moskva, Rússia, 117036. shahmardan@mail.ru

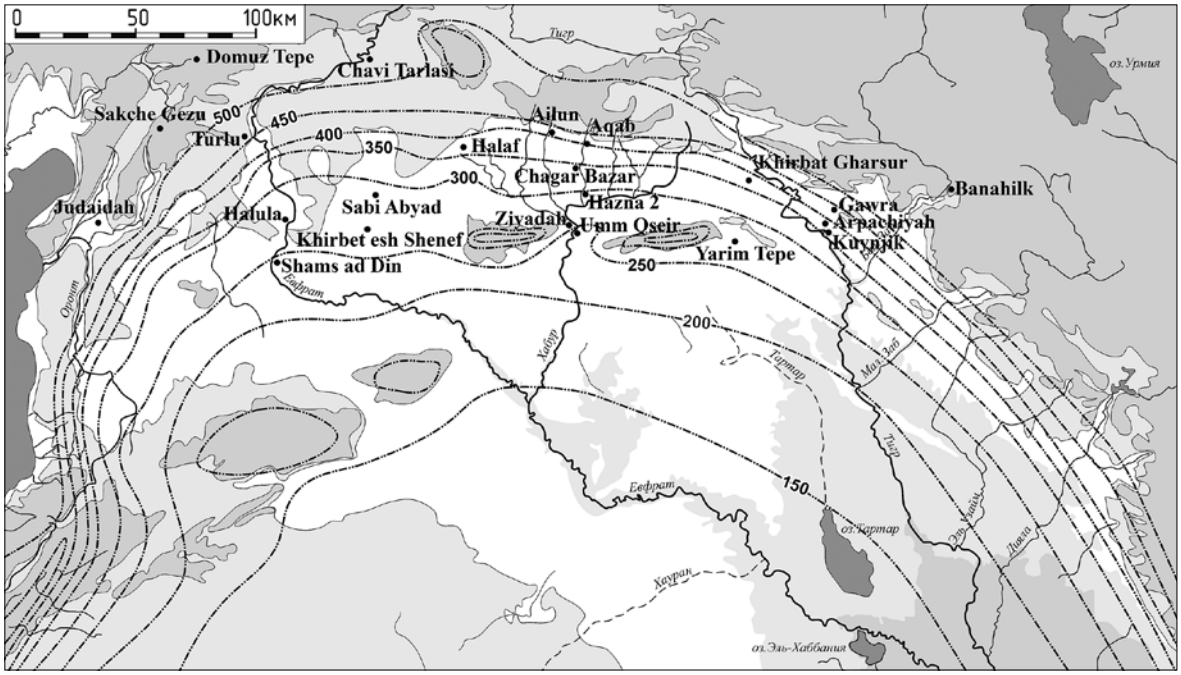

Figure 1. Map of the main Halafian sites distribution and modern precipitation in North Mesopotamia.

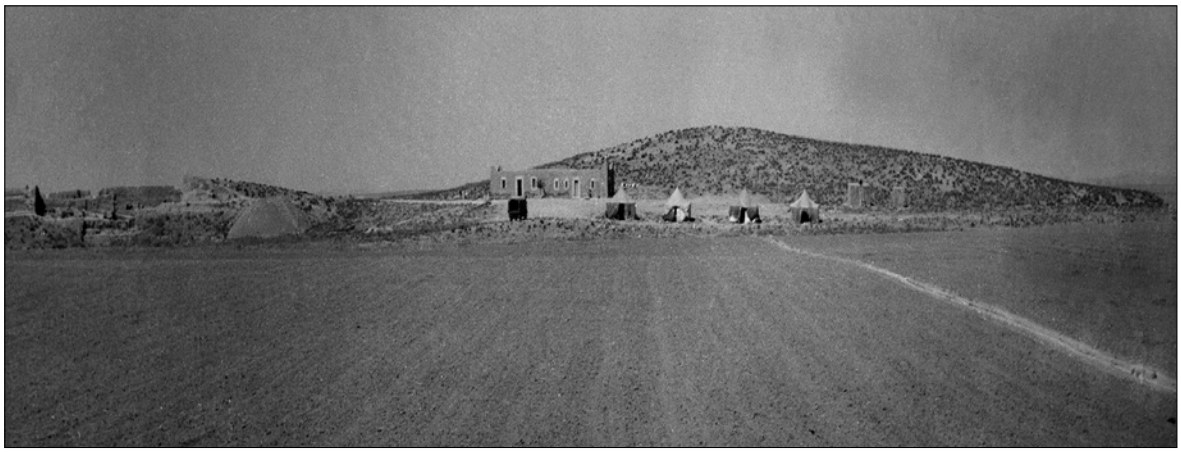

Figure 2. View of Yarim-Tepe group from the East. Yarim-Tepe II is the left one.

7000 are morphologically valid. Because of the great quantity of material in the collection it was decided to limit analysis to a representative set of samples. For this, all morphologically valid sherds from one square close to the top part of the tell (square n.28) were studied throughout the entire sequence of cultural deposits. Sampling was carried out for a 100m^2 area to a depth of 6.80 m, producing 1004 usable pottery fragments.

The point of departure for the formalized description of the collection of Halafian painted pottery was the creation of a theoretical classification of morphological variation in ceramic recipients for those categories which were adequately represented in our sample. These are referred as potential “Stable Variety of Shapes” (SVS).

As a result of this initial classification, diagnostic attributes were determined. Each shape includes, in addition to diagnostic attributes (character attributes) peculiar for example to one shape, other attributes common to several shapes, but necessary for a complete description of the vessel’s profile. Therefore, diagnostic attributes were combined with non-diagnostic ones. Qualitative and quantitative attributes (or parameters) were taken into account.

As a result, a list of attributes for the formalized description of halafian painted pottery morphology was compiled. So, every fragment was described through 76 positions, of which 42 were morphological characteristics made up of 22 qualitative (or attributes)

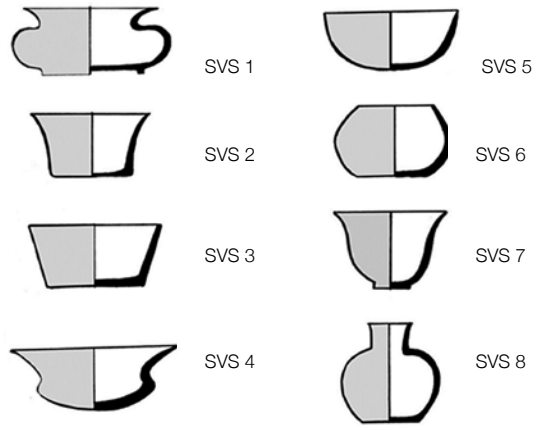

Figure 3. Stable Variety of Shapes (SVS) of mass painted pottery from Yarim-Tepe II.

and 20 quantitative (or parameters) traits. The list of attributes was illustrated by drawings which represent all possible variations of the diagnostic attribute states.

The information collected provided a database for calculations and analysis. As a result, fragments were grouped into morphological units via revealing stable sets of states of attributes. It means that "nuclear" groups (or Stable Varieties of Shapes) must have, on the end of the correlated attribute chains, a larger frequency of realizations, dividing them from morphological groups which obtained low realizations. There are, among them, single pottery fragments and, sometimes, small intermediate groups of fragments having an equal correlation with two different Stable Variety of Shapes groups. Showing these groups provided a means of determining the shape interaction systems that affected the process of evolution of the halafian painted pottery assemblage. Such groups are important for the analysis of the shape formation process, and reveal the existence of homogeneous and intrusive parts inside the halafian pottery corpus. The result of the classification work shows eight Stable Variety of Shapes groups of vessels on the upper taxonomic level (Fig. 3).

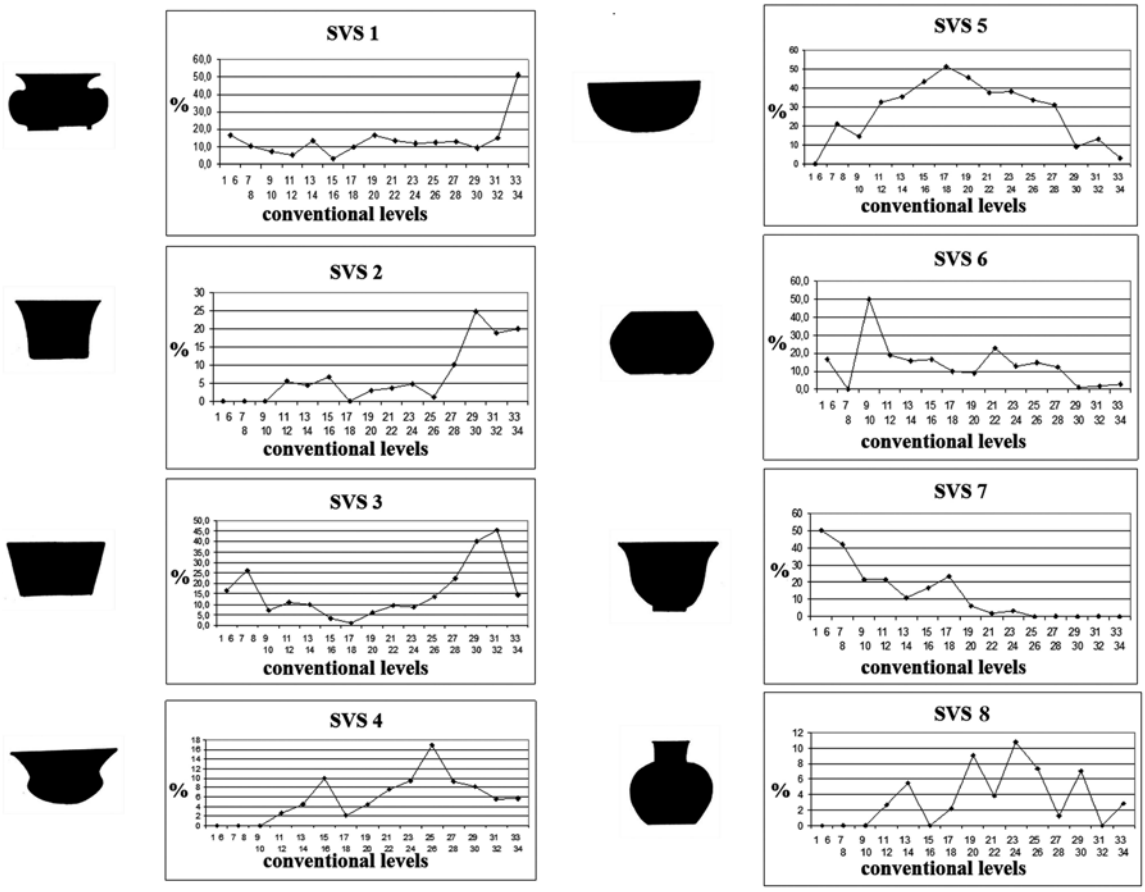

Figure 4. Percentage distribution of SVS morphological groups in cultural deposits (conventional levels) of Yarim-Tepe II.

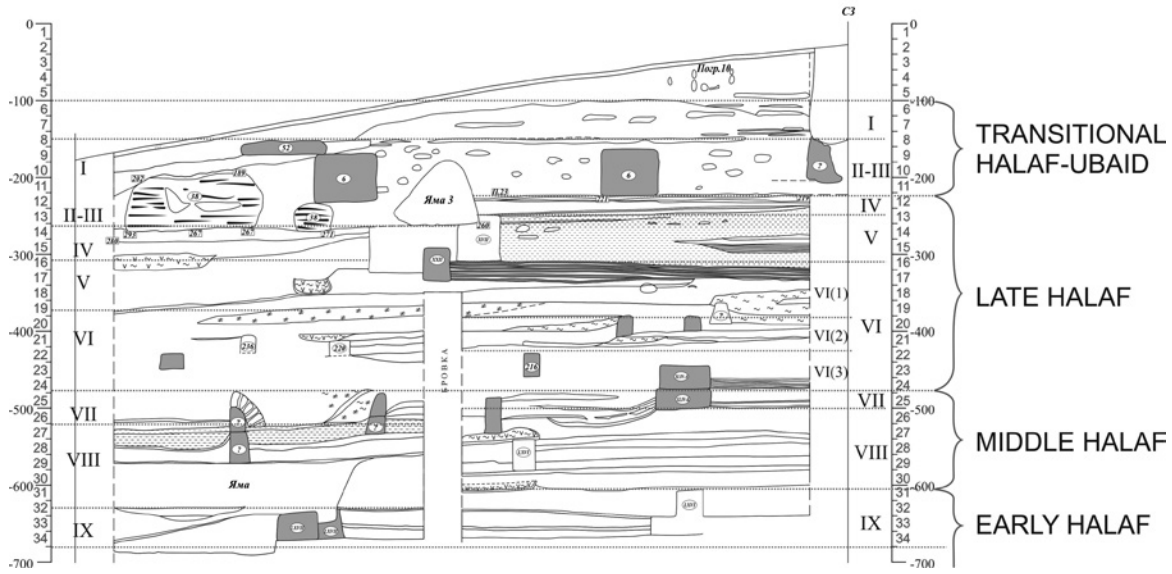

Figure 5. Yarim Tepe II, square 28 section. Concordance of building horizons, conventional levels, and proposed periodisation of the Halafian cultural deposits.

Because of all the painted morphologically valid ceramic material from an area, a similar trench was sampled; it allowed us to define metric units for the stratigraphic analysis. All the cultural deposits of Yarim Tepe II were divided into 34 conventional levels of 20 cm each. Nevertheless, in order to obtain the necessary sample size two levels had to be combined, and, in the eroded uppermost part, even 6 subdivisions had to be unified for this analysis.

The distribution dynamics of each morphological group in the cultural deposits was analyzed on the basis of ratio changes during the process of evolution (Fig. 4). Distribution analysis (in conventional levels) of percentage values of morphological groups of the upper taxonomic level (or SVS first degree) and the lower taxonomic level (or SVS second degree) allows us to reconstruct the pattern of the morphological evolution of halafian painted pottery. As a result, a 4-stage model was proposed (Amirov/Deopeak 1997: 69-86) for the Yarim Tepe II cultural evolution. It describes the second part of the early halafian stage (building horizon 9 or conventional levels 34-31), the middle halafian (building horizons 8-7 or conventional levels 30-25), the late halafian (building horizon 6-4 or conventional levels 24-12) and the transitional Halaf - Ubaid stage (a stage of acculturation) (building horizons 3-1 or conventional levels 11-7) (Fig. 5).

HALAF AND UBAID CONTACTS

As it was noted, morphology analysis allows revealing the homogeneity core of indigenous halafian shapes and intrusive pottery groups that do not have genetic roots inside the halafian pottery corpus. An intrusive one is the bell-shaped form (SVS 7), which is not only unknown in lowermost levels of Yarim Tepe II, but it is morphologically alien to halafian pottery. This shape is originated in the Ubaidian culture of Southern Mesopotamia, where pottery vessels of this morphology were among the most popular ceramic shapes. Usage of this morphological group inside the halafian assemblage reflects the graduate increment of South Mesopotamian influence to halafian pottery.

The contacts between the Halaf and Ubaid cultures were a process which lasted a long period and was realized in both directions. As an example, it is possible to mention imitations of halafian motives in Ubaid pottery from the sites of R'as al-Amiya, and Tell Abada (Stronah 1961, 95-137; Jasim 1981,102, fig.1), up in the Lower Mesopotamia. From the other side, on the mature stage of the evolution, the south Mesopotamian Ubaid culture was widespread in the Jazira region, where the Ubaid archaeological complex of North Mesopotamia was constituted. One of the bright examples of Ubaid cultural diffusion to the north Mesopotamia is the neighbor to Yarim Tepe II, the settlement of Yarim Tepe III, where due to the process of acculturation, the halafian material culture was completely changed to a classical northern Ubaid one (Мунчаев/Мерперт 1982,133-149). The life on Yarim Tepe II settlement, by some unclear reasons,

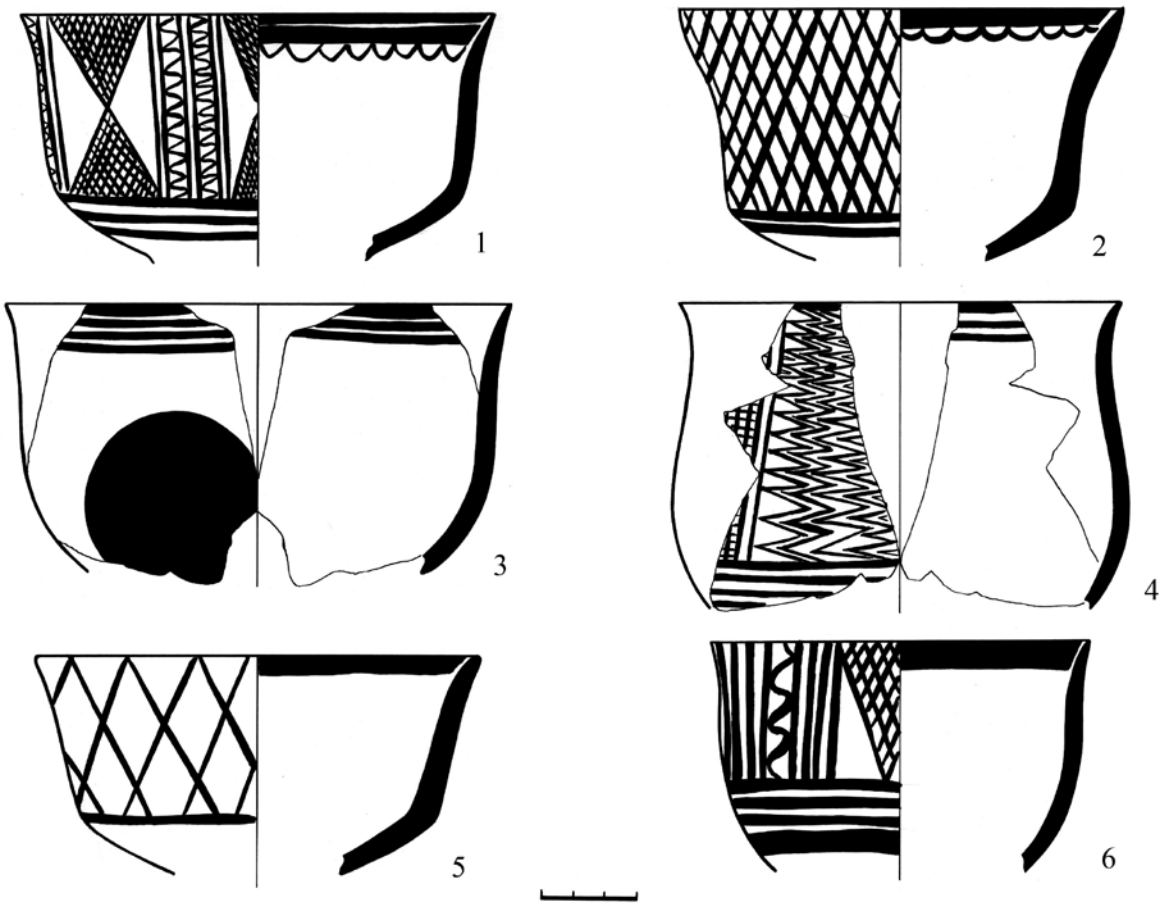

Figure 6. Bell-shaped (SVS 7) painted pottery from Yarim-Tepe II.

stopped much earlier. Accordingly, the process of Halaf-Ubaid transformation in the cultural deposits of Yarim Tepe II, the site is presented as an unfinished one.

As it is known, the first appearance of sedentary population to the alluvium lowland plains of Southern Mesopotamia is dated approximately close to the beginning of the VIth millennia, and could be related, from one side, with Huzestan and the Deh-Luran valley in particular, and from the other side with Samarra sites from Dyala, and the Zagros piedmont region (Hole/Flannery/Neely 1969; Jasim 1981, 101-104). The earliest period of the Ubaid evolution is explored in Tell Oueilly settlement, 3,5 km from Larsa (Huot 1992, 188-195). The deepest levels of the site remain uninvestigated because they are placed under ground water level.

Here it is worth noting that the initial manufacturing of ceramics made on rotating mechanisms, after H. Nissen, is strongly associated with the Ubaid culture in Southern Mesopotamia (Nissen 1988, 46-47; Nissen 1989, 245; Pollok 1999, 3; McIntosh 2005, 58; Stein 2010, 23, 28; Karsgaard 2010, 51, 56; Weeks et al. 2010, 246, 256; Özbal 2010, 45). But, as a special topic, this item remains out of investigation. In spite of this fact, the earliest Oueilly pottery (Ubaid 0) is undoubtedly handmade. Apparently, the earliest Mesopotamian pottery made by rotating devices appeared approximately within the Ubaid 2 period. This new technology is visually marked by the appearance of a thin linear decoration on the vessels, which is impossible to paint without centralized rotation (for example: Lebeau 1991, 241-266, pl.IV-VIII).

In the Northern Mesopotamia, ceramics made with rotating mechanism have appeared for the first time in the halafian settlements. For example, in Yarim Tepe II, within the collection of predominately handmade halafian painted ceramics, pottery made on rotating mechanism was revealed. Rotation traces on the surface of the halafian vessels from Yarim Tepe II were identified after a technological analysis, made in the Moscow Archaeology Institute, by prof. A.A. Bobrinsky at the beginning of 1990s. Rotation traces on Yarim-Tepe II ceramics were marked mainly on the single morphological group that is described as bell-shaped (SVS 7) form (Fig. 6).

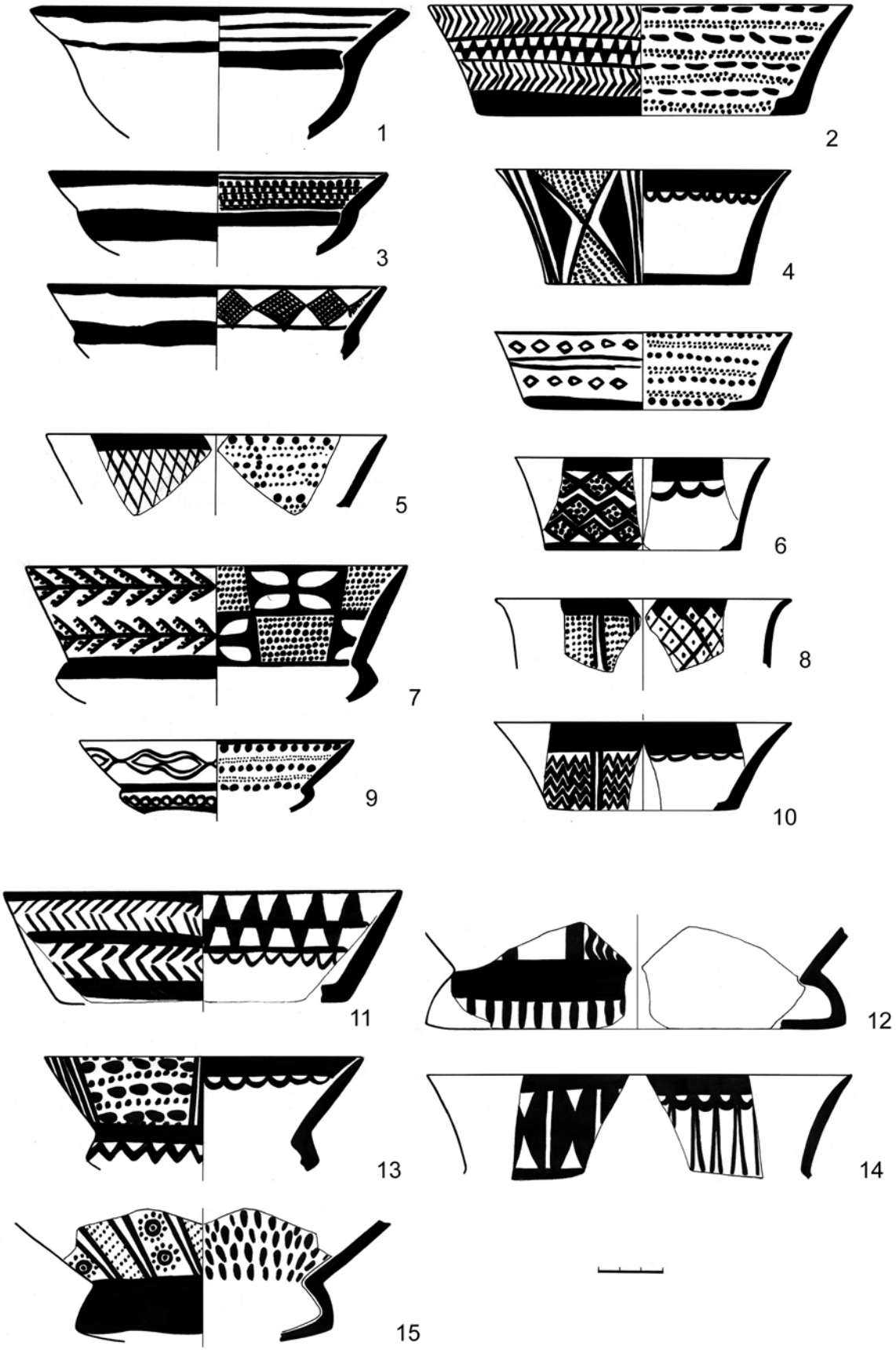

Figure 7. Painted pottery typical from the lowermost levels of Yarim-Tepe II.

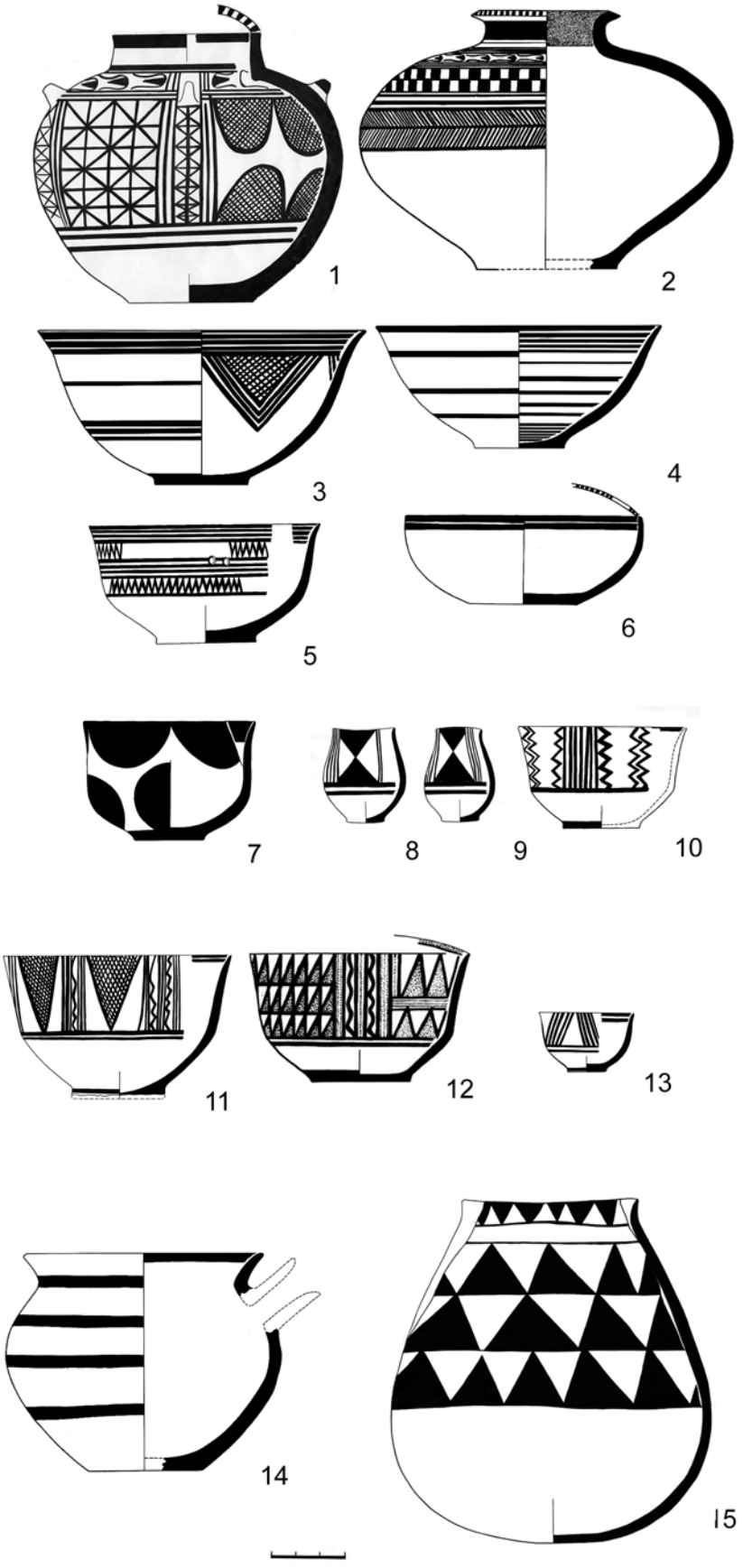

Figure 8. Painted pottery typical from the uppermost levels of Yarim-Tepe II.

For the first time, bell-shaped vessels were fixed in the cultural deposits of Yarim-Tepe II in the lower part of the sixth building horizon (within conventional levels 23-24) that is dated to the very beginning of the late period of halafian evolution. Here SVS 7 group comprised approximately 2% of all of the painted ceramic assemblage. To the end of the late period that is stratigraphically marked by the fourth building horizon (or conventional levels 13-14) the quantity of bell-shaped painted vessels reached a capacity of 10-15%. From the beginning of the transitional period, which is covered by the third building horizon (or conventional levels 11-12), the quantity of this group exceeds 20% of all painted pottery, reaching the end of the settlement's life on the level of the first building horizon (or conventional levels 8-7 and uppermost deposits) with no less than 50% of all used ceramics shapes.

So, at the end of the settlement's life, this variety of vessels became the most popular and statistically important morphological group among painted pottery of the site (Амиров 1994, 11-15; Amirov/Deopeak 1997, 69-86; Амиров 2007, 465-472). The influence exercised by vessels of this group to the traditional Halafian ceramics complex of Yarim Tepe II was extremely strong. It was reflected not only in the considerable quantity increase of bell-shaped vessels in the upper part of Yarim Tepe II cultural level, but also in the mimicry of traditional Halafian morphological shapes to morphology peculiarities of this group (Амиров 1994, 11-15; Amirov/Deopeak 1997, 69-86). Accordingly, a high amount of ceramic vessels from Yarim Tepe II, dated to final period of the settlement, was made (or decorated) by using a kind of rotating mechanism.

CONCLUDING REMARKS

As it was shown above, the initial Ubaid impact to the Halaf culture in the Sinjar plain is documented since the very beginning of the late stage of the halafian evolution. So, the process of increasing Ubaid influence to the halaf culture took a long span of time as it is clearly demonstrated by the evolution of Yarim Tepe II pottery (Fig. 7; 8). The process of cultural transformation in the Yarim Tepe halafian settlements could be explained by the fact, that among indigenous population, most likely in the site of Yarim Tepe III, a group of alien, Ubaid migrants, was settled. Newcomers would have brought cultural and technological innovations which were realized in the gradual increasing influence to the local ceramic production. The introduction of the use of rotating mechanisms in ceramic fabrication resulted in a gradual disappearance of the morphological and decorative peculiarities of the halafian pottery. So, as the driving mechanism of Halaf-Ubaid acculturation process, it could be proposed as an advanced technological progress, particularly in ceramic manufacturing, already achieved in South Mesopotamia.

It should be noted that the Halafian influence, in form of cultural impact or in form of ceramics imports circulation, is known far away from its motherland, and is outlined from Transcaucasia in the North to Lower Mesopotamia in the South, and from Western Iran in the East to Mediterranean coast in the West. But actually, the indigenous Halaf territory is marked by the existence of a set of important cultural attributes which could be named as the "halafian trinity". It means that the image of the classic Halaf culture could be determined by the simultaneous use of painted ceramics, round planned dwellings, and character painted female figurines.

In the Yarim Tepe II site, the "halafian trinity" is completely present in lower levels of the settlement. In the uppermost levels, the process of "halafian trinity" destruction could be observed. The last levels where all three characteristic halafian attributes are presented in organic unity are building horizons 5-4 (or conventional levels 18-13), which are dated to the second half of Late Halaf period. The uppermost building horizons 3-1, which are interpreted as Transitional Halaf – Ubaid period demonstrate from one side the intensive change of morphology and the decorative character of the halafian painted pottery (including a clear appearance of some Ubaid painting motifs). From another side, the gradual destruction of the architecture indicates the presence of the typical halafian settlement, which is characterized by the proportional coexistence of round planned buildings (dwellings) and rectangular utility constructions, as well as the termination of the use of halafian female figurines. For example, the average ratio for lower levels of Yarim Tepe II settlement is approximately one "tholos" to four-five rectangular constructions. In the uppermost levels, (it is fair to say, partly destroyed) the number of round planned constructions is strongly reduced. The same could be said about female figurines. The last one in Yarim Tepe II was found in the N14 rectangular construction, related to 3-rd building horizon (level).

So, the evolutionary transformations noted for the ceramic morphology of Yarim Tepe II is supported by the observation of changes concerning other important attributes determining the image of the Halaf culture. A joint analysis of materials from the uppermost levels of Yarim Tepe II demonstrates only an early stage, or an unfinished process of acculturation of the Halaf culture by the Ubaid. In the adjacent halafian settlement of Yarim Tepe III, the process of cultural transformation was completely realized.

BIBLIOGRAPHY

АМИРОВ, Ш.Н. 1994, Морфология керамики халафской культуры Северной Месопотамии (По материалам поселения Ярым Тепе 2). Автореферат диссертации на соискание ученой степени кандидата исторических наук. Москва 1994г.

AMIROV, SH. N., DEOPEAK, V. 1997, Morphology of the Halafian Painted Pottery from Yarim Tepe 2, Iraq // Baghdader Mitteilungen 28. 69-86.

АМИРОВ, Ш.Н. 2007, Методика и исследования морфологии халафской керамики. // в кн. Три четверти века. Д.В. Деопику – друзья и ученики. М.2007. с.465-472

HOLE, F., FLANNERУ K.V., NEELУ J.A. 1969, Prehistory and human ecology of the Deh Luran plain. An early village sequence from Khuzistan,Iran. Memoirs of the Museum of Anthropology, University of Michigan, No 1. Ann Arbor, 1969, XV, 438 pp., 140 figs — 44 bis.

JASIM, S.A. 1981, Excavations at Tell Abada. Iraq. *Paleorient vol.*7/2 1981 pp.101-104.

HUOT, J.L. 1992, The first farmers at Oueili. *The Biblical Archaeologist,* vol. 55. n. 4 (Dec 1992), 188-195.

KARSGAARD, P. 2010, The Halaf-Ubaid Transition: a transformation without center? in eds. Carter R.A. Philip G. Beyond the Ubaid. Transformation and Integration in the Late Prehistoric Societies of the Middle East. Studies in Ancient Oriental Civilization n.63. Oriental Institute of the University of Chicago.

LEBEAU, M. 1991a, La ceramique Obeid 1 de Tell el'Oueili: Rapport preliminaire 'Oueili Travaux de 1985 sous la direction de J-L Huot. Paris, 211-240.

LEBEAU, M. 1991b, La ceramique Obeid 2 et 3 de Tell el'Oueili: Rapport preliminaire 'Oueili Travaux de 1985 sous la direction de J-L Huot. Paris, 241-266.

LEBEAU, M. 1983, La ceramique du Niveau Obeid 4 de Tell el'Oueili: Rapport preliminaire Larsa et 'Oueili Travaux de 1978-1981 sous la direction de J-L Huot. Paris, 81-133.

MCINTOSH, J.R. 2005, Ancient Mesopotamia-new perspectives. Santa Barbara.

МУНЧАЕВ, Р.М, МЕРПЕРТ, Н.Я. 1982, Поселение убейдской культуры Ярым Тепе 3 в Сеаерной Месопотамии (из итогов работ советской экспедиции в Ираке) Советская Археология, 133-149.

NISSEN, H.J. 1988, The Early History of Ancient Near East 9000-2000 BC. Chicago&London.

NISSEN, H.J. 1989, The Ubaid Period in the context of the Early History of the Ancient Near East // in E.F.Henricson & I.Thuessen (eds) Upon this foundation-The Ubaid reconsidered. Cobenhaven.

ŐZBAL, R. 2010, A comparative look at Halaf and Ubaid period. Social Complexity and the Tell Kurdu case, *Tüba-Ar 13*.

POLLOCK, S. 1999, Ancient Mesopotamia. The Eden that never was. Cambrige.

STEIN, G. 2010, Local Identities and interaction spheres; Modelling Regional Variation in the Ubaid Horizon//in eds. Carter R.A. Philip G. Beyond the Ubaid. Transformation and Integration in the Late Prehistoric Societies of the Middle East. Studies in Ancient Oriental Civilization n.63. Oriental Institute of the University of Chicago. 2010.

STRONAH, D. 1961, Excavations at Ras al-Amiya. *Iraq 23,* 95-137.

WEEKS, L., PETRIE, C.A., POTTS, D. 2010, Ubaid related-related? The Black-on Buff ceramic Tradition of Highland Southwest Iran // in eds. Carter R.A. Philip G. Beyond the Ubaid. Transformation and Integration in the Late Prehistoric Societies of the Middle East. Studies in Ancient Oriental Civilization n.63. Oriental Institute of the University of Chicago.

Anna Gómez-Bach, Jörg Becker and Miquel Molist (ed),
II Workshop on Late Neolithic Ceramics in Ancient Mesopotamia: pottery in context,
Monografies del MAC 1, Barcelona 2018,
ISBN: 978-84-393-9750-2 (pàg. 25-34)

NEOLITHIC POTTERY WITH HORIZONTAL APPLIED BANDS FROM TELL EL-KERKH, THE ROUJ BASIN

Takahiro Odaka*

Las aplicaciones plásticas horizontales son comúnmente observadas en las superficies externas de los recipientes en forma de cuenco de los conjuntos cerámicos neolíticos del norte de Siria y sureste de Turquía. En este trabajo se aborda la función y transformación de estas aplicaciones en Tell el-Kerkh. Estos cambios parecen asociarse a la creciente diversificación y especialización de la cerámica.

Cerámica neolítica, Próximo Oriente, Bandas horizontales aplicadas, Elemento de suspensión, Diversificación.

Horizontal applied bands are commonly observed on the outer surfaces of bowl-shaped vessels in the pottery Neolithic of northern Syria and south-eastern Turkey. This paper discusses the function and transformation of the bands through Tell el-Kerkh assemblages. This change seems to correspond with the increasing diversification and specialization of pottery.

Neolithic pottery, Near East, Horizontal applied band, Handle system, Diversification.

INTRODUCTION

Pottery vessel production seems to have emerged in at least a few regions of the Near East in the first half of 7th millennium BCE, the beginning of the Late Neolithic. Several excavations since the 1990s in northern Syria and south-eastern Turkey have provided especially rich information regarding the development of early pottery. The oldest pottery from sites in this vast region shares several attributes. For example, the fabric includes considerable mineral temper, the vessel shape is limited to small simple bowls measuring around 20 cm in diameter, and, in many cases, dark coloured surfaces are treated with light burnishing. Thus, they can be identified broadly as the same type of pottery, sometimes called "Early Mineral Ware" or "early mineral-tempered pottery" (Nieuwenhuyse *et al.* 2010; Le Mière 2013).

However, the succeeding types of pottery start to show local variation. Heavily chaff-tempered light-coloured wares became major in the pottery assemblages east of the Euphrates, while the so-called Dark-faced Burnished Ware (DFBW) became dominant in western areas, such as the Orontes Valley and the Mediterranean coast (e.g. Miyake 2003, 128-129; Odaka 2013a). When studied in more detail, several local types of pottery can be identified even within each of the two regions (e.g. Le Mière/Picon 1998; Aurenche/ Kozlowski/Le Mière 2004; Odaka 2013b). The rise of such local variation was regarded as a result of diversifications of pottery production in the mid-late 7th millennium BCE.

At the same time, common aspects in ceramics across the regions are also observed during this period. One of them is the frequent occurrence of "*moyen de préhension* (parts for gripping)," such as the horizontal applied bands or handles, on the outer surfaces of bowl-shaped vessels (Le Mière/Picon 1998, 13). This is a significant phenomenon from the Northern Levant to the Balikh Valley (Fig. 1), and seems to be the key to

* Assistant Professor, University of Tokyo, University Museum. 7 Chome-3-1 Hongo, Bunkyō, Tokyo 113-0033, Japó. odakatak@gmail.com

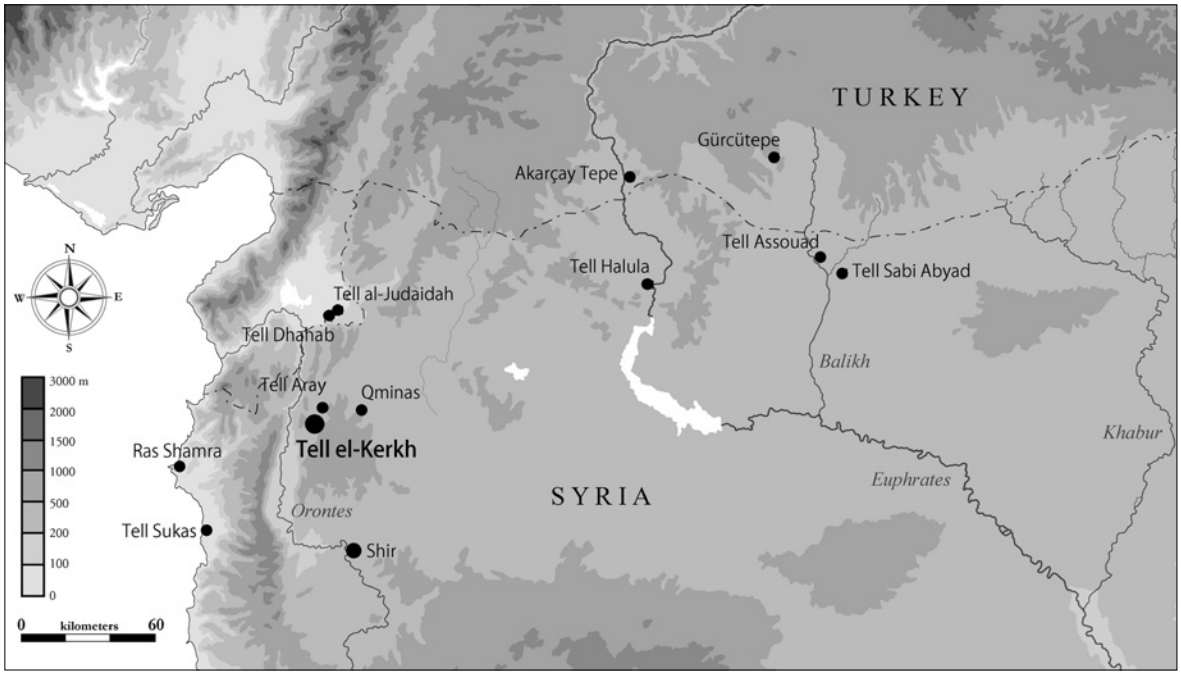

Figure 1. Map of distributions of the horizontal applied band on the Neolithic pottery.

understand how and why pottery vessels were invented and prevailed in these regions.

The first question we need to address is whether the horizontal applied band was truly a "grip" on the vessels. These bands can also be considered as decoration, and, in fact, such interpretation seems to be popular for pottery from other parts of the world. These two views, in fact, are not mutually exclusive.

Thus, this paper shall discuss the function(s) of the horizontal applied band on Neolithic pottery from the northern Levant through analyses of specimens recovered from Tell el-Kerkh in the Rouj Basin, northwestern Syria.

POTTERY ASSEMBLAGES OF THE ROUJ BASIN THROUGH THE LATE NEOLITHIC

The regional chronology of the Rouj Basin was proposed based on the results from soundings at Tell el-Kerkh 2, Tell Aray, and Tell Abd el-Aziz (Iwasaki/Nishino/Tsuneki 1995). The Late Neolithic corresponds to the El-Rouj 2 period, which is divided into four sub-periods (El-Rouj 2a to 2d). Cultural layers of all four sub-periods were exposed at Tell el-Kerkh, one of the so-called Neolithic mega-sites consisting of three mounds (Tell el-Kerkh 1, Tell el-Kerkh 2, and Tell Ain el-Kerkh).

The sounding at Tell el-Kerkh 2 in 1992 revealed a sequence consisting of El-Rouj 1 (PPNB; Layers 12-7), El-Rouj 2a (Layers 6-5), and El-Rouj 2b (Layers 4-1) periods (Iwasaki/Tsuneki eds. 2003), and excavations at Tell Ain el-Kerkh in 1997-2002 recovered archaeological remains belonging to El-Rouj 1 (Layers 10-3 in Northwest Area), El-Rouj 2b (Layers 2-1 in Northwest Area), El-Rouj 2c (Phases III-II in Central Area), and El-Rouj 2d (Phase I in Central Area) (Tsuneki *et al.* 1997, 1998, 1999, 2000, 2007). In addition, the East Trench excavated in 2005-2008 provided a sequence consisting of El-Rouj 1 (Layer 9), El-Rouj 2b (Layers 8-7), El-Rouj 2c (Layers 6-4), and El-Rouj 2d (Layers 3-1) (Fig. 2).

As a result of these investigations, El-Rouj 2a-2d pottery assemblages can be briefly summarized as follows (see Odaka 2013a, 205-208 for details).

The earliest assemblage in the El-Rouj 2a period consisted of the so-called Kerkh Ware, a variety of the Early Mineral Ware, along with DFBW, and a small number of Coarse Ware tempered with abundant chaff. In all ware-types of pottery, the vessel shape was apparently limited to simple rounded bowls, and no parts for gripping, neither handles nor horizontal applied bands, were present at all.

In the El-Rouj 2b period, Kerkh Ware drastically declined and eventually disappeared. Since then, DFBW consistently dominated the pottery assemblage through the Late Neolithic and Coarse Ware also gradually increased until the El-Rouj 2c period. The vessel shapes of both ware-types began to diversify in this period; for instance, necked jars first appeared at this time. Also, the horizontal applied band was often observed on bowl-shaped vessels, as well as handles.

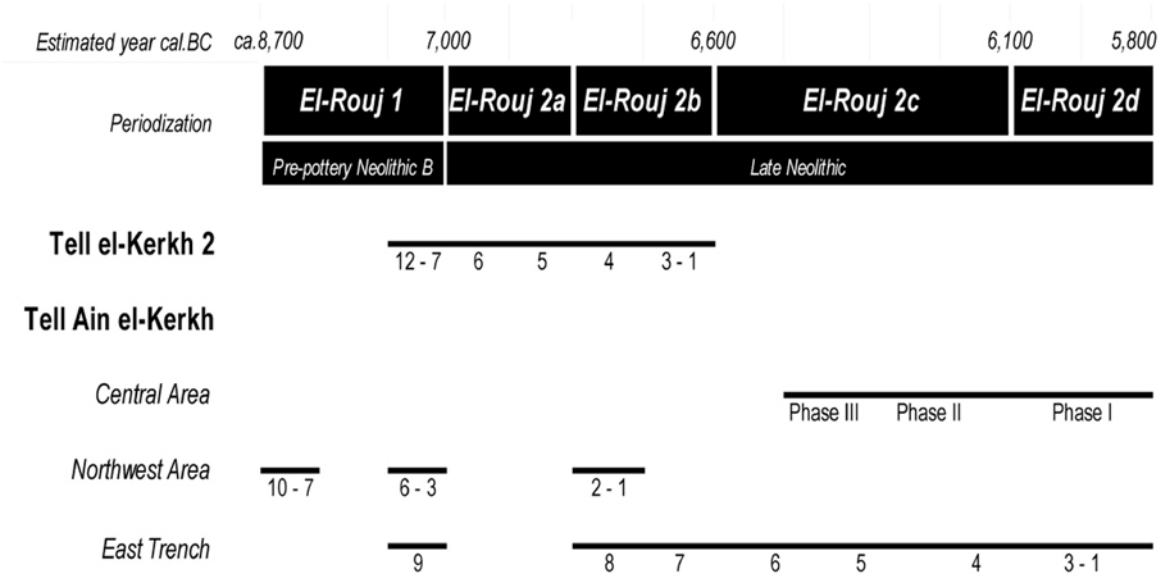

Figure 2. Neolithic chronology of Tell el-Kerkh.

The pottery assemblage in the El-Rouj 2c period included various new ware-types, such as Dark-faced Unburnished Ware (DFUBW), Samarra-related Fine Painted Ware, and Orange Fine Ware. Washed Impressed Ware was also observed in this period at the other neighbouring sites in the Rouj Basin (Iwasaki/Nishino/Tsuneki 1995) and the surrounding regions (e.g. Braidwood/Braidwood 1960; Masuda/Sha'ath 1983). Diversification in the vessel shapes increased further and specific vessel shapes became associated with certain ware-types. For instance, most DFBW were small shapes with thin walls, and the horizontal band was applied to only DFBW and Coarse Ware.

These changes were accelerated in the El-Rouj 2d period. In addition, strong influence of Halaf pottery from the east was observed especially in DFBW. Horizontal applied bands were still limited in DFBW and Coarse Ware, although its frequency became very rare (Fig. 3).

Figure 3 shows quantitative data on the change in the pottery assemblage from El-Rouj 2b to 2d. It demonstrates that the percentages of DFBW based on rim sherd counts are generally higher than those based on total weight, and vice versa for the other ware-types, especially for Coarse Ware. This implies that a DFBW sherd is generally lighter and smaller with thinner walls than that of Coarse Ware. Although sherds of Coarse Ware are usually too fragmented to reconstruct the whole shape, it is easy to imagine that most of them were originally parts of large-sized vessels.

HORIZONTAL APPLIED BANDS IN POTTERY FROM TELL EL-KERKH

Focusing further on the horizontal applied band, its frequencies in each period are shown in figure 4, which is the result of sherd counts of DFBW and Coarse Ware recovered from the East Trench and Square E310 of the Central Area at Tell Ain el-Kerkh. A chronological correspondence between the East Trench and the Central Area was decided based on stratigraphic and typological analyses. The number of rim sherds simply reflects the number of vessels, because no vessel-shapes with more than two mouths have been identified so far. Thus, by dividing the number of sherds with a horizontal applied band by the number of rim sherds, the frequency of vessels with a horizontal applied band among the whole pottery assemblage can be relatively estimated. In this analysis, sherds with both rim parts and horizontal applied bands were counted in both categories.

Immediately after the first appearance, the frequency of the horizontal applied band rapidly increased. The frequency found on Coarse Ware was much higher than on DFBW, and peaked in the late El-Rouj 2b period. In the El-Rouj 2c period, however, it radically decreased. Meanwhile, the frequency of the horizontal applied band on DFBW kept a constant level and ended up higher than that on the Coarse Ware in the late El-Rouj 2c period. Finally, horizontal applied bands almost disappeared by the end of the El-Rouj 2d period, both on DFBW and on Coarse Ware.

Figure 5 shows drawings of potsherds with horizontal applied bands, which were recovered from the East Trench at Tell Ain el-Kerkh. The horizontal applied bands

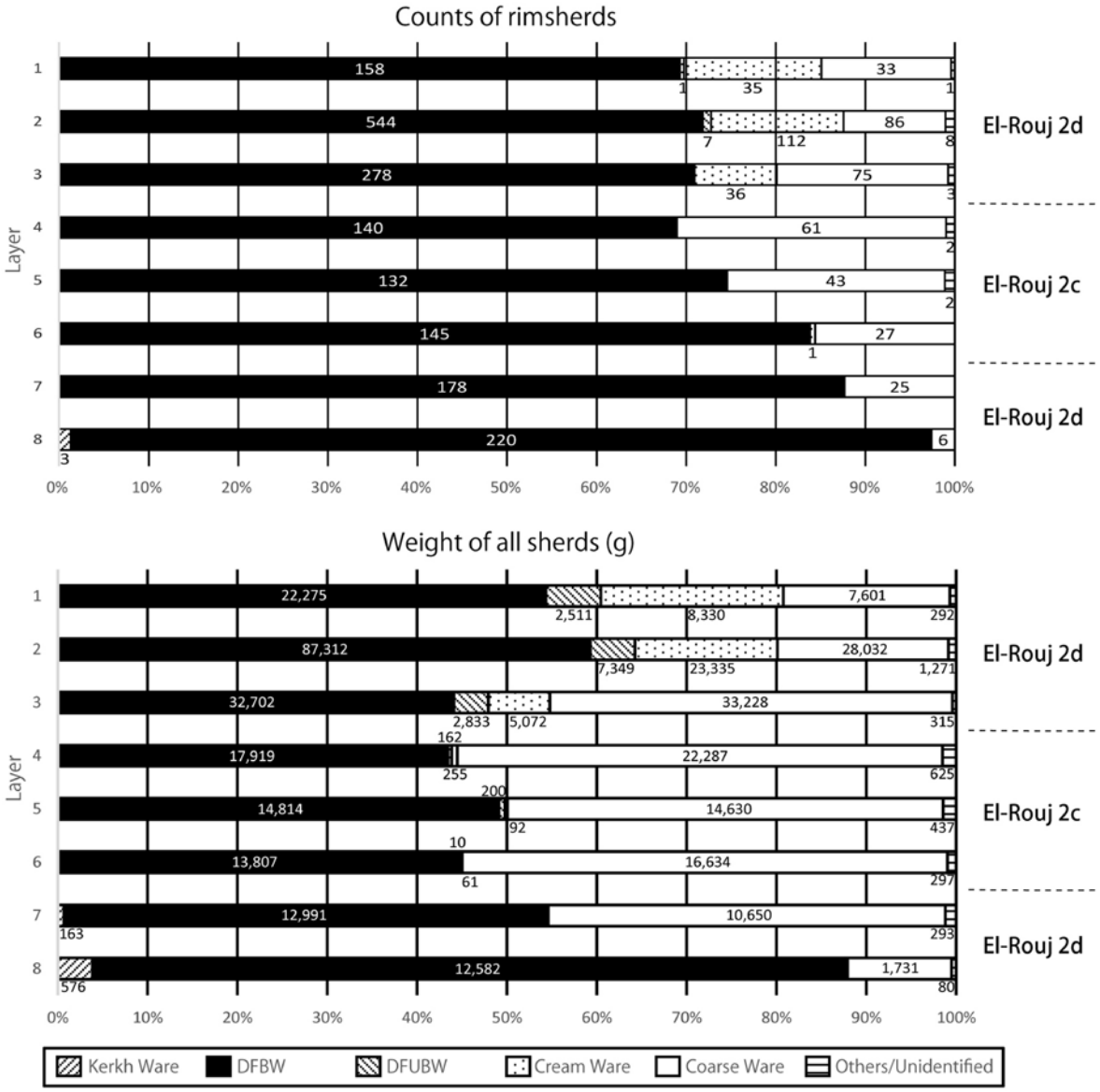

Figure 3. Pottery assemblages per layer, East Trench, Tell Ain-el Kerkh.

on Coarse Ware were often accompanied by additional decorative elements, such as a broadening of a section of the band and a disc-shaped appliqué (Fig. 5: 17-20). The profiles, however, are generally trapezoid with ca. 1 cm thickness, which seems reasonable to be gripped with a finger. While, a specimen in the middle El-Rouj 2c (Layer 5) is thinner than the previous ones (Fig. 5: 15), and the following layers in the East Trench no longer provided examples of horizontal applied bands in a meaningful condition to be drawn.

Compared to the horizontal applied bands on Coarse Ware, most horizontal applied bands on DFBW were formed into very thin and flat shapes (Fig. 5: 1, 3-7, 10, 11). An example recovered from the Central Area is shown in Fig. 5: 14. The band is very hard to identify in this photograph, and seems to not have functioned as a grip nor as decoration. Nevertheless, a gradual change can also be observed in the horizontal applied band on DFBW. In the El-Rouj 2b and the early El-Rouj 2c (Layers 8-6), the profiles often show a triangular shape with ca. 2 cm thickness or trapezoidal with ca. 1 cm thickness, which seems easy to be gripped (Fig. 5: 8, 9, 12, 13), although flat-shaped bands dominate in the middle to late El-Rouj 2c.

To summarize, horizontal applied bands were usually thick in profile, enabling a practical function as a grip, when the frequency was generally high from the El-Rouj 2b to the early El-Rouj2c periods. Although the frequency was higher on Coarse Ware than on DFBW through these periods, in the following periods horizon-

		Layer 8, East Tre.	Layer 7, East Tre.	Layer 6, East Tre.	Phase III, E310	Layer 5, East Tre.	Phase II, E310	Layer 4, East Tre.	Layer 3, East Tre.	Layer 2, East Tre.	Phase I, E310	Layer 1, East Tre.	Total
DFBW	N of the bands	3	13	12	75	5	31	7	5	2	2	1	156
	N of rims	220	178	145	1,222	132	573	140	278	544	509	158	4,099
Coarse W	N of the bands	1	9	6	7	3	1	2	1	1	0	0	31
	N of rims	6	25	27	301	43	108	61	75	86	96	33	861

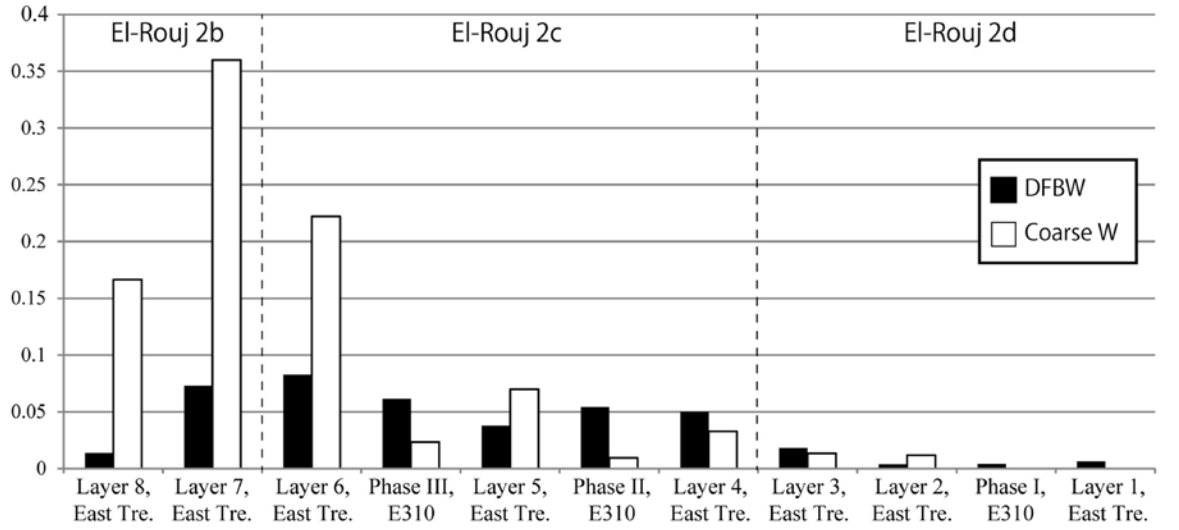

Figure 4. Frequencies of the horizontal applied bands, estimated by dividing the number of sherds with the band by the number of rim sherds, per layer or phase, East Trench and E310, Tell Ain el-Kerkh.

tal applied bands on Coarse Ware rapidly decline until they are found even less frequently than on DFBW. Even on DFBW the shape of the horizontal applied band became thinner in profile, which does not support any functions. Finally, horizontal applied bands decreased both on Coarse Ware and on DFBW, until it almost disappeared by the end of the El-Rouj 2d period.

INTERPRETATIONS

In the earliest pottery assemblage of the El-Rouj 2a period, no form of grip that would reinforce portability of the vessels is found. However, it is noteworthy that the vessel shapes were limited to small bowls. Such shapes are quite popular among pottery vessels even now, and are generally used for serving, cooking, transportation, etc., rather than for storage in a fixed place. Moreover, small bowls usually functioned on the premises of its portability. In fact, one of the principal elements of Early Mineral Ware would be portability, as it is the decisive difference between the oldest pottery vessels and the clay bins which already existed in the Pre-Pottery Neolithic. In this way, the vessel shape of El-Rouj 2a pottery, at least of Kerkh Ware, was limited to small-sized simple bowls, which were very easy to grip, therefore, portability was naturally assured without any additional specific parts for gripping.

However, pottery began to be diversified in the following period. As large-sized vessels appeared, it became necessary to reinforce their portability, since portability was a principal element for pottery vessels, at least in the early phases. Therefore, in the El-Rouj 2b period, the horizontal applied bands first appeared and were especially noticeable in Coarse Ware. The relation between the number of rim sherds and total weight suggests that Coarse Wares were generally thick walled, large sized vessels. In addition, the ratio of Coarse Ware in the whole pottery assemblage and the frequency of horizontal applied bands on Coarse Ware simultaneously increased. These facts imply that the horizontal applied band was intended to be attached to large-sized vessels, a new variety of vessel shapes that appeared in this period. Furthermore, the horizontal applied band needed to be of a reasonable shape to function as a grip to reinforce the portability of a large-sized, heavy, Coarse Ware vessel. As for DFBW, on the other hand, the frequency of the horizontal applied band was relatively low, and very thin bands, which seemed useless for use as a grip, were sometimes observed. Smaller, lighter DFBW vessels were easily carried, as in the case of El-Rouj 2a pottery. Therefore, the horizontal applied band was not significant in providing a practical function as a grip on such small and lighter DFBW.

Subsequently, although Coarse Ware still seemed large and heavy, its portability seems to have been ignored

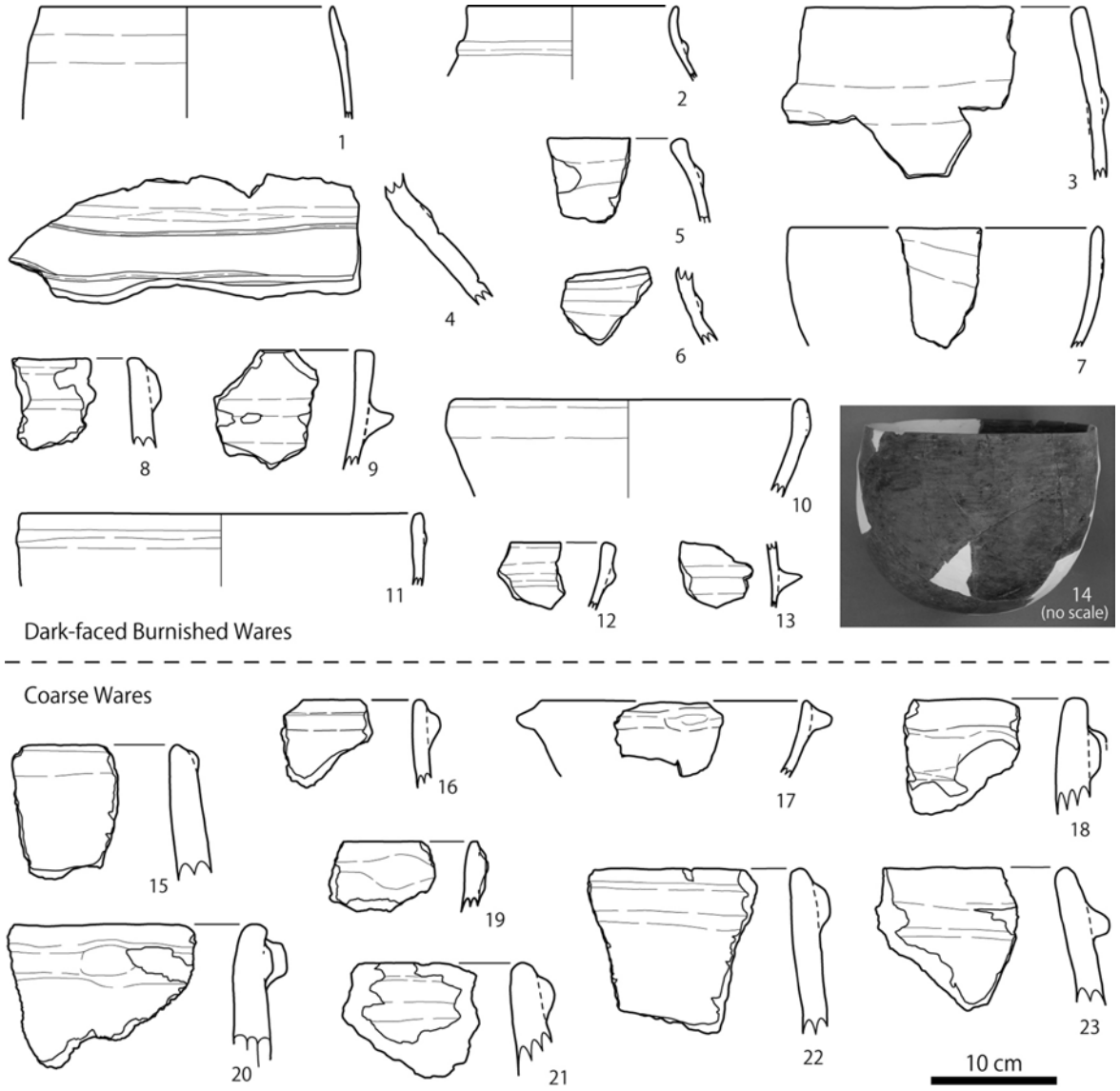

Figure 5. Pottery with horizontal applied bands, Tell Ain el-Kerkh. 1-4. Layer 4; 5, 6, 15. Layer 5; 7-9, 16-18. Layer 6; 10-12, 19-23. Layer 7; 13. Layer 8 (East Trench); 14. El-Rouj 2c period (Central Area).

in the El-Rouj 2c period. The frequency of horizontal applied bands rapidly declined in Coarse Ware, and most horizontal applied bands in DFBW were no longer used for gripping. It appears that the further diversification in vessel shapes led to the emergence of specialized pottery for specific purposes. The vessel shape, including the weight and the size, was dictated by the use, and, of course, clear distinctions between portable wares and fixed wares were adequately recognized. On one hand, most Coarse Wares were meant to be used as fixed vessels, and, on the other hand, DFBW were portable vessels to be made in sufficiently small sizes and light weights. Thus, in both cases, grips for practical uses, including horizontal applied bands, were no longer necessary.

This trend continued to the El-Rouj 2d period. Finally, the horizontal applied band virtually disappeared.

CO-RELATION WITH HANDLES

Such interpretations support the idea that the original function of the horizontal applied band was as a grip to reinforce the portability of a vessel. However, for specific kinds of Late Neolithic pottery, handles may be more easily recognized as grips, rather than the horizontal applied bands. If horizontal applied bands were surely grips, then the handles should also demonstrate similar changes through the Late Neolithic.

Similarly to the case of the horizontal applied band,

		Layer 8, East Tre.	Layer 7, East Tre.	Layer 6, East Tre.	Phase III, E310	Layer 5, East Tre.	Phase II, E310	Layer 4, East Tre.	Layer 3, East Tre.	Layer 2, East Tre.	Phase I, E310	Layer 1, East Tre.	Total
DFBW	N of handles	18	11	3	20	2	6	3	2	12	2	1	80
	N of rims	220	178	145	1,222	132	573	140	278	544	509	158	4,099
Coarse W	N of handles	1	2	1	2	0	0	1	1	0	0	0	8
	N of rims	6	25	27	301	43	108	61	75	86	96	33	861

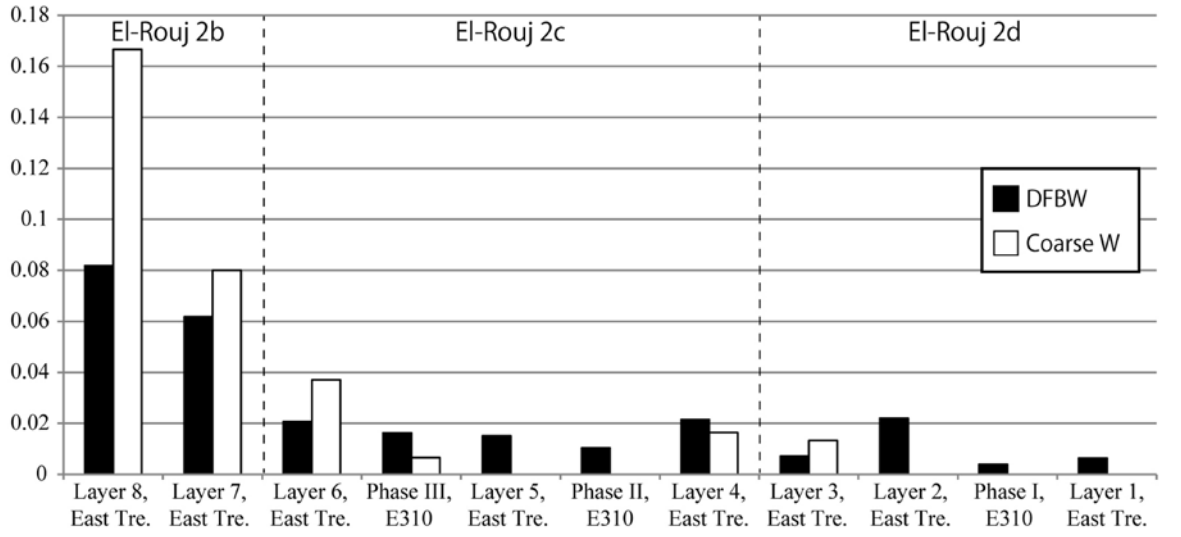

Figure 6. Frequencies of handles, estimated by dividing the number of the handle sherds with a handle by the number of rim sherds, per layer or phase, East Trench and E310, Tell Ain el-Kerkh.

the frequency of handles in each period was estimated based on the counts of rim sherds and handle sherds from Tell Ain el-Kerkh (Fig. 6). Handles first appeared in the El-Rouj 2b period as well (Fig. 7). In both the DFBW and Coarse Ware, the frequency abruptly peaked in the early El-Rouj 2b, although much more notably in the Coarse Ware. Afterwards, as both frequencies rapidly declined, the differences became smaller and finally handles on Coarse Ware became rare in the middle El-Rouj 2c period. Meanwhile, handles on DFBW survived until the El-Rouj 2d period, but the frequency was quite low. In addition, the dominant form of handles turned from ear-shaped lugs to pierced lugs which would question its effective use as a grip (Fig. 8). Because of the very narrow hole through which the string would pass, it is difficult to understand whether this string was to be used as a handle or to hang.

Although the number of specimens is quite limited, handles demonstrate roughly similar changes with those of horizontal applied bands. This fact, therefore, is affirmative for the hypothesis that horizontal applied bands were originally invented to function as a grip.

COMPARISON WITH UPPER MESOPOTAMIAN SITES

As well as Tell el-Kerkh, many mid-7th millennium sites yielded early pottery with grips. Some of them are located on the Middle Euphrates and the Balikh, although they clearly show the regional difference in the whole pottery assemblage from the Northern Levantine sites, including Tell el-Kerkh.

As for pottery with grips at these sites, unfortunately, very little quantitative data is available, although an exception is Tell Sabi Abyad I on the Balikh; 48 handles and only 1 horizontal applied band were identified among 488 diagnostic potsherds selected from 2440 recovered sherds (Le Mière/Nieuwenhuyse 1996, table 3. 12). However, the first appearance of the horizontal applied band seems later than that of handles in these regions, as well as at Tell el-Kerkh. Horizontal applied bands on Early Mineral Ware have not been found so far, while the succeeding chaff-tempered, light-coloured ware often has a band, as we can observe in Phase 2 of Tell Halula and in the early Balikh II period of Tell Assouad (Faura/Le Mière 1999, figs. 3-4; Cauvin 1972). In addition, as pottery diversified and specialized vessel shapes appeared, horizontal applied bands clearly declined. For instance, it completely disappeared in Phase 3 of Tell Halula

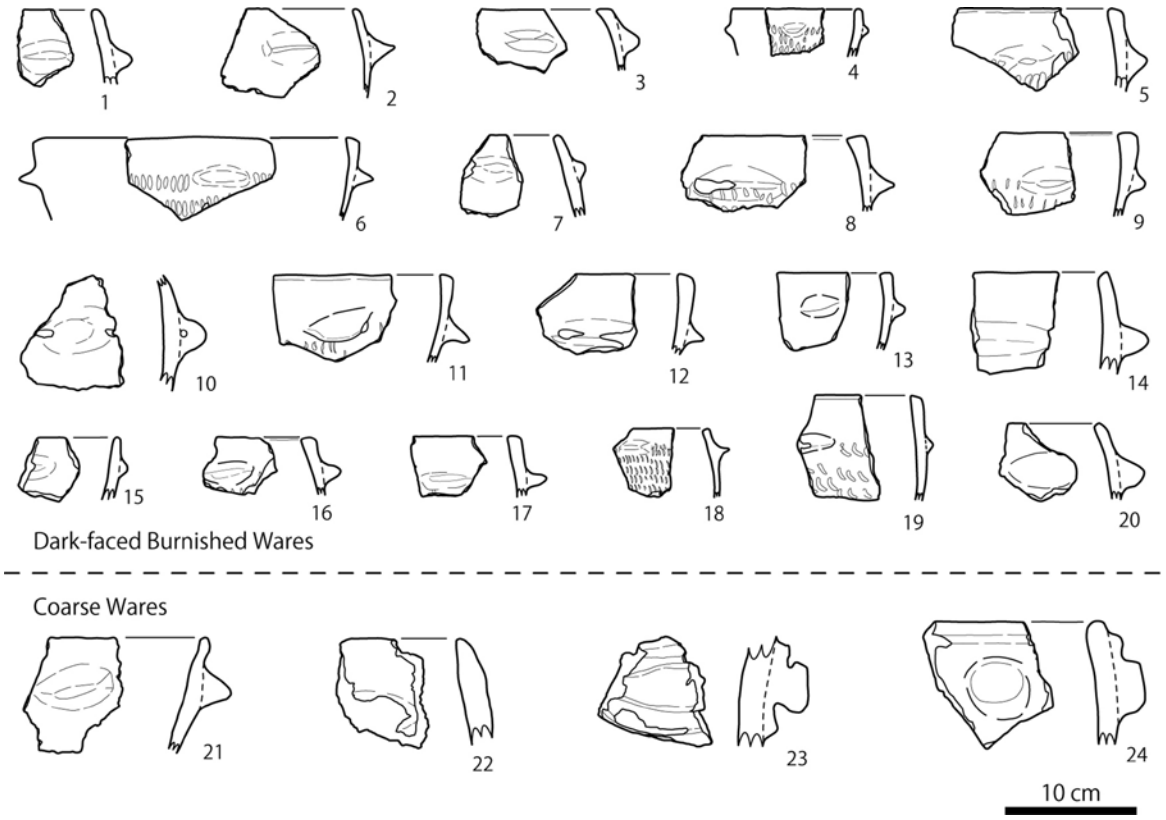

Figure 7. Pottery with handles, East Trench, Tell Ain el-Kerkh. 1. Layer 2; 2. Layer 3; 3. Layer 4; 4, 5. Layer 6; 6-10, 21-23. Layer 7; 11-20, 24, Layer 8.

(Faura/Le Mière 1999; Faura 2013). Thus, changes on the horizontal applied bands in the Middle Euphrates and the Balikh coincided with those observed at Tell el-Kerkh in the Northern Levant. This suggests that the function(s) and the meaning(s) of the horizontal applied band in this period were identical in both regions, which covered a very vast area.

On the other hand, pottery with handles in the Middle Euphrates and the Balikh seems problematic for such interpretations. In this region, handles were applied even to Early Mineral Wares, which were formed into light-weight small size vessels, simple bowls like Kerkh Ware (e.g. Faura/Le Mière 1999, fig. 3; Arimura *et al.* 2000, 241). Why did they need parts for gripping although they were sufficiently portable? In any case, quantitative analysis of Early Mineral Wares is mostly impossible due to the limited number of the available specimens so far.

ENDING REMARKS

Concluding remarks derived from the analyses and the discussion here can be summarized as follows.

Horizontal applied bands were not observed in the oldest pottery in northern Syria and south-eastern Turkey, the simple bowl-shaped vessels of Early Mineral Ware. They appeared in the following period when pottery began to be diversified. The horizontal applied band had a practical function as a grip, which offered portability to newly-made large vessels. The high frequency of occurrence of the horizontal applied band in this period reflects the importance of portability in the early pottery. As diversifications of pottery proceeded further in the succeeding period, however, various vessel shapes for specific purposes were invented. Portable vessels were usually formed into small shapes with thin walls to be reasonable for the purpose, so parts for gripping turned relatively meaningless. As a result, horizontal applied bands became extremely rare and lost the original functions as a grip: most of them seem too thin to be gripped.

Changes in handles were similar to those of horizontal applied bands through the Late Neolithic, because they both originally functioned as a grip. However, as for the correlation between horizontal applied bands and handles, a problem to be interpreted still remains: the oldest handles were applied to Early Mineral Ware in the Middle Euphrates and the Balikh, although no handles

	Layer 8, East Tre.	Layer 7, East Tre.	Layer 6, East Tre.	Phase III, E310	Layer 5, East Tre.	Phase II, E310	Layer 4, East Tre.	Layer 3, East Tre.	Layer 2, East Tre.	Phase I, E310	Layer 1, East Tre.	Total
pierced lug		2		13	1	3	2	1	8	2	1	33
unpierced lug				1		1						2
loop				3	1				2			6
ear-shape	18	6	3	3		2	1	1	2			36
unidentified		3										3

Figure 8. Forms of the handles on Dark-faced Burnished Wares per layer or phase, East Trench and E310, Tell Ain el-Kerkh.

were observed in the oldest pottery assemblage at Tell el-Kerkh. In addition, the background of the importance of portability for early pottery should also be further discussed in future.

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BIBLIOGRAPHY

ARIMURA, M. *et al.* 2000, A New Neolithic Settlement in the Urfa Region: Akarçay Tepe, 1999, *Anatolia Antiqua* 8, 227-255.

AURENCHE, O., KOZLOWSKI, S. K., LE MIÈRE, M. 2004, La notion de frontière dans proto néolithique et le néolithique du Proche-Orient, *in* Aurenche, O., Le Mière, M., Sanlaville, P. (eds.), *From the River to the Sea: The Palaeolithic and the Neolithic on the Euphrates and in the Northern Levant. Studies in Hour of Lorraine Copeland,* BAR International Series 1263, Oxford, Archaeopress, 355-366.

BRAIDWOOD, R.J., BRAIDWOOD, L.S. (eds.) 1960, *Excavations in the Plain of Antioch I: The Earlier Assemblages Phases A-J,* The University of Chicago Oriental Institute Publications 61, Chicago, The University of Chicago Press.

CAUVIN, J. 1972, Sondage à Tell Assouad (Djezireh, Syrie), *Les annales archéologique Arabes Syriennes* 22, 85-103.

FAURA, J.M. 2013, Las primeras cerámicas neolíticas de Tell Halula, *in* Molist, M. (ed.), *Tell Halula: un poblado de los primeros agricultores en el valle del Éufrates, Siria,* Tomo II, Ministerio de Educación, Cultura y Deporte, 8-58.

FAURA, J.M., LE MIÈRE, M. 1999, La céramique néolithique du haut Euphrate Syrien, *in* del Olmo Lete, G., Montero Fenollós, J.–L. (eds.), *Archaeology of the Upper Syrian Euphrates, the Tishrin Dam Area,* Barcelona, Institut del Pròxim Orient Antic, Universitat de Barcelona, 281-298.

IWASAKI, T., NISHINO, H., TSUNEKI, A. 1995, The Prehistory of the Rouj Basin, Northwest Syria. A Preliminary Report, *Anatolica* 21, 143-187.

IWASAKI, T., TSUNEKI, A. (eds.) 2003, *Archaeology of the Rouj Basin: A Regional Study of the Transition from Village to City in Northwest Syria,* Vol. I, Al-Shark 2, Tsukuba, Department of Archaeology, University of Tsukuba.

LE MIÈRE, M. 2013, Uniformity and Diversity of Pottery in the Jezirah and the Northern Levant during the Early Pottery Neolithic, *in* Nieuwenhuyse, O. P. *et al.* (eds.), *Interpreting the Late Neolithic of Upper Mesopotamia,* Papers on Archaeology of the Leiden Museum of Antiquities 9, Turnhout, Brepols, 323-330.

LE MIÈRE, M., NIEUWENHUYSE, O. 1996, The Prehistoric Pottery, *in* Akkermans, P.M.M.G. (ed.), *Tell Sabi Abyad: The Late Neolithic Settlement. Report on the Excavations of the University of Amsterdam (1988) and the National Museum of Antiquities Leiden (1991-1993) in Syria,* 2 vols., Istanbul, Nederlands Historisch-Archaeologisch Instituut te Istanbul, 119-284.

LE MIÈRE, M., PICON, M. 1998, Les débuts de la céramique au Proche-Orient, *Paléorient* 24(2), 5-26.

MASUDA, S., SHA'ATH, S. 1983, Qminas, the Neolithic Site near Tell Deinit, Idlib (Preliminary Report), *Les annales archéologiques Arabes Syriennes* 33, 199-231.

MIYAKE, Y. 2003, Pottery, *in* Iwasaki, T., Tsuneki, A. (eds.), *Archaeology of the Rouj Basin: A Regional Study of the Transition from Village to City in Northwest Syria,* Vol. I, Al-Shark 2, Tsukuba, Department of Archaeology, University of Tsukuba, 119-141.

NIEUWENHUYSE, O.P., AKKERMANS, P.M.M.G., VAN, DER PLICHT J. 2010, Not So Coarse, nor Always Plain: The Earliest Pottery of Syria, *Antiquity* 84, 71-85.

ODAKA, T. 2013a, Neolithic Pottery in the Northern Levant and Its Relations to the East, *in* Nishiaki, Y., Kashima, K., Verhoeven, M. (eds.), *Neolithic Archaeology*

in the Khabur Valley, Upper Mesopotamia and Beyond, Studies in Early Near Eastern Production, Subsistence, and Environment 15, Berlin, e*x oriente*, 205-217.

ODAKA, T. 2013b, Dark-faced Burnished Ware and Fine versus Coarse Distinction in the Early Pottery Assemblage of Northern Levant, *in* Nieuwenhuyse, O. P. *et al.* (eds.), *Interpreting the Late Neolithic of Upper Mesopotamia,* Papers on Archaeology of the Leiden Museum of Antiquities 9, Turnhout, Brepols, 296-303.

ODAKA, T. 2015, Early Pottery with Horizontal Applied Bands from Tell el-Kerkh, the Northern Levant, *Bulletin of the Society for Near Eastern Studies in Japan* 58(1), 1-14. (in Japanese)

TSUNEKI, A. *et al.* 1997, First Preliminary Report of the Excavations at Tell el-Kerkh (1997), Northwestern Syria, *Bulletin of the Ancient Orient Museum* 18, 1-40.

TSUNEKI, A. *et al.* 1998, Second Preliminary Report of the Excavations at Tell el-Kerkh (1998), Northwestern Syria, *Bulletin of the Ancient Orient Museum* 19, 1-40.

TSUNEKI, A. *et al.* 1999, Third Preliminary Report of the Excavations at Tell el-Kerkh (1999), Northwestern Syria, *Bulletin of the Ancient Orient Museum* 20, 1-36.

TSUNEKI, A. *et al.* 2000, Fourth Preliminary Report of the Excavations at Tell el-Kerkh (2000), Northwestern Syria, *Bulletin of the Ancient Orient Museum* 21, 1-30.

TSUNEKI, A. *et al.* 2007, *A Decade of Excavations at Tell el-Kerkh, 1997-2006*, Tsukuba, Department of Archaeology, University of Tsukuba.

Anna Gómez-Bach, Jörg Becker and Miquel Molist (ed),
II Workshop on Late Neolithic Ceramics in Ancient Mesopotamia: pottery in context,
Monografies del MAC 1, Barcelona 2018,
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INVESTIGATION INTO THE PRESERVATION OF LIPIDS IN POTTERY SAMPLES FROM TELL HALULA (SYRIA) USING THE ACIDIFIED METHANOL EXTRACTION AND GC-MS

Adrià Breu*, Anna Gómez-Bach*, Carl Heron, Josep Miquel Faura***, Miquel Molist***

Los porcentajes de preservación de los análisis de residuos orgánicos en la producción cerámica más antigua del Próximo Oriente caen por debajo del 15%. Dados estos hechos, los objetivos de esta pequeña investigación se centran en realizar un test piloto que evalúe la validez de la extracción en metanol acidificado en muestras de un yacimiento Pre-Halaf (Tell Halula).

Palabras clave: Extracción en metanol acidificado, Tell Halula, Análisis de residuos orgánicos, Pre-Halaf.

Preservation ratios on organic residue analysis studies on the oldest pottery of the Middle East fall below 15%. Given these percentages, the aims of this small research are to conduct a pilot test that evaluates the appropriateness of the acid extraction on samples from a Pre-Halaf site (Tell Halula).

Keywords: Acidified methanol extraction, Tell Halula, Organic Residue Analysis, Pre-Halaf.

INTRODUCTION, AIMS AND OBJECTIVES

Tell Halula is a site located on the Syrian Euphrates valley. It conceals a settlement with a wide chronology that goes from the first phases of the pre-ceramic Neolithic (PPNB) to the ceramic periods (Halaf), in which the consolidation of the first agro-pastoral communities can be studied. Tell Halula is, therefore, a key site to understand the birth and development of the first uses of pottery in Neolithic societies (Molist/Vicente 2013) (Fig. 1).

One of the main methodological approaches to understand pottery use in prehistory is organic residue analysis. Although this technique has been established and practiced since the 90' (Evershed 1993) organic residue analysis has only been recently applied on pottery from the Middle East (Barnard *et al.* 2011, Evershed *et al.* 2008, Gregg *et al.* 2009, Gregg/Brettell/Stern 2007, Gregg/Slater 2010, Thissen *et al.* 2010). Such phenomenon is due to the low preservation that organic matter presents in arid zones such as Syria and Iraq. Research applying the standard Chloroform/Methanol extraction (Evershed/Heron/Goad 1990) has not been able to recover any significant quantities of lipids in 88% of the samples (Evershed *et al.* 2008) or in 97.5% of the samples (Gregg/Slater 2010). Given this limitation, up to 300 samples would be needed to obtain a statistically significant result of 30 detected residues. Because that the Chloroform/Methanol extraction usually needs 2g of pottery, a researcher must be willing to lose 540g of ar-

* Grup de Recerca en Arqueologia del Mediterrani i el Proper Orient (GRAMPO), Department of Prehistory, Autonomous University of Barcelona, Edifici Mòdul de Recerca A, Pl. del Coneixement, Campus de la UAB 08193 Bellaterra, Barcelona. adria.breu@uab.cat, anna.gomez@uab.cat, miquel.molist@uab.cat
** Faculty of Life Sciences, University of Bradford, Bradford, West Yorkshire, BD7 1DP, Regne Unit C.P.Heron@bradford.ac.uk
***MNAC, Palau Nacional, Parc de Montjuïc, s/n, 08038 Barcelona – SAPPO, Department of Prehistory, Autonomous University of Barcelona, Edifici Mòdul de Recerca A, Pl. del Coneixement, Campus de la UAB 08193 Bellaterra, Barcelona, jfauravendrell@gmail.com

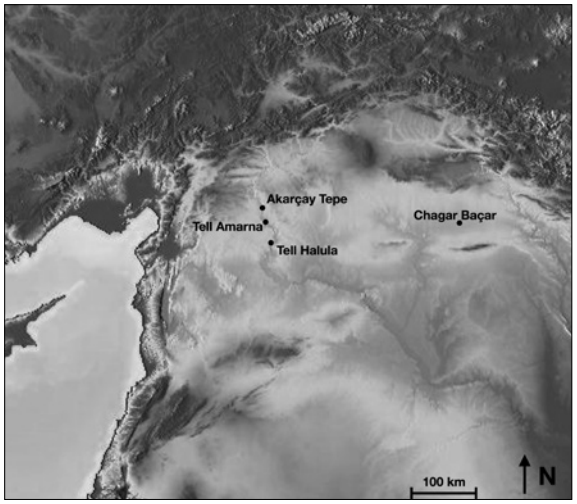

Figure 1. The location of Tell Halula relative to other relevant sites such as Akarçay Tepe, Tell Amarna and Chagar Baçar. Source: http://grupsderecerca.uab.cat/sappo/es/content/tell-halula.

chaeological material and cover the costs of an analysis 5 times more expensive than in other more humid and cold climates. These limitations motivated the development of new extraction methods with the objective to improve the lipid yields and, therefore, the number of positive results in samples from the Middle East.

To date, three new strategies have been published. The first one, the Microwave-assisted solvent extraction, modifies the standard extraction by using a microwave accelerated reaction system and 5g of sample. It has been able to improve the preservation rate up to 52% of positive results (Gregg/Slater 2010). The second one, an acid-base extraction, was initially used in the Mediterranean (Regert *et al.* 1998) and has also been applied with good results in Middle Eastern samples (Mayyas *et al.* 2013). The third one, the Acidified methanol extraction, only uses 1g of sample (Correa-Ascencio/Evershed 2014). The results of this last technique have not been published yet on pottery from the Middle East but its results in other areas of the planet seem promising. In Mesoamerica, where the preservation rate was around 2% with the Chloroform/Methanol extraction, 94% is achieved with Acidified Methanol (Correa-Ascencio/Evershed 2014). In the British Neolithic, the rate goes from 86% to 100% (Correa-Ascencio/Evershed 2014) and in the Canadian Palaeolithic the recovery rate reaches 82% (Taché/Craig 2015). This new technique has also been used to minimise to 0.1g the amount needed in samples with good preservation such as Jōmon pottery (Papakosta *et al.* 2015).

Therefore, given that the first pottery productions in the Near East have a significantly high archaeological value; it is necessary to test the Acidified Methanol extraction on them to evaluate the recovery rates and the result's interpretability.

MATERIALS AND METHODS

10 samples from sectors 1, 7 and 14 in the Pre-Halaf layers of Tell Halula were analysed. To account for possible morphological, technical and functional differences that could explain the presence of different residues, 6 rims and 4 bases were selected. 90% of the samples could be classified as *coarse ware* because of the presence of vegetal inclusions. Only sample 9, which presented significant mineral temper, could be classified as *fine ware* (Faura 2013). 30% of the samples presented a wall thickness between 0.8 and 1.1cm, 40% were between 1.1 and 1.29cm and 30% were between 1.3

Sample ID	TLE (µg/g)	Free Fatty Acid Range	Dicarboxylic acids	Other
1	16.7	C12:0, C14:0-C18:0, C16:1, C18:1, C18:2	Nonanedioic acid	
2	3.5	C15:0, C16:0, C18:0, C16:1, C18:1		
3	26.7	C15:0, C16:0, C18:0		
4	4.8	C15:0, C16:0, C18:0, C16:1, C18:1		
5	37.4	C12:0-C18:0	Nonanedioic acid	Citric acid
6	11.9	C12:0, C15:0, C16:0, C18:0, C16:1, C18:1		
7	17.7	C12:0, C14:0-C18:0, C16:1, C18:1		
8	24.7	C12:0, C14:0-C16:0, C18:0 C16:1	Nonanedioic acid	
9	31.7	C12:0, C14:0-C22:0, C16:1, C18:1	Nonanedioic acid	
10	12.4	C7:0-C12:0, C15:0, C16:0, C18:0	Nonanedioic acid	Monoterpenoid (Champhor)

Figure 2. Total Lipid Extracs of each sample with the relevant molecules detected.

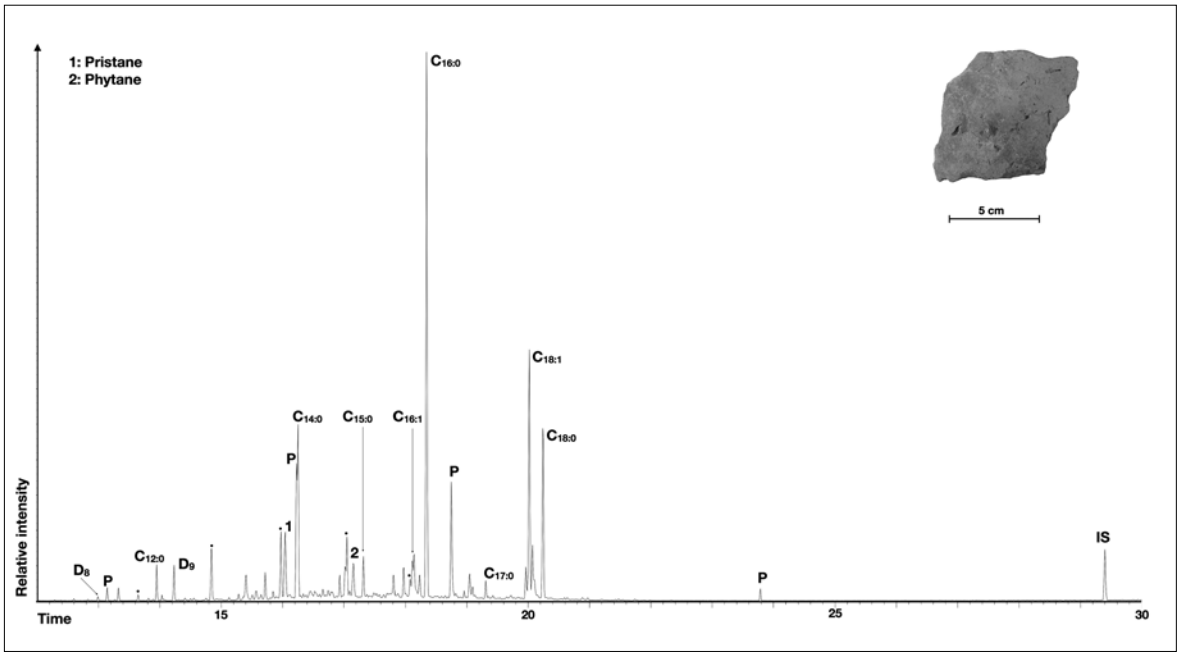

Figure 3. Chromatogram of sample 7. Cxx:x = fatty acids with its chain length and its degree of unsaturation. DX = Dicarboxilic acids and its chain length. • = alkanes, P = phthalate plasticiser, IS = Internal Standard (tetratriacontane).

and 1.5cm. The presence (40%) and absence (60%) of slip was also noted. The samples had been fired under an atmosphere with an irregular input of oxygen, which created areas with both oxidised and reduced colours. Two samples were completely oxidised and one (sample 6) seemed to be slightly overcooked. Finally, a broad density estimate of the material was calculated by weighing the samples and dividing it by its dimensions (surface times the thickness). Following these calculations, 30% of the sherds had a density between 1 to 1.3 g/cm^3, 40% were between 1.31 and 1.5 g/cm^3 and finally 30% of the samples were denser than 1.51 g/cm^3. The extractions of residues were performed on 1g of pottery from the inner wall of the vases. The outside surfaces, which present higher probability of contamination (Heron *et al.* 1993), were removed before drilling. 4ml of methanol were added to the sample and the mixture was ultrasonicated for 15 minutes and acidified with 0.8ml of concentrated sulphuric acid. The result was heated at 70ºC for 4 hours and then left to cool. Lipids were extracted 3 times by adding 2 ml of hexane, mixing under a vortex, leaving the sample to partition and extracting the hexane layer. The extracts were left on copper turnings overnight and then dried under a gentle stream of nitrogen. Finally, the samples were re-suspended in hexane and transferred to inlet vials, which had been prepared with 10µg of n-tetratriacontane as the internal standard.

Samples were analysed with a 7890A Agilient Technologies Gas Chromatograph (GC) and a 5975C Agilient Technologies Mass Spectrometer with a triple axis detector and Electric Ionisation (EI). Injection was done in splitless mode at a temperature of 300ºC and the analyses were performed on an Agilient HP-5MS 30m x 0.25mm x 0.25µm fused silica column with helium as the carrier gas. Oven temperature was set for an initial 2 minutes isothermal period at 50ºC. Afterwards, it ascended at 10ºC min^{-1} until it reached a maximum of 350ºC. Temperature, then, was held constant for the remaining 10 minutes of the analysis. The resultant eluted compounds were identified using its mass spectra and compared with a reference database (NIST 2.0).

Quantification of the samples was performed by calculating the peak area of each molecule and comparing it to the peak area of n-tetratriacontane, which corresponded to a known amount of 10µg. Nevertheless, this method of quantification does not to account for losses during the extraction process. For this reason, an extra sample composed of the main molecules found in organic residues (C16:0 and C18:0) with a known quantity of 100µg was run and quantified alongside the archaeological samples. The error detected in this sample has been used to correct the total lipid extract (TLE) values.

RESULTS

The Total Lipid Extracts (TLE) of each sample along with the presence of the most significant detected molecules

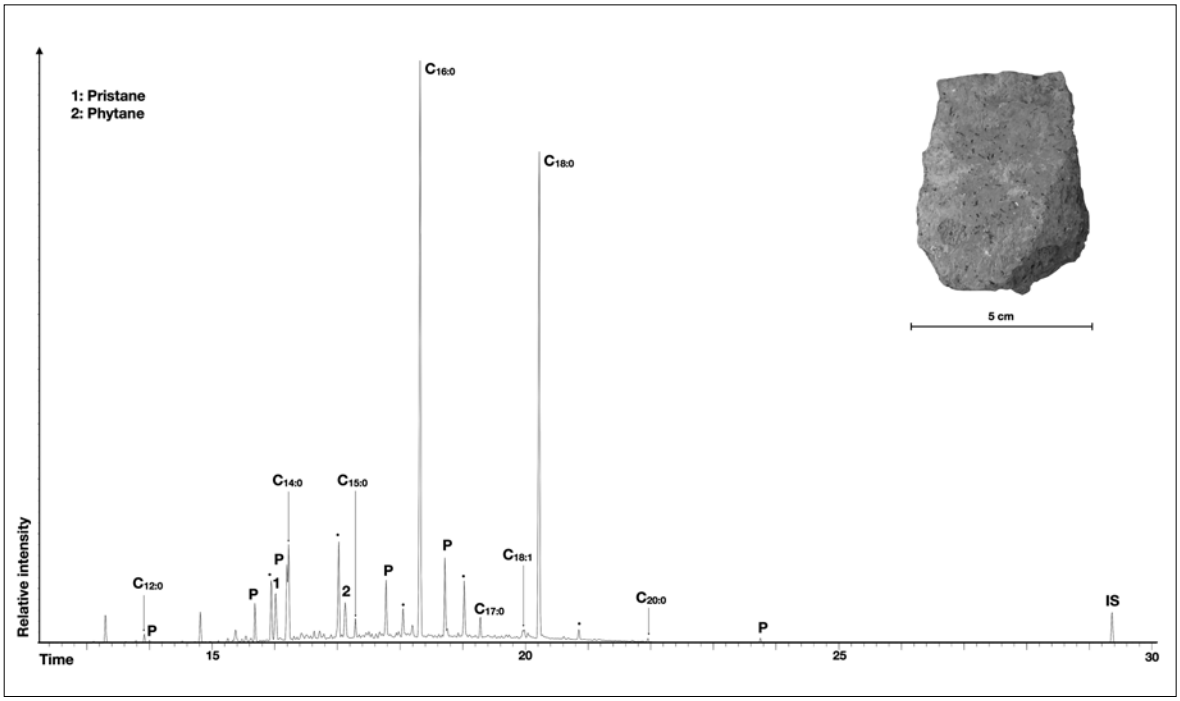

Figure 4. Chromatogram of sample 1. Follows the same annotation criteria as figure 3.

is presented in figure 2 (Fig. 2). The preservation rate has been calculated using a 5µg/g threshold (Craig *et al.*, 2011) and it is reported as a percentage of the total.

Therefore, taking data from figure 2 into account, the preservation rate in samples from Tell Halula has reached 80%. Furthermore, Figures 3 and 4 present chromatograms which show profiles presented in the literature as characteristic of animal fats and plant residues (Copley *et al.* 2001, Copley *et al.* 2003, Dunne *et al.* 2012).

Although not all samples have provided lipid patterns as clear as the ones presented, the detection of a pair of singular molecules should also be considered. In sample 5, the comparison of the mass spectra with the reference database has allowed the detection of Citric acid (Fig. 5).

Citric acid is one of the main modern acidifiers and a significant compound in citrus fruits such as lemons or oranges. Its presence in a residue in which the fatty acid profile does not point to an animal origin could point at the possibility that the vessel had contained a plant product. Nevertheless, this compound has only been detected once and not in a significantly high quantity, therefore, it is difficult to provide a meaningful archaeological interpretation for it. Citric acid has been previously detected in archaeological residues (Eerkens 2005, Manzano *et al.* 2015). Therefore, its appearance can be used as an indicator that these types of molecule can also be recovered under the acidified methanol extraction.

In sample 10, a molecule eluting at minute 8.83 with the mass spectra presented in figure 5 was identified as Camphor, a specific monoterpenoid. This molecule is also highly used nowadays in products for alimentation, medical and religious purposes.

Nevertheless, also in this case, Camphor has also only been found once in a vessel whose fatty acid profile does not point at an animal origin. The high volatility of the molecule and the absence of other terpenoids suggest its origin might not be archaeological. However, its detection indicates that it can also be extracted by the acidified methanol technique (Fig. 6).

Finally, the presence of significant quantities of lipids has allowed comparing the TLE with different vessel characteristics (Fig.7). Figure 7 compares the amount of residue with sherd shape, firing atmosphere, presence of slip as a surface treatment, density and thickness.

As shown in the graphs, some minor differences on lipid quantities exist depending on the characteristics of the sherd. Bases seem to yield slightly less lipids than rims and pottery with slip also tends to present better preservation. Other differences are not acute enough to affect the presence of organic residues in the vessel.

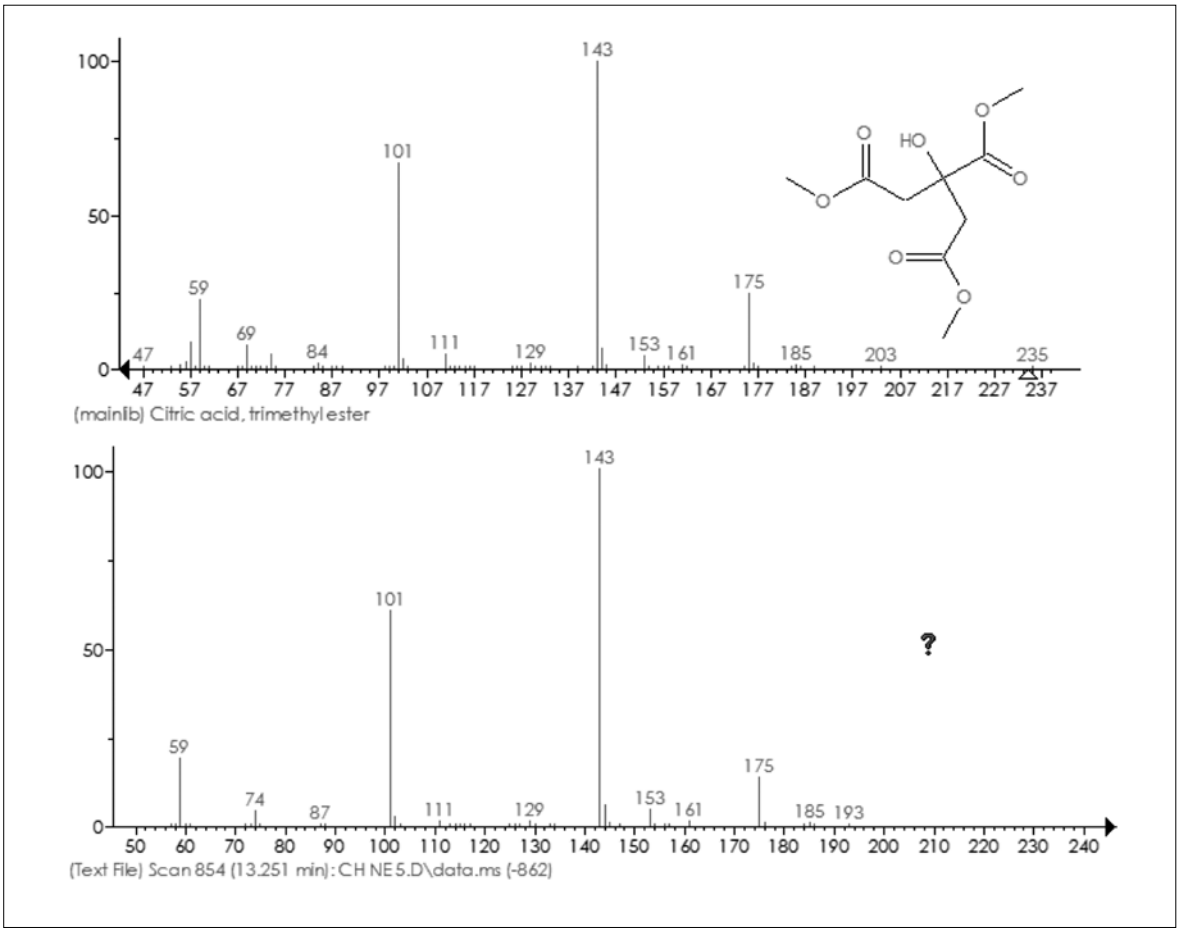

Figure 5. Comparison of mass spectra for Citric Acid. Top: Spectra from methylated Citric acid as presented in the NIST database. Bottom: Spectra from Rt: 13.24 min in Sample 5.

DISCUSSION

Taking the objectives of this research into account, several questions can be specifically answered: Is the Acidified Methanol extraction more effective in samples from the Near East?

The use of the Acidified Methanol extraction has clearly achieved similar results to those published in the literature (Correa-Ascencio/Evershed 2014, Papakosta *et al.* 2015, Taché/Craig 2015). More precisely, complex molecules such as triacylglycerols, long-chain ketones and wax esters do not seem to have survived in this case. The absence of such compounds could be due to the important degradation activity (hydrolysis) of the sulphuric acid, which is used during the extraction. This could be an important limitation in other preservation environments, where the amount of complex molecules is significant. Nevertheless, more arid and aggressive soils such as the ones in the Near East would hardly preserve these molecules (Gregg/Slater 2010). Therefore, although this is a clear limitation of the method, its negative consequences can be avoided in the case of the Near East.

When evaluating which quantity of lipids is sufficient to attempt any archaeological interpretation, researchers have used different thresholds such as 5µg/g (eg: Craig *et al.* 2011, Evershed *et al.* 2008) 10µg/g (Craig *et al.* 2005) and 20µg/g (Baeten *et al.* 2013). The use of the lowest cap is considered a standard practice since minor contamination from soils and modern compounds must be considered. The 5µg/g limit is the most commonly used in the literature (ex: Copley *et al.* 2005; Craig *et al.* 2011, Dudd/Evershed/Gibson 1999, Evershed *et al.* 2008). Nevertheless, since the acidified extraction increases the quantity of lipids recovered, it is also possible that lipids that can be classified as contamination also increase. Therefore, to add an extra layer of certainty to the interpretation of the results, the 10µg/g limit was also considered. The number of samples with TLE's above these thresholds is 80% for the Pre-Halaf layers at Tell Halula whereas the Microwave-assisted approach reached 52% (Gregg/Slater 2010) and the Chloroform/Methanol extraction detected significant quantities of lipids in 12-20% of the samples in studies from other chronologically similar sites in the Middle East (Evershed *et al*. 2008, Thissen *et al*. 2010).

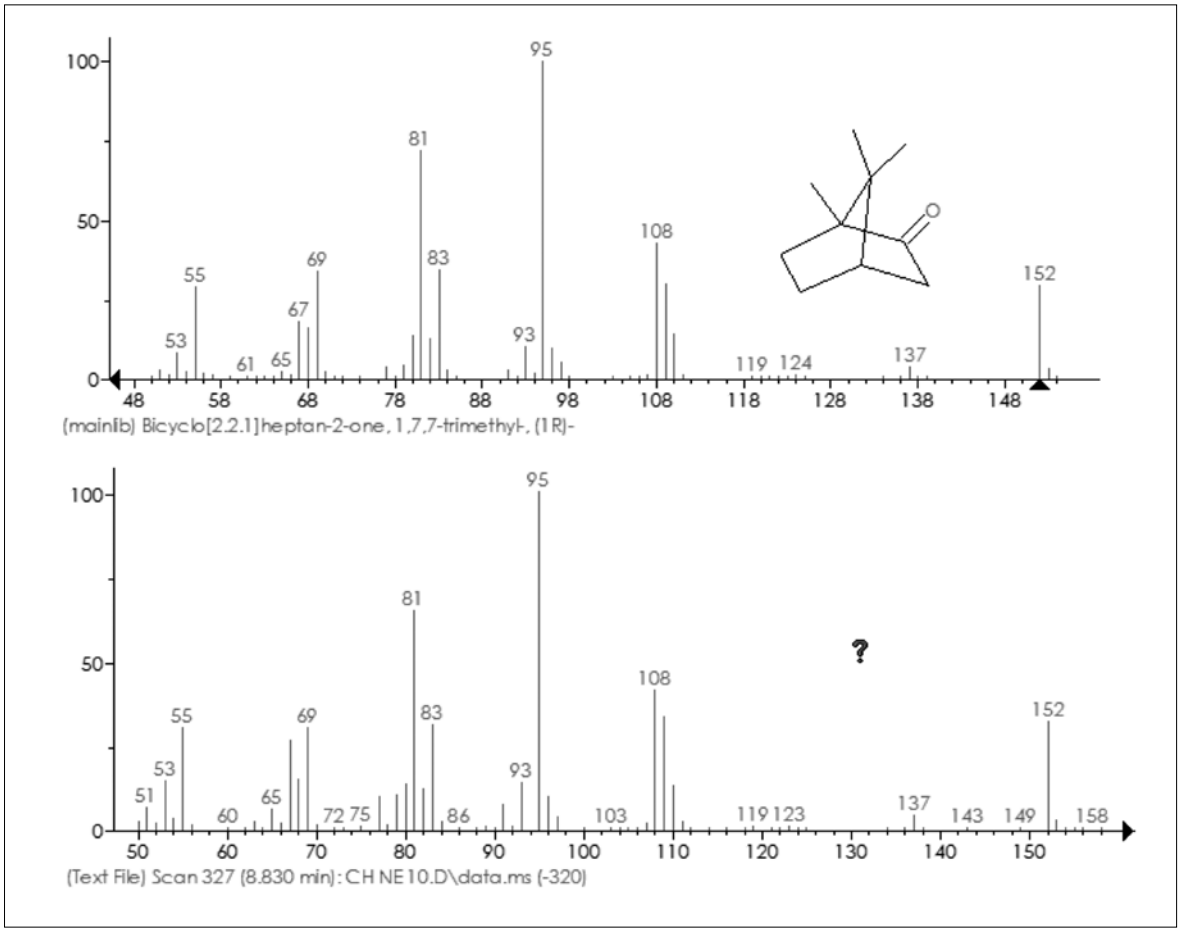

Figure 6. Comparison of mass spectra for Camphor. Top: Spectra from methylated Camphor as presented in the NIST database. Bottom: Spectra from Rt: 8.8 min in Sample 10.

As shown, the Acidified Methanol extraction has been effective in 8 out of 10 samples for both thresholds, which presents a clear improvement of the lipid yields when compared to the other practiced methods. Although the aggressiveness of the acid extraction is considerably higher than other extraction methods and some information could be lost, the overall result is a gain in the amount of chemical information that could be further interpreted by the archaeologist.

Which products did the analysed vessels use to contain? Although lipid quantities have been improved, not all the detected residues could be clearly characterised. Three main factors have caused interpretation problems. First, the management of the sherds once they are excavated normally involves the use of plastic bags and direct contact with the human skin. Plastic bags contain highly volatile compounds such as phthalic acids. These molecules are easily incorporated in the clay matrix when the sherd is introduced in the box and, when performing the analysis, create noise and sometimes hide possible relevant ancient molecules. Phthalic acids have been widely found in the samples from Tell Halula. Its high abundance is also caused by a second factor. The fact that these samples were excavated in 1993 implies that the sherds were removed from a closed and stable environment under earth and placed in a new environment with changes in light, temperature and humidity. After 22 years in storage, an important part of the residue could have been lost and plastics had a lot of time to enter the clay matrix. Finally, although lipids are not leached in water, the more time the sample stays under earth, the higher the chances the residue degrades and disappears. In consequence, the fact that these samples come from the oldest pottery productions in the Middle East also adds more uncertainty onto whether the original residue would survive in a state that allows its identification.

In consequence, the fact that the Acidified Methanol extraction has been able to find significant quantities of lipids in 80% of the samples it is a clear example of the potential of this new technique. Nevertheless, interpretation of the residue origin could be a more difficult task. In terms of the identification of the residues, sam-

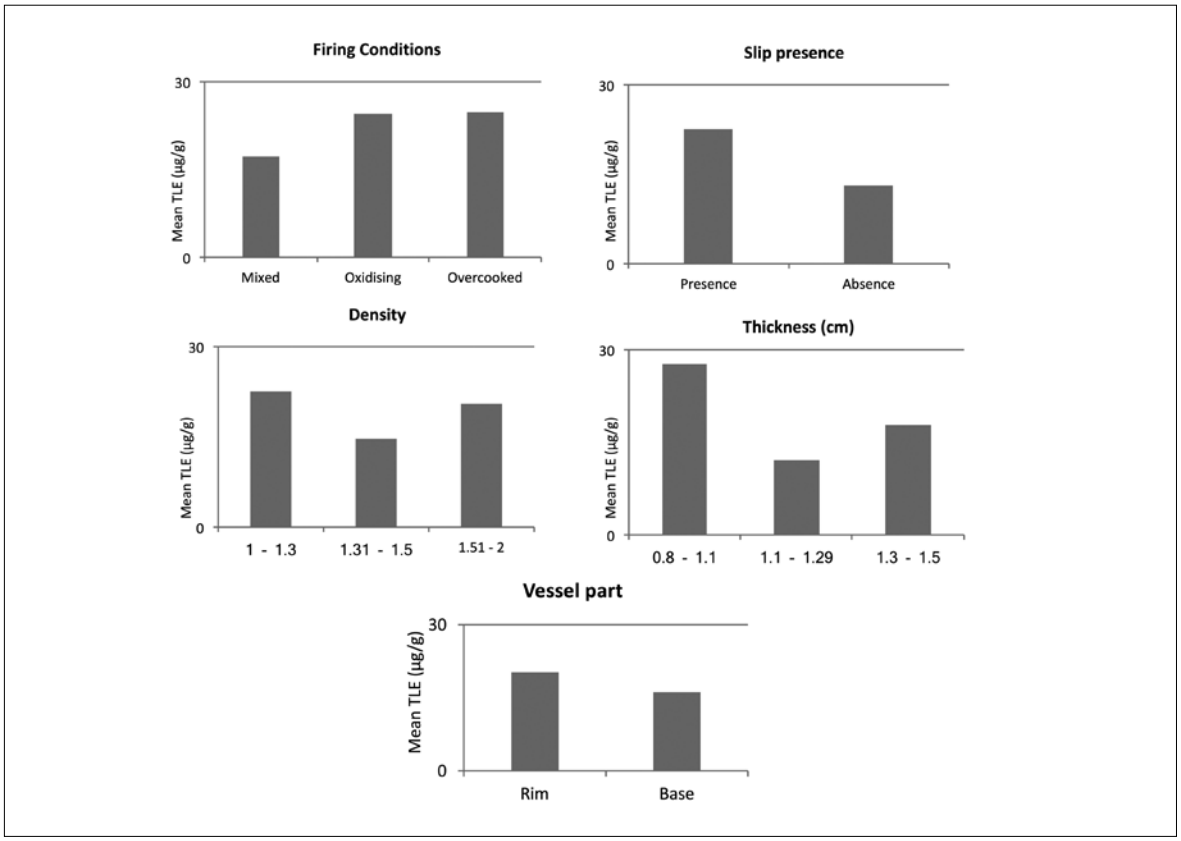

Figure 7. Bar diagrams showing the mean total lipid extract (TLE) compared related to firing conditions, slip presence, density, thickness and the vessel part.

ples 7 and 9 present a clear abundance of $C_{16:0}$ and $C_{18:0}$ which suggest the presence of animal fat. These molecules could be further analysed by gas chromatography coupled to combustion and isotope ratio mass spectrometry (GC-C-IRMS). This analytical technique provides the stable light isotopic ratios of the carbon atoms in the $C_{16:0}$ and $C_{18:0}$ molecules, which can be used to differentiate between ruminant and non-ruminant animals, terrestrial and marine fats, and milk and adipose fat.

Furthermore, sample 1 presents a clearly different profile with $C_{18:1}$ being more abundant than $C_{18:0}$ and $C_{16:0}$ being the dominant peak. When this profile is complemented with a slight increase in the abundance of *n*-alkanes and the detection of nonanedioic acid, the residue can be cautiously interpreted as probably originating from a plant product. Therefore, the isotopic study of the main fatty acids would allow the differentiation between C_3 and C_4 plants.

Sample 5 presents a lipid profile that should also be commented. The detection of citric acid could suggest the presence of some type of fruit. Nevertheless, critics such as lemons or oranges were not introduced into the Near East until more recent chronologies. Moreover, previous research on fruits (Copley *et al.*, 2001) suggest that its chemical profile contains a dominant presence of $C_{12:0}$, a molecule that is only present in small amounts in sample 5. Nevertheless, the low quantities of $C_{18:0}$ related to $C_{16:0}$ suggest that the residue does not have an animal origin. Following this line of thought, a plant origin should not be discarded but it is also possible that Citric acid was somehow incorporated into the sample from the surrounding soil or by the excavators. Although laboratory blanks indicate that no contamination comes from the treatment process, more samples with the same profile should be found before Citric acid can be interpreted with no uncertainty as an ancient molecule.

The detection of terpenoids has been associated with resins (Pollard *et al.*, 2007, 153). The presence of Camphor in sample 10 hints at the possibility that this type of product might have been present during transformation processes that also involved ceramics. Nevertheless, although monoterpenoids are specific of plants, because of its low molecular weight and volatility, they are not often found in archaeological vessels (Pollard *et al.*, 2007, 153), therefore, a possible contamination from modern organic matter should not be discarded. Terpenoids should be detected in more samples from

the site before any firm archaeological interpretation can be made in this matter.

Sample 10 also presents a clearly different profile. It is the only sample that presents significant abundances of mid chain fatty acids ($C_{6:0}$ to $C_{12:0}$). Such molecules have been interpreted in the literature to naturally come from ruminant milk lipids. Nevertheless, the quantity of $C_{18:0}$ in the sample is not high enough to strongly support this hypothesis. Analysis through GC-C-IRMS would be able to provide a clear answer to this possible identification. Nonetheless, the strength of the extraction practiced in the samples could have broken larger molecules into mid chain fatty acids. Therefore, it would be advisable to practice other softer extractions such as the microwave-assisted chloroform/methanol technique before concluding that these mid chain fatty acids genuinely originating from an ancient product.

CONCLUSIONS

As suggested by previous research (Correa-Ascencio/Evershed 2014, Papakosta *et al.* 2015, Taché/Craig 2015) the acidified methanol extraction has improved lipid preservation rates. Data from Tell Halula, where 80% of the samples presented TLE's above 10µg/g, suggest that ceramic archaeological samples from low lipid recovery environments might provide relevant archaeological information when using the Acidified Methanol extraction. Nevertheless, the aggressiveness of the procedure carries several limitations such as the destruction of complex molecules. In consequence, comparison with results from other "softer" extraction techniques should still be practiced until the acidified extraction and its consequences are better understood.

The possible differences in use between fine and coarse ware (Faura 2013) might be investigated under this technique, thus opening the possibility to new studies that connect the *chaîne operatorie* with the active life of the artefact.

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Recognition must be also given to Ben Stern, Belinda Hill and Beatriz Bastos for their assistance in the laboratory and for making sure the analyses were to the best standards. Josep Miquel Faura, Miquel Molist and Anna Gómez-Bach excavated and provided the samples. Adrià Breu performed the analyses and performed the interpretations and Anna Gómez-Bach and Carl Heron supervised and provided comments on the manuscript.

BIBLIOGRAPHY

BAETEN, J., JERVIS, B., DE VOS, D., WAEL-KENS, M. 2013, Molecular evidence for the mixing of Meat, Fish and Vegetables in Anglo-Saxon coarseware from Hamwic, UK, *Archaeometry* 55, 1150–74.

BARNARD, H., DOOLEY, A.N., ARESHIAN, G., GASPARYAN, B., FAULL, K.F. 2011, Chemical evidence for wine production around 4000 BCE in the Late Chalcolithic Near Eastern highlands, *Journal of Archaeological Science* 38, 977–84.

COPLEY, M.S., BERSTAN, R., DUDD, S.N., DOCHERTY, G., MUKHERJEE, A.J., STRAKER, V., PAYNE, S., EVERSHED, R.P. 2003, Direct Chemical Evidence for Widespread Dairying in Prehistoric Britain, *Proceedings of the National Academy of Sciences of the United States of America* 100, 1524–29.

COPLEY, M.S., BERSTAN, R., MUKHERJEE, A.J., DUDD, S.N., STRAKER, V., PAYNE, S., EVERSHED, R.P. 2005, Dairying in antiquity. III. Evidence from absorbed lipid residues dating to the British Neolithic, *Journal of Archaeological Science* 32, 523–46.

COPLEY, M.S., ROSE, P.J., CLAPHAM, A., EDWARDS, D.N., HORTON, M.C.M., EVER-SHED, R.P. 2001, Processing palm fruits in the Nile Valley — biomolecular evidence from Qasr Ibrim, *Antiquity* 75, 538–42.

CORREA-ASCENCIO, M., EVERSHED, R.P. 2014, High throughput screening of organic residues in archaeological potsherds using direct acidified methanol extraction, *Analytical Methods* 6, 1330–40.

CRAIG, O.E., STEELE, V.J., FISCHER, A., HARTZ, S., ANDERSEN, S.H., DONOHOE, P., GLYKOU, A., SAUL, H., JONES, D.M., KOCH, E., HERON, C. 2011, Ancient lipids reveal continuity in culinary practices across the transition to agriculture in Northern Europe, *Proceedings of the National Academy of Sciences of the United States of America* 108, 17910–15.

CRAIG, O.E., TAYLOR, G., MULVILLE, J., COLLINS, M.J., PARKER, M. 2005, The identifi-cation of prehistoric dairying activities in the Western Isles of Scotland: an integrated biomolecular approach, J*ournal of Archaeological Science* 32, 91–103.

DUDD, S.N., EVERSHED, R.P., GIBSON, A.M. 1999, Evidence for Varying Patterns of Exploitation of Animal Products in Different Prehistoric Pottery Traditions Based on Lipids Preserved in Surface and Absorbed Residues, *Journal of Archaeological Science* 26, 1473–82.

DUNNE, J., EVERSHED, R.P., SALQUE, M., CRAMP, L.J.E., BRUNI, S., RYAN, K., BIAGETTI, S., DI LERNIA, S. 2012, First dairying in green Saharan Africa in the fifth millennium bc, *Nature* 486, 390–94.

EERKENS, J.W. 2005, GC-MS analysis and fatty acid ratios of archaeological potsherds from the western great basin of North America., *Archaeometry* 47, 83–102.

EVERSHED, R.P. 1993, Biomolecular Archaeology and Lipids, *World Archaeology* 25, 74–93.

EVERSHED, R.P., HERON, C., GOAD, L.J. 1990, Analysis of organic residues of archaeo-logical origin by high-temperature gas chromato-graphy and gas chromatography-mass spectro-metry, *Analyst* 115, 1339–42.

EVERSHED, R.P., PAYNE, S., SHERRATT, A., COPLEY, M.S., COOLIDGE, J., UREM-KOTSOU, D., KOTSAKIS, K., ÖZDOĞAN, M., ÖZDOĞAN, A.E., NIEUWENHUYSE, O., AKKERMANS, P.M.M.G., BAILEY, D., ANDEESCU, R.-R., CAMPBELL, S., FARID, S., HODDER, I., YALMAN, N., ÖZBASARAN, M., BIÇAKCI, E., GARFINKEL, Y., LEVY, T., BURTON, M.M. 2008, Earliest date for milk use in the Near East and southeastern Europe linked to cattle herding, *Nature* 455, 528–31.

FAURA, J.-M. 2013, Las primeras producciones cerámicas de Tell Halula, *in* MOLIST, M. (ed.) *Tell Halula: un poblado de los primeros agricultores en el Valle del Eufrates. Siria.* Barcelona, Ministerio de Educación, Cultura y Deporte, Tomo II, 8–58.

GREGG, M.W., BANNING, E.B., GIBBS, K., SLATER, G.F. 2009, Subsistence practices and pottery use in Neolithic Jordan: molecular and isotopic evidence, *Journal of Archaeological Science* 36, 937–46.

GREGG, M.W., BRETTELL, R.C., STERN, B. 2007, Bitumen in Neolithic Iran: Biomolecular and isotopic evidence, *in* GLASCOCK, M. (ed.) *Archaeological Chemistry: Analytical Methods and Interpretation.* Washington, American Chemical Society, 137–51.

GREGG, M.W., SLATER, G.F. 2010, A new method for extraction, isolation and transesterification of free fatty acids from archaeological pottery, *Archaeometry* 52, 833–54.

MANZANO, E., GARCÍA, A., ALARCÓN, E., CANTARERO, S., CONTRERAS, F., VÍLCHEZ, J.L. 2015, An integrated multianalytical approach to the reconstruction of daily activities at the Bronze Age settlement in Peñalosa (Jaén, Spain), *Microchemical Journal* 122, 127–36.

MAYYAS, A., DOUGLAS, K., HOFFMANN, T., THORENZ, U., BANY, I., EL-KHALILI, M. 2013, Organic residues preserved in archaeological ceramics from the Early Bronze age site of Khirbet Al-Batrawy in North-Central Jordan, Mediterranean Archaeology and Archaeometry 13, 189-206,

MOLIST, M., VICENTE, O. 2013, Analisis estrati-gráfico y arquitectónico de los diferentes hori-zontes históricos., *in* MOLIST, M. (ed.) *Tell Halula: un poblado de los primeros agricultores en el Valle del Eufrates. Siria.* Barcelona, Ministerio de Educación, Cultura y Deporte, Tomo I, 31–86.

PAPAKOSTA, V., SMITTENBERG, R.H., GIBBS, K., JORDAN, P., ISAKSSON, S. 2015, Extraction and derivatization of absorbed lipid residues from very small and very old samples of ceramic potsherds for molecular analysis by gas chroma-tography–mass spectrometry (GC–MS) and single compound stable carbon isotope analysis by gas chromatogra, *Microchemical Journal* 123, 196–200.

POLLARD, A.M., BATT, C., STERN, B., YOUNG, M.M.S. 2007, *Analytical chemistry in archaeology.* 2nd ed. Cambridge, Cambridge University Press.

REGERT, M., BLAND, H.A., DUDD, S.N., VAN BERGEN, P.F., EVERSHED, R.P. 1998, Free and Bound Fatty Acid Oxidation Products in Archaeological Ceramic Vessels, *Proceedings of the Royal Society B: Biological Sciences* 265, 2027-2032.

TACHÉ, K., CRAIG, O.E. 2015, Cooperative harvesting of aquatic resources and the beginning of pottery production in north-eastern North America, *Antiquity* 89, 177–90.

THISSEN, L., ÖZBAL, H., TÜRKEKUL, A., GERRITSEN, F., ÖZBAL, R. 2010, The land of milk? Approaching dietary preferences of Late Neolithic communities in NW Anatolia, *Leiden Journal of Pottery Studies* 26, 157–72.

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IN THE SHAHRIZOR. REASSESSING THE HALAF CERAMIC TRADITIONS OF IRAQI KURDISTAN

Olivier Nieuwenhuyse*

El artículo discute la cerámica pintada Halaf de Shahrizor, Kurdistán Iraquí. Este material se adscribe bien a la amplia tradición cultural Halaf del Norte de Mesopotamia, pero también muestra elementos distintos a escala regional. El artículo también aborda la ausencia, hasta el momento, del Early Halaf en el Norte de Mesopotamia y el papel de la cerámica pintada policroma del Halaf-Ubaid Transicional.

Neolítico final, Halaf, HUT, Kurdistán Iraquí, Cerámica.

The paper discusses the painted pottery from the Halaf period in the Shahrizor, Iraqi Kurdistan. This material generally fits well with the wider Halaf cultural tradition as known from Upper Mesopotamia but it also shows regionally distinctive elements. The paper discusses the absence so far of any trace of the Upper Mesopotamian Early Halaf and the role of the Halaf-Ubaid Transitional polychrome-painted pottery.

Late Neolithic, Halaf, HUT, Iraqi Kurdistan, pottery.

INTRODUCTION

In this contribution I would wish to discuss the Halaf pottery traditions from the Shahrizor, an intermontane valley in the Zagros piedmont of Iraqi Kurdistan (Altaweel *et al*. 2012). Recent surveys and excavations in this region have brought intriguing new evidence to light for local ceramic traditions during the Late Neolithic and Halaf periods (Mühl 2013; Mühl/Nieuwenhuyse 2016; Nieuwenhuyse/ Berghuijs/Mühl 2012; Nieuwenhuyse/ Odaka/Mühl 2016; Nieuwenhuyse *et al*. 2016). This evidence offers a complex image of (supra-) regional interaction through the medium of painted Halaf Fine Ware ceramics. On the one hand, it suggests that the Shahrizor Halaf material fits well with wider Halaf traditions as previously defined in Upper Mesopotamia (Akkermans 1993; Akkermans/Schwartz 2003; Campbell 1992; Cruells 2004, 2006, 2009; Mallowan/Rose 1935). On the other hand, aspects of its *chaîne opératoire* and its decorative style are unfamiliar, especially during the final stages of the Halaf period. Moreover, some of the sub-phases we have come to know so well from Upper Mesopotamia appear to be absent in this part of the Near East, and perhaps *vice versa*. The Shahrizor Halaf is unmistakingly *Halaf*, yet it is also distinctively different.

Investigating the circumstances that brought local Late Neolithic groups to embrace the Halaf cultural idiom - and elucidating the ways they did this - is the scope of several ongoing research projects in the Iraqi Kurdistan region that have espoused an explicit focus on the Halaf period (Altaweel *et al*. 2012; Bonacossi/ Iamoni 2015; Gavagnin/Iamoni/Palermo 2016; Iamoni 2016a, 2016b; Kolinski 2016; Nieuwen-huyse/Odaka/Mühl 2016; Nieuwenhuyse *et al*. 2016; Saber *et al*. 2014; Tsuneki *et al*. 2015; Ur *et al*. 2013). In what follows I wish to briefly present some general results concerning the Halaf period pottery that emerged from the ongoing Shahrizor Survey project (Altaweel

*Institut für Vorderasiatische Archäologie, Freie Universität Berlin, Fabeckstrasse 23-25, 14195, Berlin, Germany

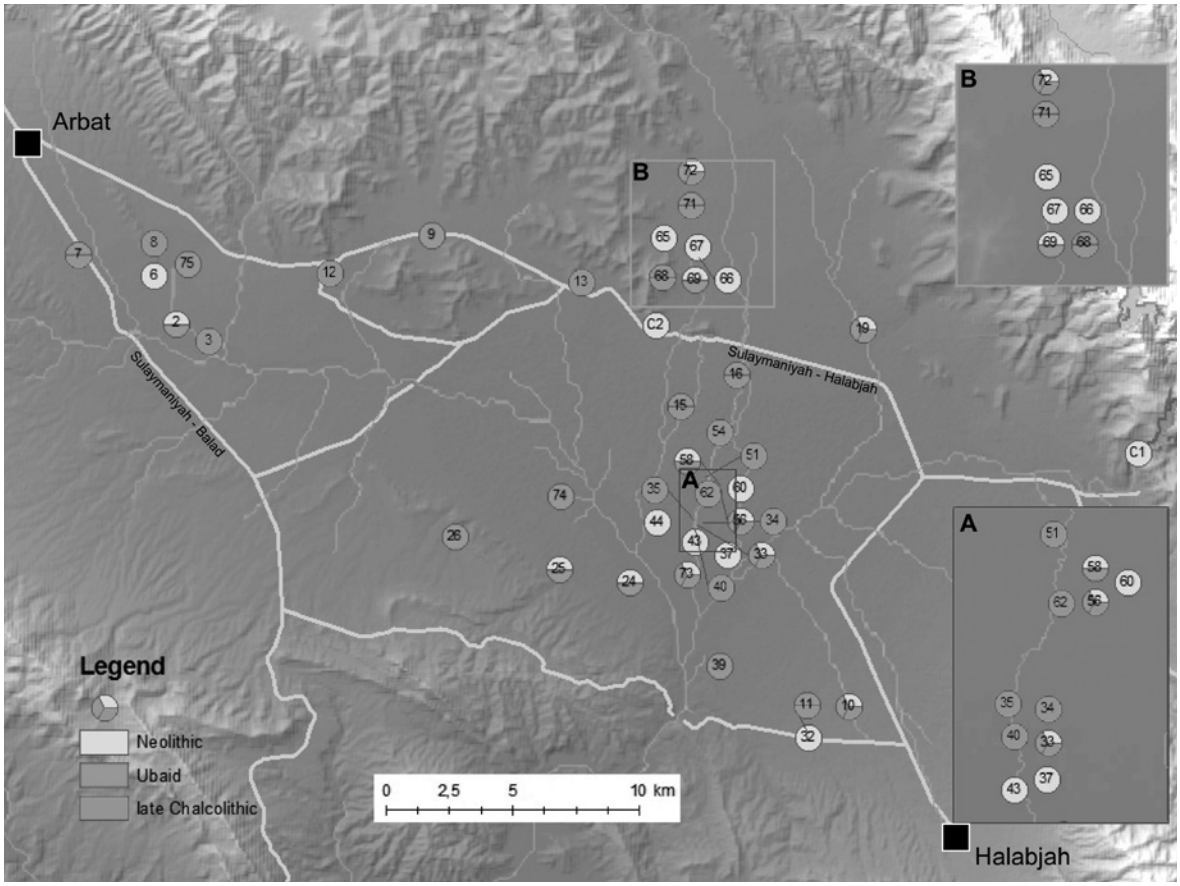

Figure 1. The Shahrizor Survey Project. The distribution of later prehistoric sites (Neolithic, Ubaid and Late Chalcolithic). No. 6: Sragon. No. 56: Tell Begum (after Mühl/Nieuwenhuyse 2016).

et al. 2012). I shall discuss the apparent absence in the region of the incipient stages of the Halaf ceramic tradition. I shall continue by presenting the local painted pottery tradition dated to the chronological interval between the Halaf and Ubaid periods, the so-called Halaf-Ubaid-Transitional (HUT).

THE HALAF-PERIOD CERAMIC ASSEMBLAGE OF THE SHAHRIZOR

The first extensive synthesis of the Halaf period ceramic traditions in the Shahrizor region was provided by Ismail Hijara (1997). Hijara made use of extensive surveying across Iraq to trace Halaf settlement preferences (Directorate General of Antiquities Baghdad 1970, 1976). For the Shahrizor, this yielded precisely two sites, Tell Begum and Sragon (Fig. 1). Hijara made detailed notes of the painted ceramics collected from a deep sounding excavated at Tell Begum (Hijara 1997: Appendix I), and proposed a 'Halaf-Ubaid-Transitional' date for them, as further discussed below. However, as the primary aim of Hijara's project was to analyse site distributions and settlement patterns, his final publication did not include a discussion of the ceramic evidence collected in these various surveys.

Beginning in 2011, the Shahrizor Survey Project has continued to discover many additional sites dated to other prehistoric periods, among which are several new Halaf sites (Fig. 1).

As with other ongoing survey projects in the Iraqi Kurdistan region, the Shahrizor Survey Project employs a systematic analysis of the collected evidence. One important aim of this and related projects is to use this evidence to reconstruct local ceramic traditions. So what does the Shahrizor survey have to say as far as the Halaf pottery is concerned?

As a first step, a basic classificatory ceramic framework was constructed. The material collected in the survey may be categorized in several broad descriptive groups, provisionally termed: *Plant-tempered Coarse Ware*, *Halaf Fine Ware*, *Halaf Coarse Ware*, and, potentially, *HUT Fine Ware* (Nieuwenhuyse/ Odaka/Mühl 2016). Evidently all of these coarse-grained categories can be, and should be, refined and sub-divided in future studies on the basis of the subtle internal variability in raw materials, technological choices during the shaping

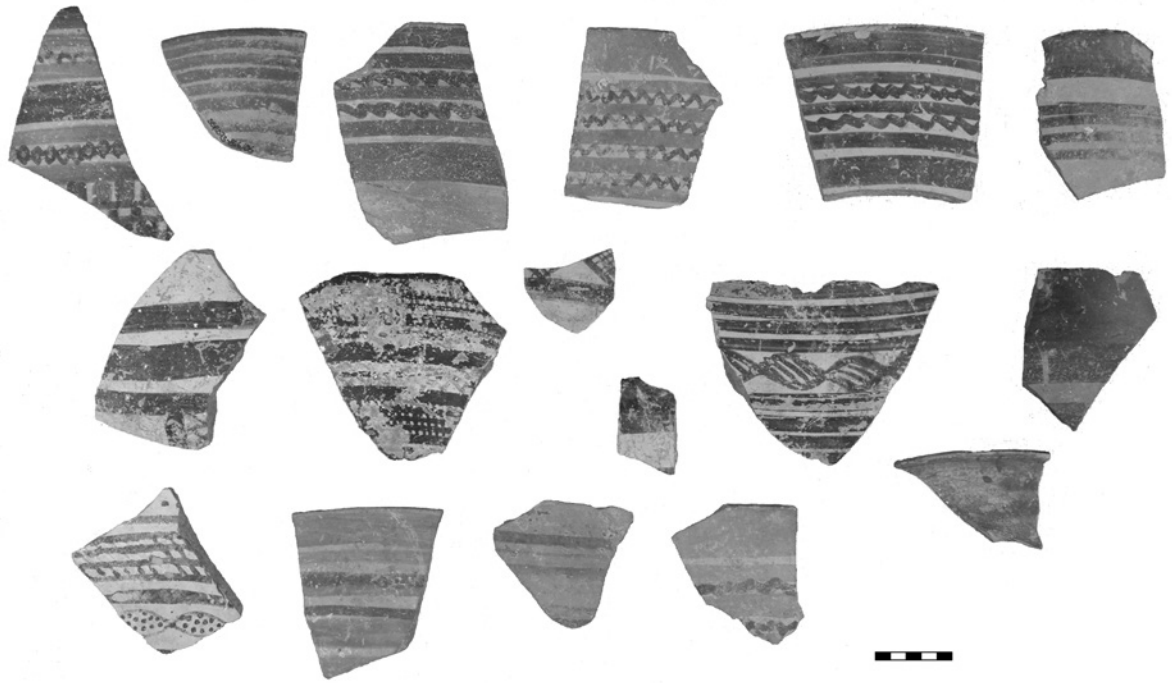

Figure 2. Examples of painted Halaf Fine Ware from the Shahrizor (image: Shahrizor Survey project).

and firing, and decorative style. Yet, for the twin purposes of presenting the regional survey evidence and facilitating inter-regional comparisons, we believe such down-to-earth, macroscopically-defined categorizations are quite useful (Ur 2010: appendix b). With the exception of the HUT Fine Ware, most of these categories would by and large correspond to groups known from elsewhere in northern Iraq, northern Syria and Southeastern Turkey.

To most scholars familiar with Mesopotamian prehistory, the achievements of participants in the Halaf cultural tradition are best exemplified by the elaborately decorated Halaf Fine Ware (HFW) they left behind. Closely comparable to Halaf pottery from across northern Iraq and Upper Mesopotamia, the HFW from the Shahrizor was made of relatively compact clay with few visible inclusions (Fig. 2). Future work should explore whether the potters employed techniques to purify the clays, for example by levigating (Rye 1981). The vessels were mostly well fired, often to a fully oxidized state that produced buffish to orange surface colours. Vessel shapes are those that are quite familiar to students of Halaf pottery from Upper Mesopotamia, including convex-sided bowls, bowls with a carinated contour and bowls with S-shaped walls. Often the bowls have pointed or flattened rims.

The painted designs, too, are overall familiar. The potters emphasized horizontal band patterns – motifs replicated by translation symmetry – encircling the vessel. Common motifs include various types of cross hatching, circular, squared or oval cables, and undulating lines. Perhaps significantly, figurative designs have so far not been observed. At first glance the design structures of the painted Halaf pottery from the Shahrizor might look rather unsophisticated in comparison to what is known from sites elsewhere. However, we must keep in mind that the available evidence almost exclusively comes from surface collections: fragmented surface collections such as those collected at Tell Begum are likely to be biased against the preservation of complex design 'grammars'. The material tends to be severely fragmented, reducing the changes of recovering intact design structures. The strong fragmentation may also go a long way in explaining the apparent absence of figurative compositions; once broken they may easily be interpreted as fragmented geometric designs.

Interestingly, in addition to painting, for which the Halaf Fine Ware has become rightly famous, several surface-manipulative decorative techniques are found in the Shahrizor. These include incising and impressing, often in combination with the painted designs (Nieuwenhuyse/Odaka/Mühl 2016; Nieuwenhuyse *et al.* 2016; Wengrow *et al.* 2016). Finally, stunning examples of polychrome painted decoration appear to be characteristic for the final stages of the Shahrizor Halaf (see below).

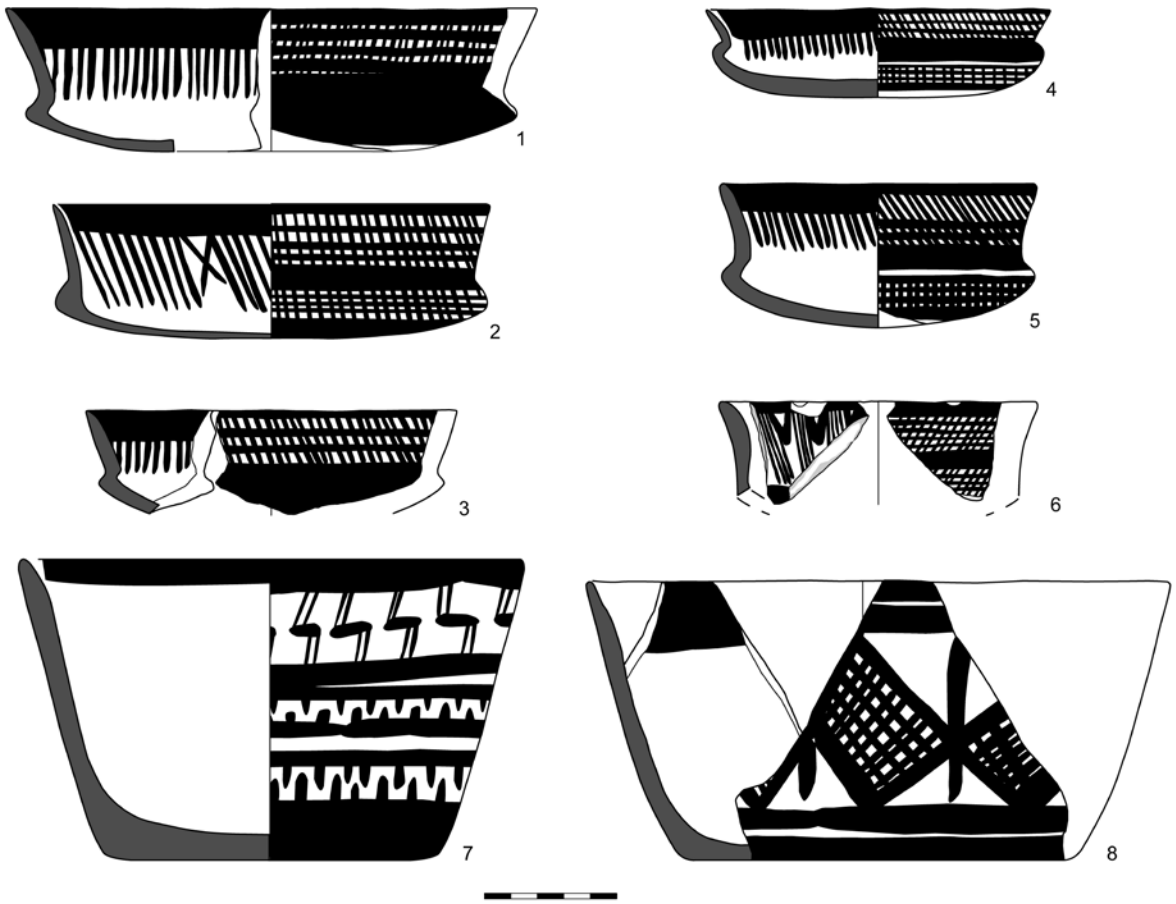

Figure 3. Early Halaf (Halaf Ia) painted Halaf Fine Ware from Tell Sabi Abyad (Operation III). Quite identifiable in surveys across Upper Mesopotamia, this pottery is so far conspicuously absent from Iraqi Kurdistan (after Nieuwenhuyse in press, b).

WHERE IS THE LOCAL EARLY HALAF?

One of the results of recent work on Halaf-period surface collections in Upper Mesopotamia was the insight that fine-tuned chronological sub-divisions of the material were in fact possible (Akkermans 1993; Becker 2015; Campbell 1992; Kozbe 2013; Nieuwenhuyse 2000; Nieuwenhuyse/Wilkinson 2007). Ultimately, the analysis of surface collections combined with stratigraphic excavations may contribute to a viable local chronology for the Halaf period in the Shahrizor, or indeed for northern Iraq in general. Applied to the survey evidence this may in turn shed light on changing settlement patterns *during* the Halaf period. Here I wish to introduce our preliminary impressions concerning the first introduction of Halaf ceramic styles from the Shahrizor.

In northern Syria, southeastern Turkey and northern Iraq, scholars have identified an uninterrupted transition leading from the earlier, Pre-Halaf ceramic assemblages through a short-lived 'Transitional' stage to the Early Halaf (Akkermans 1989, 1993; Akkermans/Le Mière 1992; Akkermans/Verhoeven 1995; Campbell 1992; Cruells 2006, 2009; Cruells/Nieuwenhuyse 2005; Cruells *et al*. 2013; Le Mière/Nieuwenhuyse 1996; Nieuwenhuyse 2007; Všianský/ Mateiciucová 2017). Dated to ca. 6000-5900 cal. BC (Akkermans 2014; Cruells 2017), this transition is characterized by ceramic properties that were previously seen as typical for, and culture-historically limited to, the Standard Hassuna and Samarra ceramic traditions of Central Iraq.

Thus, the northern Syrian ceramic assemblage during the Transitional stage (also termed 'Proto-Halaf' or 'Hassuna III') was characterized by increasing amounts of painted (occasionally painted-and-incised) Fine Ware that was made of 'sandy' clays and emphasized the application of dark-coloured paints over a light surface background. Typical painted motifs included Samarra-style stepped patterns and 'dancing ladies'. By ca. 5900 cal. BC this ceramic ware evolved into something that qualifies as a very early form of Halaf Fine Ware, during a stage that specialists may recognize by the names of 'Halaf Ia', 'Balikh IIIB', or 'Incipient Halaf'.

The point to be made here is that the earliest Halaf horizon as known from northern Syria is rather easy to identify in regional surveys (Fig. 3). In fact it *has* been identified in surveys across the Upper Mesopotamian realm (Akkermans 1993; Becker 2015; Cruells/Molist/Tunca 2004; Kozbe 2013; Nieuwenhuyse 2000). In contrast, the surveying in the Shahrizor has so far yielded none of the typical indices for this stage. These could have included dark-on-buff painted cream bowls carrying diagonal cross hatching (Fig. 3).

The Shahrizor material includes small quantities of ceramics that can be attributed to the Hassuna-Samarra ceramic tradition. However, the bulk of the Halaf Fine Ware would seem to date to the Middle to Late Halaf in terms of the commonly accepted Upper Mesopotamian framework. The first results emerging from surveying the Rania Plain further north reflect a similar impression (Tsuneki *et al.* 2015).

Only further study can establish the validity of these intriguing preliminary impressions. Several explanations may be explored if these early conclusions are supported. For instance, in contrast to the Upper Mesopotamian plains, sites from this particular stage (the Halaf Ia) may all be buried and invisible to modern surveys. Geomorphological work in the Shahrizor indeed attests to a very significant Holocene sedimentation (Mühl/Fassbinder 2016; Nieuwenhuyse *et al*. 2016). If so, this may imply that sites at the start of the Halaf were without exception small and inconspicuous, and perhaps short-lived. This would contrast with Upper Mesopotamia, where larger and more prominent tell sites existed during this phase. Alternatively, the entire valley may have been abandoned during the Halaf period. This seems rather unlikely given the agricultural potential of the valley to Early Halaf farmers. Did local Early Halaf groups shift to transhumant, pastoralist modes of subsistence?

Finally, from a ceramic-specialist perspective, it may be argued that the entire discussion is based on negative evidence. So far no stratified excavations in the broader region have facilitated the identification of a local version of a Pre-Halaf (i.e. Hassuna/Samarra) to Halaf ceramic transition. Speculating, local communities may have held on to Hassuna-Samarra styles for longer, adopting the Halaf repertoire at a later stage. They may have developed ceramic styles still unfamiliar to us specialists and which are therefore unrecognizable in surveys (Campbell 2007). Whatever explanation is eventually supported; each would portray the Shahrizor as regionally distinct during the Early Halaf stage.

HALAF-UBAID TRANSITIONAL (HUT) CERAMICS FROM THE SHAHRIZOR

In 2013 the Shahrizor Survey Project cleaned and partially re-excavated soundings from the 1960's at the 4,5 ha site of Tell Begum, with the aims of understanding the biography of this mound in broad outlines and collecting stratified ceramics to interpret the survey results. The mound appears to have been inhabited from the later Halaf period throughout the Ubaid period, and into the earlier stage of the Late Chalcolithic. Particularly well represented are the LC1-3 periods, during which the mound reached its largest extent, and the Late Halaf period, which Iraqi archaeologists in the 1960's excavated in a deep sounding through the Lower Mound (Nieuwenhuyse *et al.* 2016).

The earlier soundings excavated the Halaf strata to about eight metres below the present-day surface of the mound; the 2013 pilot excavations were limited to cleaning the upper three metres of this sounding. Three radiocarbon dates provide an absolute date for the re-excavated Halaf strata of around 5400 cal. BC (Odaka *et al.* n.d.).This fits with the absolute dates recently gained from comparable complexes excavated at Tepe Marani and Qalat Said Ahmadan (Tsuneki *et al.* 2015; Wengrow *et al.* 2016). These dates collectively fall well within the range accepted for the Upper Mesopotamian Halaf-Ubaid Transition (Campbell 2007; Campbell/Fletcher 2010; Hours *et al.* 1994).

The ceramic assemblage recovered from the Halaf strata comprises two broad groups, each with a unique internal variability. Provisionally, these have been termed Halaf Fine Ware (HFW) and Halaf Coarse Ware (HCW), but it is emphasized that further work may necessitate modifications of this nomenclature. The *Halaf Fine Ware* from Tell Begum on the whole corresponds to the description given above for the Shahrizor painted Halaf pottery. *Halaf Coarse Wares* are comparatively thick-walled vessels, often having incompletely oxidised cores. For HCW the potters used clay containing many small mineral inclusions and sometimes small plant particles (Nieuwenhuyse/Odaka/Mühl 2016).

At first sight, the range of vessel shapes and decorative designs correspond reasonably well to what is known in northern Iraq and northern Syria as Halaf-Ubaid-Transitional painted Fine Ware pottery, however poorly understood this ceramic horizon may still be (Cruells *et al.* 2013; Davidson 1977; Gómez-Bach 2009, 2011; Gómez-Bach *et al*. 2012; Nieuwenhuyse 2000; Tobler 1950). In Upper Mesopotamia this ceramic phase is characterized by a strong continuity from the preceding Late Halaf phase, but it displays subtle changes in the proportions of specific shapes and decorative designs. However, a closer inspection yields intriguing variabili-

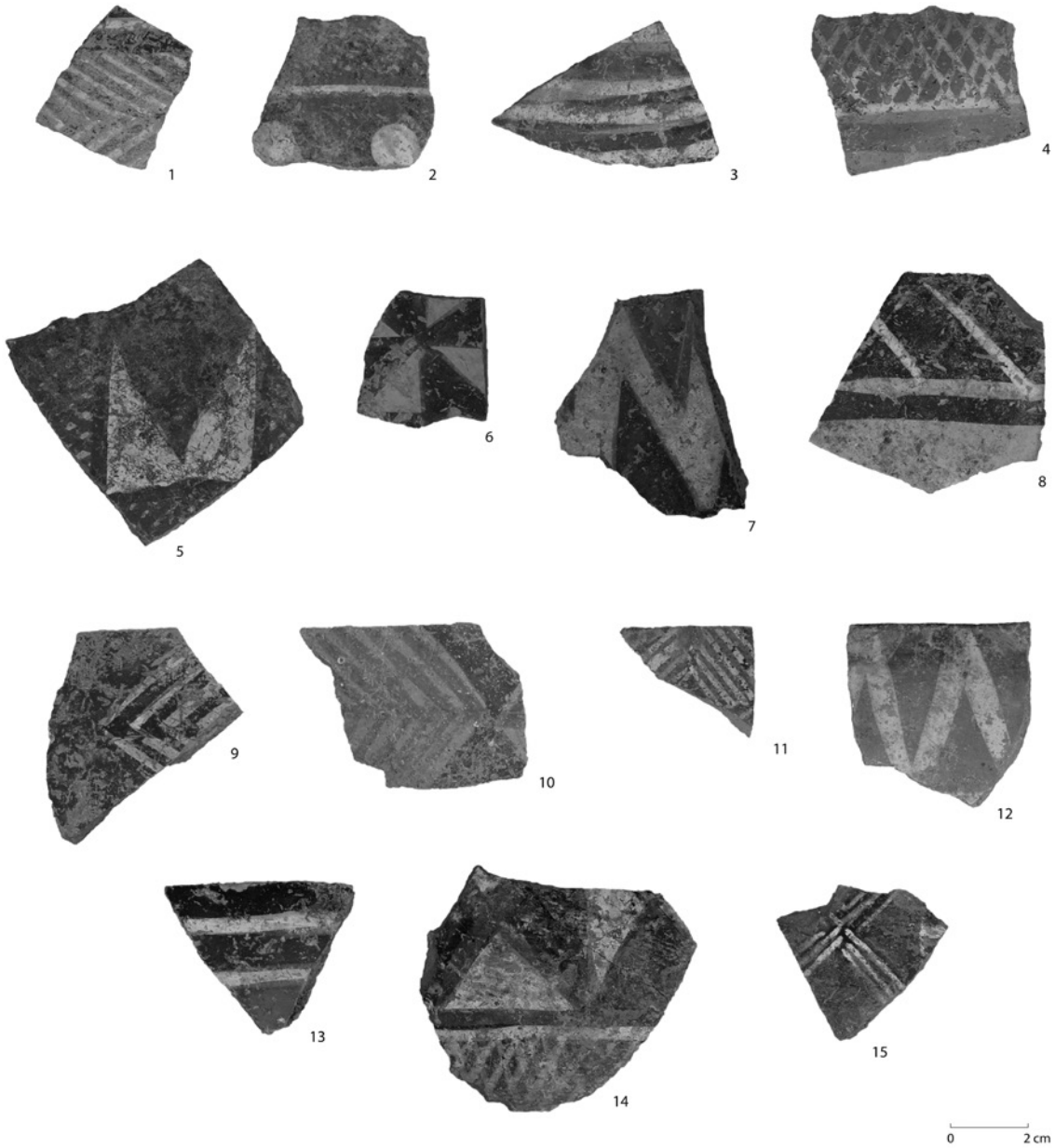

Figure 4. Tell Begum. Examples of polychrome-painted Halaf Fine Ware (after Nieuwenhuyse *et al.* in press).

ty that suggests the Halaf Fine Ware from Tell Begum is distinctive in at least two of its properties. First, the macroscopic fabric analysis done so far suggests variability in the clays prepared by the potters. Specifically, in many cases *plant* inclusions can be macroscopically observed which in all likelihood constituted a purposeful addition: in other words they were a real temper. Plant-tempered fabrics are *not* associated with Upper Mesopotamian Halaf Fine Ware.

Second, the high proportion of polychrome paints (ca. 30% in terms of basic sherd counts) is remarkable. At HUT sites further west of the Shahrizor, polychrome-painted designs do occur (Gómez-Bach 2017; Gómez-Bach *et al.* 2012) but they are far less common. The Tell Begum specimens are indeed remarkable, showing shades of red, brown and reddish brown in addition to different shades of grey, black and white (Figs. 4 - 6). The white paint, interestingly, always seems to have been applied last, perhaps *after* firing.

In Iraqi Kurdistan, the prevalence of polychrome-painted decoration was certainly not unique to Tell Begum. Visually comparable ceramics have been documented at Tell Qortas and Tepe Marani in the Shahrizor (Mühl/Nieuwenhuyse 2016; Wengrow *et al.* 2016), at Logardan near Chamchamal (Vallet, pers. com., July 2016) and at Qalat Said Ahmadan on the Rania Plain (Tsuneki

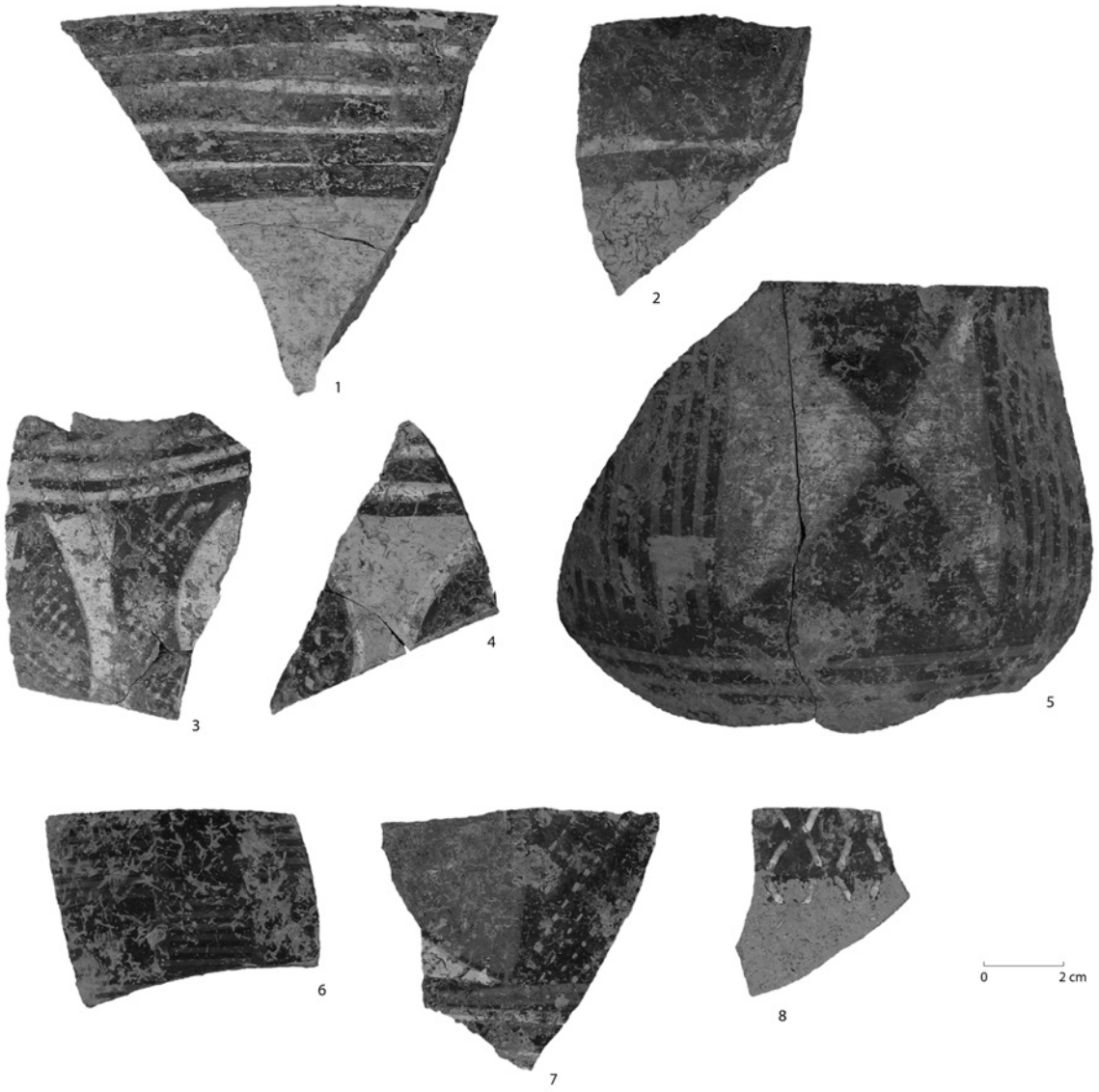

Figure 5. Tell Begum. Examples of polychrome-painted Halaf Fine Ware (after Nieuwenhuyse *et al.* in press).

et al. 2015, 2016). In other words, this is a regionally distinct stylistic expression. What is more, this prehistoric ceramic category appears to cross modern political borders, proving once more that such contemporary divisions are meaningless in Mesopotamian prehistory. It closely resembles the so-called J-Ware discovered in the 1960s in the Mahidasht Plain of the Iranian Central Zagros (Henrickson 1985; Levine/McDonald 1977; McDonald 1979). Further collaborative work should establish if the J-Ware and the Shahrizor HUT also are similar from a ceramic-technological point of view.

The recent work in the Iraqi Kurdistan region offers new perspectives on the role of polychrome-painted decoration in the later Halaf period. Polychrome-painted ceramics were not regionally limited to the Zagros, but the frequencies with which they are found in later Halaf ceramic assemblages gradually decrease and eventually peter out moving west (Campbell 1995). They do occur in the Khabur Headwaters of Northern Syria, but are less common (Gómez-Bach 2009, 2011; Nieuwenhuyse 2000). At Tell Halula on the Syrian Euphrates, they are rather uncommon (Gómez-Bach 2009, 2011, 2017). In the Balikh Valley of Northern Syria they are altogether absent. Might the application of polychrome painted decoration in the later Halaf period have its origins in the Zagros, where it appears to have been the most abundant?

CONCLUDING REMARKS

To sum up, there is little doubt that the Shahrizor participated in the dynamic world of the Halaf cultural tradi-

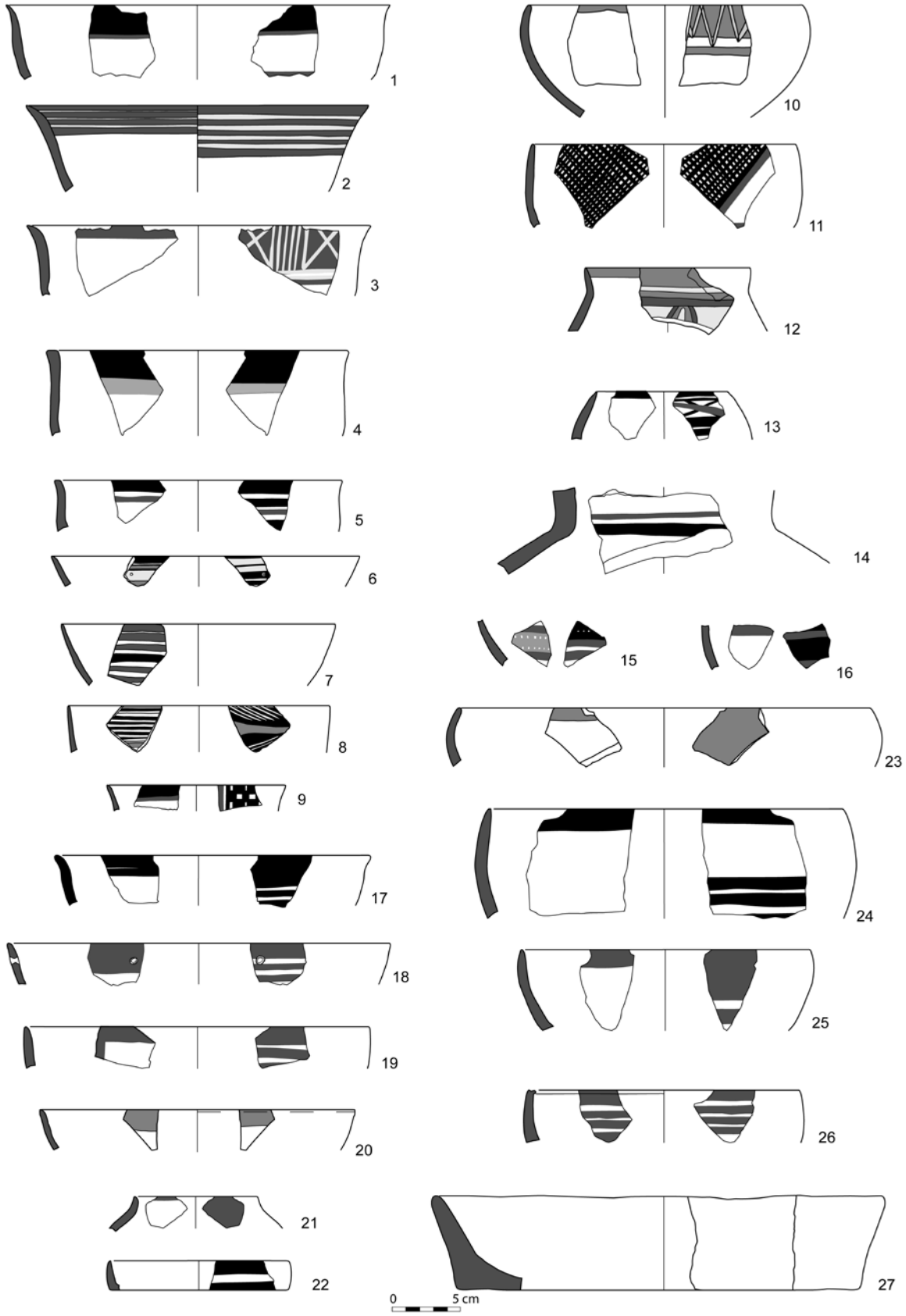

Figure 6. Tell Begum. Typical vessel shapes and decoration of the Halaf-Ubaid Transitional ceramics. Nos 1-26: Halaf Fine Ware. No. 27: Halaf Coarse Ware (after Nieuwenhuyse et al. 2016).

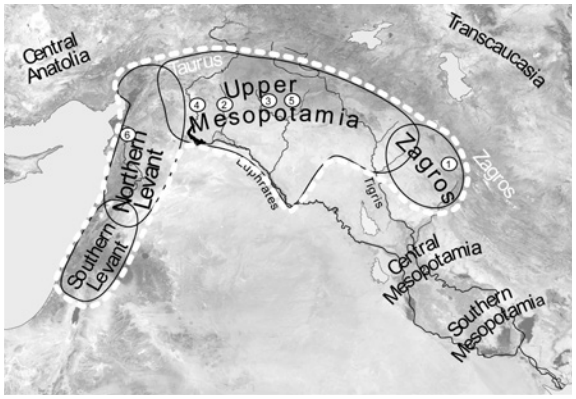

Figure 7. The Halaf world and its sub-regions, showing the locations of sites mentioned in the text. 1. Tell Begum in the Shahrizor. 2. Tell Sabi Abyad. 3. Tell Halaf. 4. Tell Halula. 5. Tell Chagar Bazar. 6. Tell el-Kerkh (after Nieuwenhuyse 2017).

tion. However, recent work suggests at least two possible ways in which the Halaf pottery from the Shahrizor is distinct from mainstream Halaf traditions as known from Upper Mesopotamia. First, the lead-up to the Halaf period may have differed locally. So far, no 'typical Early Halaf' pottery traits have been identified whatsoever in the Shahrizor. Local groups may instead have continued to use earlier Pre-Halaf styles longer than their contemporaries in northern Syria, or they may have developed styles that we cannot yet identify, or their socio-economic organization may have resulted in small, inconspicuous sites buried to modern surveyors. Second, during the final stages of the Halaf, the extraordinary polychrome-painted ceramics seem to represent a local variety of the Halaf-Ubaid Transitional stage. While certainly reminiscent of recent findings at Late Halaf to HUT sites in northern Syria, the abundance of polychrome compositions and the preference for using plant-tempered fabrics for making the vessels so far does not neatly match wider HUT ceramic assemblages in Upper Mesopotamia.

A more subtle aspect of regional distinctiveness may pertain to the organization of ceramic distribution: How did Halaf traits spread? For Upper Mesopotamia, it has become generally accepted that in addition to several other factors, ceramic exchange certainly played a role in distributing the containers and the stylistic innovations they represented (Davidson 1977; Davidson/McKerrel 1976, 1980; Le Mière/Picon 2008; Spataro/Fletcher 2010). In contrast, recent work by Helen Himmelman at the UCL Institute of Archaeology on decorated Halaf Fine Ware from the site of Tepe Marani suggests that the vessels were in all likelihood produced locally, although this remains to be confirmed by further study (Wengrow, pers. comm., August 2016). This would suggest that ceramic exchange played a minor role in spreading innovative ideas on pottery production into this part of the Zagros Mountains. Alternative models might present travelling potters which made 'foreign' pots in local villages as suggested by Peder Mortensen for the Rania Plain (Mortensen 1970), or a decided preference by local communities for regionally extensive marital exchange programs, importing novel ideas as part of the marital package (Forest 2013).

Near Eastern prehistorians are, of course, quite familiar with regionally localized expressions of broader cultural traditions. Few would *a priori* expect bounded, homogeneous 'ceramic provinces' with synchronized ceramic changes in the Halaf period (Campbell 1992, 2007; Bernbeck/Nieuwenhuyse 2013; Nieuwenhuyse 2017). It is possible to conceive of the Halaf cultural tradition as a phenomenon extending to many more regions beyond the semi-arid Upper Mesopotamian plains with which it is traditionally associated (Fig. 7). Several micro-regions appear to have locally developed distinct expressions of the Halaf idiom; the Shahrizor and the Zagros more broadly may represent just another case in point (Nieuwenhuyse 2017). The point here is not to insist on typological hair splitting - are the northern Levantine DFBW cream bowls from Tell el-Kerkh genuinely Halaf or not? – but rather to argue that local, regional groups would have had distinct reasons for adopting or rejecting specific ceramic traits that modern archaeologists associate with the Halaf culture.

As has often been observed, archaeologists should not blindly stare at the material culture itself – the pots – but instead focus on the immaterial social practices they represent or made possible. In the case of the Halaf painted Fine Ware, we should think of shared notions of mutual hospitality, sharing and ritualized gift-giving through feasting (Karsgaard 2010; Nieuwenhuyse 2007, 2009, 2013, 2017, in press; Özbal/Gerritsen 2013). As Mottram argues (2016), such practices would be vital in the establishment of the supra-local social networks that provided a safety net in times of hardship and offered opportunities for the delayed return of people, goods and services. Regional groups may have come up with different material expressions while sharing these intangible notions to some extent.

Apparently, Late Neolithic communities in the Zagros thought it important to be part of the Halaf phenomenon, but to do so on their own terms. Adopting the occasional plant temper and indulging themselves in elaborately embellished polychrome-painted pottery containers may have been elements of a distinctive 'Western Zagros' approach to making Halaf painted pottery.

BIBLIOGRAPHY

AKKERMANS, P. M. M. G. 1989, The prehistoric pottery of Tell Sabi Abyad, in Akkermans, P. M. M. G. (ed.), *Excavations at Tell Sabi Abyad*, Oxford, Archaeopress (BAR International Series 468), 77-214.

AKKERMANS, P. M. M. G. 1993, *Villages in the Steppe,* Michigan, Ann Arbor.

AKKERMANS, P. M. M. G. 2014, Tell Sabi Abyad: the site and its chronology, in Akkermans, P. M. M. G., Brüning, M., Huigens, H. and Nieuwenhuyse, O. P. (eds.), *Excavations at Late Neolithic Tell Sabi Abyad, Syria. The 1994-1999 Field Seasons*. Turnhout, Brepols (PALMA Series 11), 17-28.

AKKERMANS P. M.M.G., LE MIÈRE, M. 1992, The 1988 Excavations at Tell Sabi Abyad, a Later Neolithic Village in Northern Syria, *American Journal of Archaeology* 96, 1-22.

AKKERMANS, P. M. M. G., VERHOEVEN, M. 1995, An Image of Complexity - The Burnt Village at Late Neolithic Sabi Abyad, Syria, *American Journal of Archaeology* 99, 5-32.

AKKERMANS, P. M. M. G., SCHWARTZ, G. M. 2003, *The Archaeology of Syria*, Cambridge, Cambridge University Press.

ALTAWEEL, M., MARSH, A., MÜHL, S., NIEUWENHUYSE, O. P., RADNER, K., RASHEED, K., SABER, A. S. 2012, New investigations in the environment, history, and archaeology of the Iraqi Hilly Flanks: Shahrizor Survey Project 2009–2011, *Iraq* 74, 1-35.

BECKER, J. 2015, *Tell Tawila, Tell Halaf and Wadi Hamar: Halaf- und 'Obed-Zeit in Nordost-Syrien. Regionale Entwicklungen, Gemeinschaftkeiten und Unterschiede,* Berlin, *ex oriente*.

BERNBECK, R., NIEUWENHUYSE, O.P. 2013, Established paradigms, current disputes and emerging themes: the state of research on the Late Neolithic in Upper Mesopotamia, in Nieuwenhuyse, O. P., Bernbeck, R., Akkermans, P. M. M. G. and Rogasch, J. (eds.), *Interpreting the Late Neolithic of Upper Mesopotamia*, Turnhout, Brepols (PALMA Series 9), 17-37.

BONACOSSI, D. M., IAMONI, M. 2015, Landscape and settlement in the Eastern Upper Iraqi Tigris and Navkur Plains: the Land of Nineveh Archaeological Project, seasons 2012-2013, *Iraq* 77/1, 9-39.

CAMPBELL, S. 1992, *Culture, Chronology and Change in the Later Neolithic of North Mesopotamia,* Edinburgh, Unpublished Ph.D. Thesis University of Edinburgh.

CAMPBELL, S. 1995, The Halaf Pottery, in Baird, D., Campbell, S. and Watkins, T. (eds.), *Excavations at Kharabeh Shattani, vol.II,* Edinburgh, University of Edinburg (Occasional Paper no. 18), 55-90.

CAMPBELL, S. 2007, Rethinking Halaf Chronologies, *Paléorient* 33/1: 103-136.

CAMPBELL, S., FLETCHER, A. 2010, Questioning the Halaf-Ubaid Transition, in Carter, R. A. and Phillip, G. (eds.), *Beyond the Ubaid. Transformation and Integration in the Late Prehistoric Societies of the Middle East,* Chicago, Oriental Institute (OIP 63), 69-83.

CRUELLS, W. 2004, The pottery, in Tunca, Ö., Molist, M. and Cruells, W. (eds.), *Tell Amarna (Syrie) I. La période de Halaf*, Leuven, Peeters (Publications de la Mission archéologique de l'Université de Liège en Syrie), 41-200.

CRUELLS, W. 2006, Chagar Bazar pré-historique: esquisse de la séquence d'évolution et la périodisation, in Tunca, Ö. Baghdo, A. M. and Cruells, W. (eds.), *Chagar Bazar (Syrie) I: Les sondages préhistoriques (1999-2001)*, Leuven, Peeters, 121-142.

CRUELLS, W. 2009, Nouvelles données sur les origines et le développement de la céramique Halaf en Syrie, in Astruc, L., Gaulon, A. and Salanova, L. (eds.), *Methods for the Study of the First Pottery Productions: Case Studies from the Balkans and the Levant,* Rahden, Marie Leidorf, 93-103.

CRUELLS, W. 2017, Transitions and their Chronologies in the Pottery Neolithic of the Near East, in Cruells, W., Mateiciucová, I. and Nieuwenhuyse, O.P. (eds.) *Painting Pots - Painting People. Late Neolithic Ceramics in Ancient Mesopotamia,* Oxford, Oxbow, 11-29.

CRUELLS, W., MOLIST, M., TUNCA, Ö. 2004, Tell Amarna in the general framework of the Halaf period, in Tunca, Ö., Molist, M. and Cruells, W. (eds.), *Tell Amarna (Syrie) I. La période de Halaf*, Leuven, Peeters (Publications de la Mission archéologique de l'Université de Liège en Syrie), 261-283.

CRUELLS, W., NIEUWENHUYSE, O. P. 2005, The Proto-Halaf period in Syria. New sites, new data, *Paléorient* 30/1, 47-68.

CRUELLS, W., GÓMEZ, A., BOUSO, M., GUERRERO, E., TORNERO, C., BUXÓ, R., SAÑA, M., MOLIST, M., BAGHDO, A., TUNCA, Ö. 2013, Chagar Bazar in Northeastern Syria: recent work, in Nieuwenhuyse, O. P., Bernbeck, R., Akkermans, P. M. M. G. and Rogasch, J. (eds.), *Interpreting the Late Neolithic of Upper Mesopotamia,* Turnhout, Brepols (PALMA Series 9), 367-478.

DAVIDSON, T. E. 1977, *Regional Variation within the Halaf Culture,* Edinburgh, Unpublished Ph.D. Thesis University of Edinburgh.

DAVIDSON T.E., MCKERREL H. 1976, Pottery Analysis

and Halaf Period Trade in the Khabur Headwaters Region, *Iraq* 38, 45-56.

DAVIDSON T.E., MCKERREL H. 1980, The neutron activation analysis of Halaf and 'Ubaid pottery from Tell Arpachiyah and Tepe Gawra, *Iraq* 42, 45-56.

DIRECTORATE GENERAL OF ANTIQUITIES BAGHDAD. 1970, *Archaeological Sites in Iraq*, Baghdad.

DIRECTORATE GENERAL OF ANTIQUITIES BAGHDAD. 1976, *Atlas of Archaeological Sites in Iraq*, Baghdad.

FOREST, J. D. 2013, The birth of a new culture: at the origins of the Halaf, in Nieuwenhuyse, O. P., Bernbeck, R., Akkermans, P. M. M. G. and and Rogash, J. (eds.) *Interpreting the Late Neolithic of Upper Mesopotamia,* Turnhout, Brepols (PALMA Series 9), 101-106.

GAVAGNIN, K., IAMONI, M. and PALERMO, R. 2016, The Land of Niniveh Archaeological Project: the ceramic repertoire from the Early Pottery Neolithic to the Sasanian period, *Bulletin American Society for Oriental Research*, 119-170.

GÓMEZ-BACH, A. 2009, Las producciones cerámicas del Halaf Final en Siria: Tell Halula (Valle del Éufrates) y Tell Chagar Bazar (Valle del Khabur), in Córdoba, J. M., Molist, M., Perez, C., Rubio, I. and Martínez, S. (eds), *Proceedings of 5th International Congress on the Archaeology of the Ancient Near East, Madrid, April 2006*, *UAM II,* Madrid, Universidad Autónoma de Madrid, 113-122.

GÓMEZ-BACH, A. 2011, *Caracterización Del producto cerámico en las comunidades neolíticas de mediados del VI milenio cal BC: el valle del Éufrates y el valle del Khabur en el Halaf Final,* Barcelona, Unpublished Ph.D. Thesis Universitat Autònoma de Barcelona.

GÓMEZ-BACH, A. 2017, Investigating Painted, Incised and Impressed Ware from the Late Halaf Period, in Cruells, W., Mateiciucová, I. and Nieuwenhuyse, O.P. (eds.) *Painting Pots - Painting People. Late Neolithic Ceramics in Ancient Mesopotamia,* Oxford, Oxbow, 38-51.

GÓMEZ-BACH, A., CALVO DEL CASTILLO, H., CRUELLS, W., STRIVAY, D., MOLIST, M. 2012, Black, red and white: characterizing Neolithic ceramic productions in middle Euphrates Valley, in Matthews, R. and Curtis, J. (eds.), *Proceedings of the 7th International Congress on the Archaeology of the Ancient Near East. Vol. III.* Wiesbaden, Harrasowitz, 527-536.

HIJARA, I. 1997, *The Halaf Period in Northern Mesopotamia.* London, NABU Publications (Edubba 6).

HENRICKSON, E. F. 1985, An updated chronology of the Early and Middle Chalcolithic of the Central Zagros Highlands, Western Iran, *Iran* 23, 63-108.

HOURS F., AURENCHE O., CAUVIN J., CAUVIN M.-C., COPELAND L., SANLA-VILLE P. 1994, *Atlas des Sites du Proche-Orient (14 000-5700 BP),* Lyon, (Travaux de la Maison de l'Orient méditerranéen 24).

IAMONI, M. 2016a, Across millennia of occupation: the Land of Niniveh Archaeological Project in Iraqi Kurdistan: the prehistory and protohistory of the Upper Tigris rediscovered, in Kopanias, K. and MacGinnis, J. (eds.), *Archaeological Research in the Kurdistan Region of Iraq and the adjacent areas,* Oxford, Archaeopress (BAR International Series), 125-134.

IAMONI, M. 2016b, Larger site, better life? Site dimensions and the path to socio-economic complexity in Upper Mesopotamia across the Halaf and Ubaid periods, in Iamoni, M. (ed.), *Trajectories of complexity in Upper Meso-potamia: processes and dynamics of social complexity and their origin in the Halaf period,* Wiesbaden, Harrasowitz, 57-84.

KARSGAARD, P. 2010, The Halaf-Ubaid Transition: a transformation without a center?, in Carter, R. A. and Phillip, G. (eds.), *Beyond the Ubaid. Transformation and Integration in the Late Prehistoric Societies of the Middle East*, Chicago, Oriental Institute (OIP 63), 51-68.

KOLINSKI, R. 2016, Insights into the settlement history of Iraqi Kurdistan from the Upper Greater Zab Archaeological Reconnaissance Project, in Kopanias, K. and MacGinnis, J. (eds.), *Archaeo-logical Research in the Kurdistan Region of Iraq and the adjacent areas,* Oxford, Archaeopress (BAR International Series), 163-172.

KOZBE, G. 2013, The Late Neolithic in the Şirnak area (Southeast Turkey, in Nieuwenhuyse, O. P., Bernbeck, R, Akkermans, P. M. M. G. and Rogasch, J. (eds.), *Interpreting the Late Neolithic of Upper Mesopotamia*, Turnhout, Brepols (PALMA Series 9), 479-492.

LE MIÈRE, M., NIEUWENHUYSE, O.P. 1996, The prehistoric pottery from Tell Sabi Abyad, in Akkermans, P. M. M. G. (ed.), *Tell Sabi Abyad, a Neolithic Village in the Balikh Valley (1988 to 1992),* Leiden, Nederlands Instituut voor het Nabije Oosten, 119-284.

LE MIÈRE, M., PICON, M. 2008, A Contribution to the Discussion on the Origins of the Halaf Culture from Chemical Analyses of Pottery, in Córdoba, J., Molist, M., Pérez, C., Rubio, I. and Martínez, S. (eds.), *Proceedings of the 5th International Congress on the Archaeology of the Ancient Near East, Universidad Autónoma de Madrid, April 3-8 2006,* Madrid, Universidad Autònoma de Madrid, 729-734.

LEVINE, L. D., MCDONALD, M. M. A. 1977, The Neolithic and Chalcolithic periods in the Mahidasht, *Iran* 51, 39-50.

MALLOWAN M.E.L., CRUIKSHANK-ROSE J. 1935, Excavations at Tall Arpachiyah, 1933, *Iraq* II, 1-178.

MCDONALD, M. M. A. 1979, *An Examination of Mid-Holocene Settlement Patterns in the Central Zagros Region of Western Iran*, Toronto, Unpublished PhD Thesis University of Toronto.

MORTENSEN P. 1970,*Tell Shimshara. The Hassuna period*, Copenhagen, Munksgaard.

MOTTRAM, M. 2016, When the going gets tough: risk minimization responses to the 8.2 event in the Near East and their role in the emergence of the Halaf cultural phenomenon, in Biehl, P. F. and Nieuwenhuyse, O. P. (eds.), *Climate and Cultural Change in Prehistoric Europe and the Near East,* Buffalo, SUNY Press (Distinguished Monograph Series of the Institute for European and Mediterranean Archaeology 2), 37-66.

MÜHL, S. 2013, *Siedlungsgeschichte im mittleren Osttigrisgebiet vom Neolithikum bis in die neuassyrische Zeit,* Wiesbaden, Harrasso-witz (Abhandlungen der Deutschen Orient-Gesellschaft 28).

MÜHL, S., FASSBINDER, J. 2016, Magnetic investigations in the Shahrizor Plain: revealing the unseen in survey prospections, in Kopanias, K. and MacGinnis, J. (eds.), *Archaeological Research in the Kurdistan Region of Iraq and the adjacent areas,* Oxford, Archaeopress (BAR International Series), 241-248.

MÜHL, S., NIEUWENHUYSE, O. P. 2016. Halaf and Ubaid period settlement: A view from the Central Zagros Piedmont, in Iamoni, M. (ed.), *Trajectories of complexity in Upper Mesopotamia: processes and dynamics of social complexity and their origin in the Halaf period*, Wiesbaden, Harrasowitz, 27-56.

NIEUWENHUYSE, O. P. 2000, Halaf Settlement in the Khabur Headwaters, in Lyonnet, B. (ed.), *Prospection Archéologique Haut Khabur Occidental (Syrie du N.E.). Vol. I*,Beirut, IFAPO, 151-260.

NIEUWENHUYSE, O. P. 2007, *Plain and Painted Pottery. The Rise of Neolithic Ceramic Styles on the Syrian and Northern Mesopotamian Plains*, Turnhout, Brepols (PALMA Series 3).

NIEUWENHUYSE, O. P. 2009, The Painted Pottery Revolution: Emulation, Ceramic Innovation and the Early Halaf in Northern Syria, in Astruc, L., Gaulon, A. and Salanova, L. (eds.), *Méthodes d'approche des premières productions céramiques. Etude de cas dans les Balkans et au Levant,* Rahden, Marie Leidorf, 81-91.

NIEUWENHUYSE, O. P. 2013, The social uses of decorated ceramics in Late Neolithic Upper Mesopotamia., in Nieuwenhuyse, O. P., Bernbeck, R., Akkermans, P. M. M. G. and Rogasch, J. (eds.), *Interpreting the Late Neolithic of Upper Mesopotamia*, Turnhout, Brepols (PALMA Series 9), 135-146.

NIEUWENHUYSE, O. P. 2017, Globalizing the Halaf, in Hodos, T. (ed.), *The Routledge Handbook of Archaeology and Globalization*, London, Routledge, 839-854.

NIEUWENHUYSE, O.P. In press. *Relentlessly Plain. Seventh Millennium Ceramics from Tell Sabi Abyad,* Oxford, Oxbow.

NIEUWENHUYSE, O. P., BERGHUIJS, K., MÜHL, S. 2012, A Late Neolithic "fishing net" from Kurdistan, Northern Iraq?, *Paléorient* 38, 141-7.

NIEUWENHUYSE, O. P., ODAKA, T., KANEDA, A., MÜHL, S., RASHEED, K., ALTAWEEL, M. R. 2016, Revisiting Tell Begum. A prehistoric site in the Shahizor Valley, Iraqi Kurdistan, *Iraq* 78, 103-135.

NIEUWENHUYSE, O. P., WILKINSON, T. J. 2007, Late Neolithic settlement in the area of Tell Beydar, (NE Syria), in Lebeau, M. and Suleiman, A. (eds.), *Beydar Studies I,* Turnhout, Brepols (SUBARTU XXI), 268-303.

NIEUWENHUYSE, O.P., ODAKA, T. MÜHL, S. 2016, Halaf settlement in the Iraqi Kurdistan: the Shahrizor Survey Project, in Kopanias, K. and MacGinnis, J. (eds.), *Archaeological Research in the Kurdistan Region of Iraq and the adjacent areas,* Oxford, Archaeopress (BAR International Series), 257-266.

ODAKA, T., NIEUWENHUYSE, O.P., RASHEED, K., OZAKI, H., OMORI, T YONEDA, M. n.d. Halaf pottery in the East End: new radiocarbon dates from Tell Begum, Iraqi Kurdistan.

ÖZBAL, R. GERRITSEN, F. 2013, Burnishing, painting and fenestrating: social uses of pottery at Tell Kurdu, in Nieuwenhuyse, O., P., Bernbeck, R., Akkermans, P. M. M. G. and Rogash, J. (eds.) *Interpreting the Late Neolithic of Upper Mesopotamia,* Turnhout, Brepols (PALMA Series 9), 107-116.

RYE, O. S. 1981,. *Pottery technology: principles and reconstruction* 4, Washington, Taxacum.

SABER, A. S., SALMAN, S., RASHEED, K. MÜHL, S. 2014, Two salvage excavations in Southern Kurdistan, Sulaymaniyah Province, Iraq – Tell Tanjero (season 2008) and Tell Greza (season 2003), *Mitteilungen der Deutschen Orient-Gesellschaft* 146, 139-168.

SPATARO, M., FLETCHER, A. 2010, Centralisation or regional identity in the Halaf period? Examining interactions within fine painted ware production, *Paléorient*, 36/2, 91-116.

TOBLER, A. J. 1950. *Excavations at Tepe Gawra,* Philadelphia, University of Pennsylvania Press.

TSUNEKI, A., RASHEED, K., SABER, S. A., NISHIYAMA, S., ANMA, R., ISMAIL, B. B., HASEGAWA, A., TATSUMI, Y., MIYAUCHI, YAMMO, S. J., MAKI-

NO, M., KUDO, Y. 2015, Excavations at Qalat Said Ahmadan, Slemani, Iraqi-Kurdistan: first interim report (2014 Season), *Al-Rafidan* XXXVI, 1-63.

TSUNEKI, A., RASHEED, K., SABER, S. A., NISHIYAMA, S., WATANABE, N., GREEN-FIELD, T., ISMAIL, B. B., TATSUMI, Y., MINAMI, M. 2016, Excavations at Qalat Said Ahmadan, Qaladizah, Iraqi-Kurdistan: second interim report (2015 Season), *Al-Rafidan* XXXVII, 89-142.

UR, J. 2010, *Urbanism and Cultural Landscapes in Northeastern Syria. The Tell Hamoukar Survey 1999-2001*, Chicago, Oriental Institute (Oriental Institute Publications 137).

Ur, J., JONG, L. DE, GIRAUD, J., OSBORNE, J. F., MACGINNIS, J. 2013. Ancient Cities and Landscapes in the Kurdistan Region of Iraq. The Erbil Plain Archaeological Survey 2012 Season, *Iraq* 75, 89–118.

VŠIANSKÝ, D., MATEICIUCOVÁ, I. 2017. Analyzing Painted Pottery from Late Neolithic Tell Arbid Abyad, in Cruells, W., Mateiciucová, I. and Nieuwenhuyse, O.P. (eds.) *Painting Pots - Painting People. Late Neolithic Ceramics in Ancient Mesopotamia,* Oxford, Oxbow, 83-92.

WENGROW, D., CARTER, R., BRERETON, G., SHEPPERSON, M., HAMARASHI, S. J., SABER, S. A., BEVAN, A., FULLER, D., HIMMELMAN, H., SOSNOWSKA, H. 2016, Gurga Chiya and Tepe Marani: new excavations in the Shahrizor Plain, Iraqi Kurdistan, *Iraq* 78, 253-284.

Anna Gómez-Bach, Jörg Becker and Miquel Molist (ed),
II Workshop on Late Neolithic Ceramics in Ancient Mesopotamia: pottery in context,
Monografies del MAC 1, Barcelona 2018,
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A NEW METHOD FOR STUDYING POTTERY? EXPLORING THE SCANNER TECHNOLOGY

Christophe Moulhérat*, Béatrice Robert, Catherine Breniquet***, Aymeric Beau (collab)*****

Los análisis arqueométricos en cerámica suelen ser destructivos y costosos. En este artículo se propone un método alternativo basado en el escáner y el uso de imágenes 2D y 3D. Los resultados exploratorios obtenidos con fragmentos del Neolítico del Próximo Oriente son alentadores. Esta técnica permitirá comparar y superar los métodos utilizados por la arqueología tradicional.

Arqueometría, Escáner, Imágenes, Cerámica, Próximo Oriente

Archaeometric researches on ceramics are often destructive and costly. We explore here an alternative method based on scanner technology with 2 and 3D imaging. Exploratory results, obtained with Late Neolithic sherds from the Near East, are encouraging. This technique will allow and overcome the methods used by traditional archaeology.

Archaeometry, Scanner, Image, Pottery, Near East.

INTRODUCTION

It is well known that pottery sherds are amongst the most numerous and durable remains found on archaeological sites. Ceramic is, with flint, one of the most studied artifacts of archaeology. This peculiar situation is related with the hardness of the material when fired, which hardly disappeared, and with the place of such artifacts in the daily life. Pottery is used for cooking, storage, but is not restricted to pots; it is also used for figurines or architectural elements such as tiles. Their basic material is clay. Found in the nature, clay is heterogeneous but has to be evenly mixed with other elements such as temper (vegetal or mineral) and water to be used as a raw material. Ceramic was one of the first synthetic materials to be made by human communities in the past.

The observation of pottery in archaeology brings important information about technical knowledge (preparing the clay, firing temperature linked with the use of specific ovens sometimes) and decoration (style, nature of the motives, etc.). The classification of sherds or pots coming from stratified contexts allows us to interpret and assign dates. The contexts in which sherds are found give us an idea on the functions and uses of the pots and objects. However, if we want to go further, archaeometric researches are necessary. These analyses, which involve high technology and skilled scientific knowledge, are often expensive and destructive.

*Chargé d'analyses des collections, Musée du quai Branly, 37 Quai Branly, 75007 Paris, França christophe.moulherat@quaibranly.fr
**Membre Associée Laboratoire TRACES Toulouse – UMR 5608, Equipe Préhistoire Récente du Bassin Méditerranéen, Université Toulouse Jean Jaurès, 31058, 5 Allée Antonio Machado, 31100 Toulouse, França. bealithic@yahoo.fr
***Pr. Université Clermont Auvergne, UFR LCSH, 29 boulevard Gergovia, 63000 Clermont-Ferrand, França. catherine.breniquet@univ-bpclermont.fr
**** Sales Engineer, North Star Imaging Europe, Les Frégates 6 Hall F Paris Nord II, 13 Rue de la Perdrix, 93290 Tremblay-en-France, França. abeau@4nsi.com

New methods, based on scanning technology, are now available, making possible to work on images rather than on objects. For instance, a new method based on scanning technology, using an X-ray computed tomography scanner was tested successfully in the Musée du Quai Branly by Christophe Moulhérat on Peruvian mummies[1]. New imaging technologies made possible to see through the objects, without destroying them, in other words, to make a virtual "autopsy" or "excavation".

Within the frame of this conference, we tried to use this technology on sherds in order to see if the traditional investigation on pottery could be challenged. It was tested on Late Neolithic ware samples from Tell Turlu, Turkey (Jean Perrot's excavations archives: Breniquet 1991 a)[2] and painted sherds from Tell es-Sawwan, Iraq (French excavations: Breniquet 1991b, 1992. See also Ippolitoni 1970-1971; Youkana 1997). All the samples used here come from official excavations and have been officially exported to France. These samples come from published excavations and were also studied by Béatrice Robert with archaeometric analyses in the CRP2A Laboratory in the University of Bordeaux (Robert 2010, successfully defended in 2010). So, we expect to have a multifocal and comparative presentation of the general topic of ceramic investigation and of the different methods.

GENERAL CONTEXT

Since the beginning of the XXth century, painted ware has been identified as a characteristic of the first agricultural settled villages in the Near East. The first painted ware found at Samarra by Hertzfeld (1911), which belonged to a set of grave goods, was found below the abbassid levels of the city. Other discoveries are reported in the same years below the neo-hittite layers of Tell Halaf, or at Tell el Ubaid during the British excavations in the twenties. At that time, the links between these painted wares and the other known wares were quite unclear and gave rise to speculation in interpreting their decorative motives (for instance *bucrania* or *swastika* or textile patterns). A better understanding of their stratigraphic positions was provided by the first stratigraphic excavations on major sites in the fifties, which set the whole chronological sequences of the Late Neolithic: Tell Hassuna, Eridu, Tepe Gawra and so on (Braidwood *et al*. 1952; Lloyd/Safar 1944; Safar/Mustafa/Lloyd 1981).

However, since the beginnings of the archaeological research in the Near East, ceramic (and by extension painted ware which came soon after) is understood to be the last characteristic to appear in the Neolithic communities (after settled life, agriculture and herding). Moreover, the nature of the clay, the firing temperature, the pigments used for the decorative motives and the general style of the designs were considered relevant to their provenience and the "identity" of their fabricants and owners. Sometimes, pots were categorized as human groups (the famous never demonstrated adequacy between pots and people according to Kossina's readings of the archaeological records, for instance: Demoule 2005) and their geographical area of distribution was supposed to be the area settled by specific groups. We learned that things are not so clear and that material culture is not the best way to identify ethnic groups. Cultural signification of the material differences between wares remains one of our biggest challenges.

Now, thanks to the previous great excavations, we understand that the last step of the Neolithic period is characterized by the introduction of pottery. At least, for the first time, in three different areas: northern Levant, Anatolia and Iran (and probably, elsewhere too). During the sixth millennium BC, Halaf painted pottery and the Halaf culture developed in northern Syria, from burnished ware, apparently after the contact of the Samarra culture (Nieuwenhyuse 2008). In the opposite part of Mesopotamia, Hassuna and Samarra represent a different evolution, as well as the Ubaid tradition (6500-3900 BC) from southern Mesopotamia (For an up-to-date view: Huot 1994; Nieuwenhyuse *et al*. 2013). Clays, technology, painting and firing are different.

The development of the laboratory and interdisciplinary archaeology since the fifties helped us focus on other aspects and on a more scientific platform. As stated above, from the archaeometric point of view, ceramic is a perfect material for conducting investigations: it is an inorganic, nonmetallic, and solid (because it was a fired) material and it is also a composite construction combining crystalline and non-crystalline phases, sometimes coated by thin layers of slip or paint. The whole process of transforming the clay into pot gives new physical properties to the object, perfectly suitable for archaeometric investigations. The physicists and chemists introduced new methods for dating and studying composition, determining the provenance or brought answers on technical data such the understanding of the "chaîne opératoire" (manufacturing process, or operational sequence work), based on the physical properties of the constituting materials (especially atomic and electronic properties). The

1. For instance the exhibition held at the Musée du Quai Branly, Paris, « Anatomie des chefs d'œuvre », 10 March 2015/17 May 2015.
2. We would like to thank J. Perrot for his generous help, many years ago.

availability and progress of computers bring a statistical perspective as well as image treatment possibilities. We are mainly concerned here by these last methods. Despite the progress made by archaeometry during the last decades, most (but by chance, not all) of the methods used (even the nano-analyses methods) are destructive and expensive. Obtaining authorization for exporting and destructing archaeological material, even for scientific reason, can be a huge problem.

ARCHAEOMETRIC INVESTIGATIONS

Such methods are varied and are now used in combination as they each have their appropriate applications in ceramic studies, one filling the weaknesses of another. In many phases of the studies, they complement each other in such a way that the final conclusions are better. They are often performed at different physical scales. Their main domains of application are: the characterization of the material, its structure, and the provenance of the clay or the temper in a wide perspective especially for prehistoric periods where textual data are unavailable (local products, exchanges…). This includes the technical knowledge of the potters, from the collection of the clay to the firing processes. Despite their cost and constraints, these methods provide valuable information.

For one who wants to start an archaeometric investigation on pottery, the first steps are to get information about the local clays by a geological survey and, if possible, to take different samples of a local formation. This is because the composition pattern of the clay should vary in the same area due to many natural factors. Analysis of clays from production centers is a direct approach in the study of sources of fine pottery. Macroscopic evaluation of the pottery should also be carried out. Many details such as pastes, temper, and color of firing, slip or paint can be observed. Usually this is completed with the binocular observations of thin sections from sherds. During the past, binocular microscopy was used to identify the traditional way of preparing the pastes, and to recognize their different features. The observation allows a quick description and classification of the pottery pastes and it is easy to identify “foreign” sherds by visual inspection when their surface features or treatment do not yield information about their provenance. Knowledge of petrography will bring information about the impurities and minerals included in the pottery and will allow the estimation of these major impurities in the pastes, even the finest ones, providing proof of the clay sedimentation process (and the craftsman’s skill) and identifying different production centers. So, a preliminary typology can be proposed on the basis of petrographic observations.

Advances in technology have allowed petrography to be approached through cathodoluminescence analysis on thin sections. Cathodoluminescence is an evaluative method used when an electron beam (Bechtel and Schvoerer 1994: 256. Bechtel and Gourdon-Platel 2000: 36) impacts a material (sherd, glass, marble…) and luminescence is produced. Minerals absorb many colors which correspond to their mineralogical nature. For example, calcite returns red, quartz is often purple and feldspars appear blue or green. In archaeometry, cathodoluminescence is used to determine the internal structures of the samples studied, in order to get information on the composition, the distribution and quality of the material. In the case of pottery, information about the paste, the temper and its granulometry can, therefore, be gathered.

X-ray Diffraction is a crystallographic analysis used for identifying minerals present in the sherd (Mannoni 1984, 237-238) or other samples containing minerals. It can also be used to quantify them. This method runs on the atomic and molecular structure of a crystal: determining the size of the atoms, but also revealing the structure and function of many molecules. Since many materials can form crystals, X-ray crystallography plays a major role in the development of archaeometry as it allows the characterization of the materials with the same chemical composition but with different crystallization morphology. This is particularly useful for the study of ceramic temper, sometimes pastes (especially for inclusions of high-firing temperature because minerals transformations can be observed) or for identifying geological deposits.

The method is, however, destructive as the sample has to be transformed into powder. The crystal is then bombarded with a focused beam of X-Rays, which produces a diffraction pattern of regularly spaced spots. The images produced are then converted into a three-dimensional model using a mathematical model and matching the chemical properties of the sample.

Scanning Electron Microscope coupled with Energy Dispersive X-ray Spectrometry (SEM-EDX) is another surface analytical technique. It produces high resolution images of the surface of a sample by using scanning electron beam. From the archaeometric point of view (Le Blanc 1984), SEM-EDX gives the opportunity to determine the elementary composition of the sherds’ paste, minerals and also paintings. It also gives us detailed images of the mineral or organic material, making the elementary composition of organic temper such as chaff easy to identify.

X-ray fluorescence (XRF) is the emission of characteristic “secondary” X-rays from a material after having been bombarded with gamma rays. In archaeometry, the phenomenon is commonly used for elemental analysis

and the investigation of ceramics, especially, for their provenances (Schmitt 2003). This method is destructive because part of the sherd must be transformed into powder. Currently, specialists work on a non destructive perspective.

Last, Raman microspectrometry is a non-destructive method used for observing and characterizing both the molecular composition of a sample and its surface[3]. The best results for archaeology are the analyses of the painted decoration of pots.

ARCHAEOMETRIC INVESTIGATIONS ON LATE NEOLITHIC WARES FROM MESOPOTAMIA

The archaeometric investigations conducted by Béatrice Robert combine several methods. Samples from Tell es-Sawwan and Tell Turlu were already studied (Robert 2000, 99-124), covering the last half of the 7th and the all 6th millennia. Several typological groups were concerned. All of them were representative of a culture (Burnished Ware, Samarra, Halaf) and come from well stratified layers and are well dated.

With two samples from Turlu (BDX6535 and BDX6566), a complete characterization was obtained. The pottery has a black core and a brown surface which is linked with a first reductive and then oxidizing firing atmosphere. Manufacturing was not fully under control: the ware is porous and vegetal temper was abundant, probably mostly straw (Fig.1).

Observations with a binocular microscope and cathodoluminescence confirm the first impressions and show a siliceous paste with a natural mineral temper made of quartz and calcites. Few potassic feldspars were noticed too. These facts were confirmed by SEM-EDX analysis and a good estimation of the elementary composition which characterized the paste could be performed: silico-aluminous paste (around 73% SiO2, 8% Al2O3 and 8% Fe2O3). Low levels of potassium, calcium, titanium, magnesium, manganese and sodium were also found.

For the second sample, the temper is entirely anthropic. It was composed by large white minerals (more than 600 µm) and fragments (around 150 µm). Crystallographic and microscopic methods show that the temper here is made of quartz and calcite inclusions, mixed probably with some siliceous elements.

Returning to the first sample, crystallographic analysis with X-ray diffraction confirms the presence of quartz and calcite and helps determine the nature of the clay, which was an ilite-montmorillonite, whose minerals are not destroyed by the firing.

The two sherds from Turlu belong to the burnished wares family. Clay used in both cases seems the same as well as the surface-treatments. However, the manufactures are different, corresponding probably to different uses: in the first case, a cooking-pot used on fire and maybe linked with the use of liquids, while storage was probably used for the second pot.

Regarding the two Samarra samples from Sawwan (BDX6536 and BDX6568), both are beige in color and fired in an oxidizing atmosphere. Round homogeneous inclusions (around 400 µm) seem to be more concentrated at the peripheral margins than in the center (Fig. 2).

The temper is mineral, made of quartz with few feldspars, calcite, iron oxides inclusions and probably mudstone. Crystallographic analysis allows us to add the presence of gypsum and diopsides to the list. These elements are linked with a high firing temperature, at least 900 °C. Scanning electron microscope observations show a calcareous paste (14%) with a high percentage of silicium (around 51%) and aluminum (around 14%). Iron, magnesium, potassium follow, but sodium, titanium and manganese are present in a low percentage. Temper is also made of micas which were invisible by eyes. Black pigments in the paint were identified as iron (magnetite) applied in a thick layer (100 à 200 µm).

In conclusion to these Samarran ware analyses, pastes are always light beige, calcareous, non siliceous (contrary to naked eye immediate observation), with an abundant mineral temper (quartz calcites, feldspars, iron oxides, few micas and mudstones). These wares were fired at high temperatures (900°C) bringing, sometimes, a greenish color to the paste. Black thick layers of paint were made with iron pigments. Those two samples show similar technical features, quite different from the previous Halaf ones. They recall the technical characteristics of the Ubaid ware and, probably, the manufacturing processes are similar. However, in order to keep in mind that we are in front of different cultures (and people), the composition of the pastes are probably different. Ubaid pastes are siliceous and black paints are made with manganese pigments as Liliane Courtois previously shown (Courtois unpublished; Courtois/Velde 1987, 160-162, 1996, 345, 1991, 286 and 292).

In summary:

By using the different archaeometric methods present-

3. http://www.sciencefrance.com/techniques/RAMAN/RAMAN.html, consulted 15/04/2016.

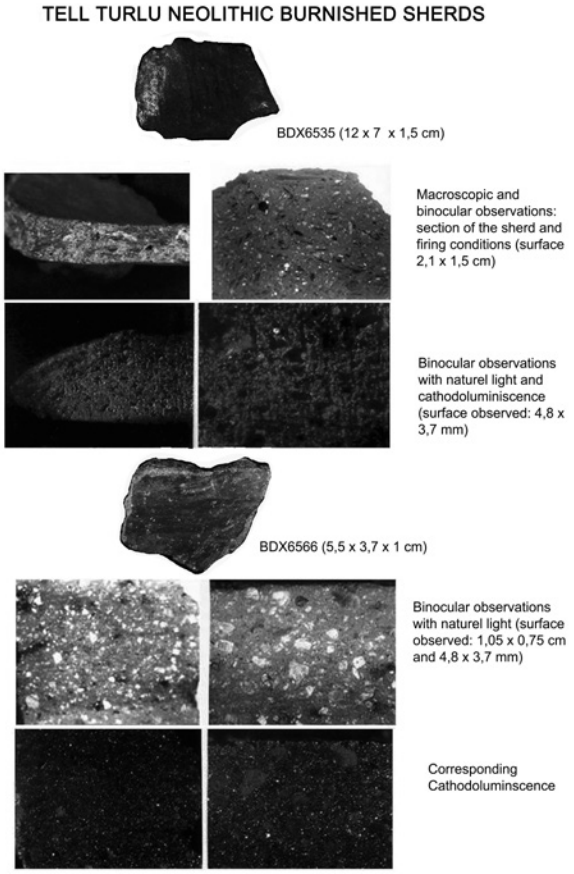

Figure 1. Manufacturing process: macroscopic, microscopic and luminescence observations. Tell Turlu Burnished sherds, Turkey. (Robert, 2010 © Robert, B. CRP2A Bordeaux).

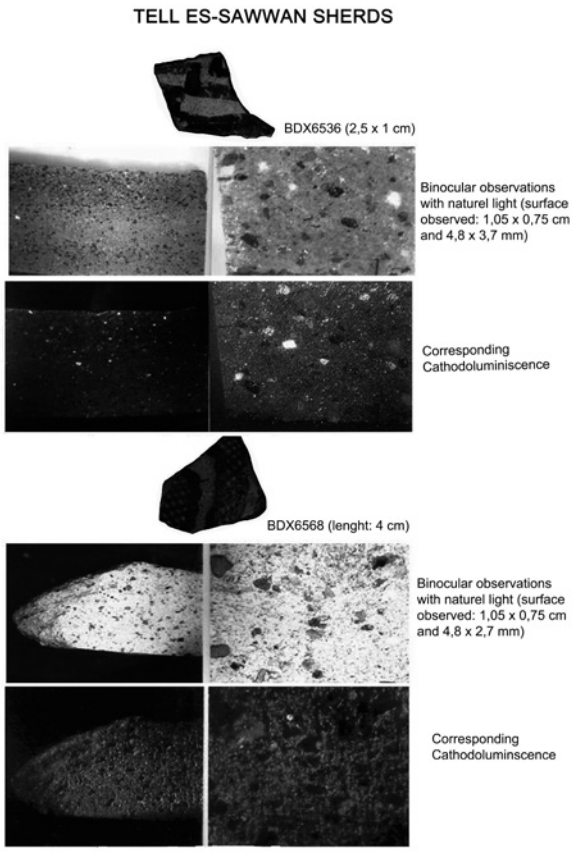

Figure 2. Manufacturing process: macroscopic, microscopic and luminescence observations. Samarran sherds, Tell es-Sawwan, Iraq. (Robert, 2010 © Robert, B. CRP2A Bordeaux).

ed above, results concerning ceramic technology have been highlighted. The entire manufacturing process has been brought to light from the collection of the clay to the firing:

- The collection of the clay was approached by X-ray Fluorescence and SEM-EDX.

- The manufacture was studied through macroscopic observations with a binocular microscope, cathodoluminescence and X-ray diffraction.

- The drying process and the pigments identification were obtained through observations with SEM-EDX and Raman microspectrometry.

- The firing, then, was evaluated by X-ray diffraction as some minerals get a new physical structure at certain temperatures. (Fig. 3).

Other methods such as, for instance, differential thermal analysis (or DTA) could have been used. This is a thermo-analytic technique where the material under study and an inert reference are made undergo identical thermal cycles, while recording any temperature difference between sample and reference. It could be combined with thermo-gravimetric analysis (TGA), where changes in physical and chemical properties of materials are measured as a function of increasing temperature, or as a function of time. They can provide data about decomposition, and solid-gas reactions (e.g., oxidation or reduction) which are particularly suitable for ceramic studies. They can shed new light into characteristic decomposition patterns, evaluation of firing temperatures, and the determination of the organic content in a sample. The main constraint remains the cost of the technical material involved.

In this context, archaeometric investigations are considered a fundamental tool applied to uncover aspects regarding the technical parameters necessary for pottery production and to understand various aspects of the ancient pottery technology.

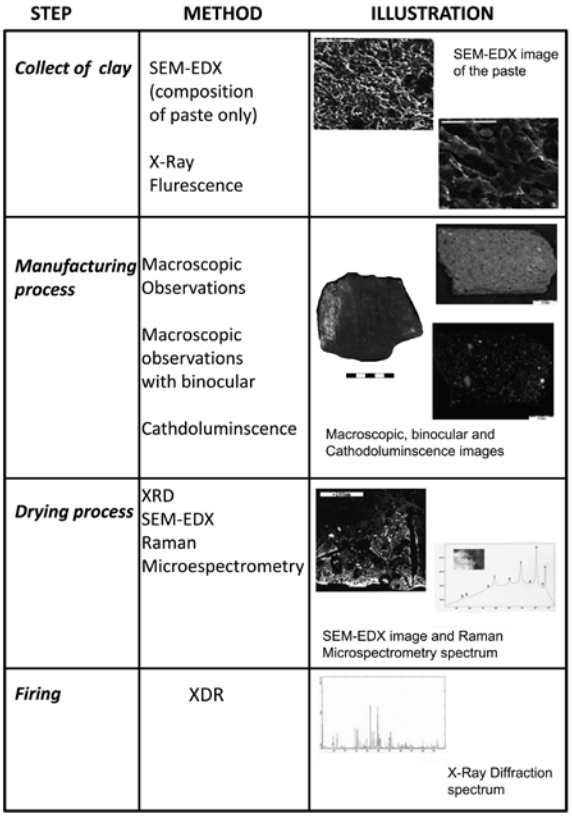

Figure 3. Archaeometric methods used to study the pottery's "chaîne opératoire". (Robert, 2010, unpublished CRP2A Laboratory Bordeaux).

SCANNER TECHNOLOGY: NEW INVESTIGATIONS AT THE MUSÉE DU QUAI BRANLY

CBCT SCANS

In order to study ceramic fragments (Late Neolithic Near Eastern Halaf polychrome pottery) we first used a Cone Beam CT scanner. Cone beam computed tomography (or CBCT) has become increasingly important in treatment planning and diagnosis in implant dentistry and interventional radiology, among others. This medical imaging technique uses a divergent source of X-rays, which form a cone-shaped beam.

In contrast, the conventional scanner uses a narrow fan beam which rotates several times around the object acquiring thin axial sections at each rotation. The CBCT scanner however, acquires the whole volume within a single rotation with its conical beam. This technology offers more freedom regarding the size of the acquisition field, which allows for a better resolution than conventional scanners, but is limited to smaller objects. In fact, CBCT scanners are not suitable for objects larger than 18x16x16 cm (Fig. 4).

Acquisitions were taken after a few minutes at a CBCT scanner equipped hospital; the data was then transferred on a USB key. The data provided by the scans was later processed with the Vizua software in order to obtain 2D and 3D images. Some appear very similar to those obtained by thin section observations and provide some insight as to the repartition, the granulometry (shape, size) of the inclusions, and the nature of the temper (mineral or vegetal).

In B&W images, it is hard to identify the minerals and to distinguish quartz and calcites as a stereo microscope does. However, it is possible to improve the processing by using colors and density. For instance, physicians use "Hounsfield units" (HU), named after the inventor of the CT. HU represent the relative density of the scanned substance through measuring the attenuation (brightness) of each pixel. It ranges from -1000 (air) to +1000 (bone). The medical range can be used to improve the approach to the study of archaeological artifacts. Densities of different ceramics analyzed by Cone-beam computed tomography, using human studies for calcium, air water, and corporal fat as a reference provide a good starting point for using CBCT in archaeology (Photo). 3D images of sherds, sections and surfaces, are quite good and offer many possibilities for studying the shape (fits or not in the typology), the paint, the way it was applied, the many layers, the errors made by the potter etc. These images could easily be compared with stereo microscope observations, which could be especially interesting in the case of the Halaf polychrome pottery. Additional processing allows comparing the composition of a few sherds on the same 3D image, in order to make their own "identity card" visible immediately, as regards to their cultural background and the technical knowledge.

This new approach can still be improved but the first results are very encouraging. The aspects speaking in favor of the method are: the low cost of the analyses, the fact that they are non-destructive and routinely available. These images are probably also a very good starting point for studying the way that various liquid substances penetrate the ceramic walls, especially milk, grease or beer. It can thus provide interesting information on the use made of the pots. In near future, we hope to improve and develop the method. Every scholar interested in this new field of research is welcome to contact us.

One way to improve the results obtained by X-ray imaging would be to enhance resolution. However, the power used for devices dedicated to medical purposes has to be kept relatively low in order to limit the patient's level of irradiation. To overcome this hindrance, we turned to Industrial Computed Tomography Scanners that provides high resolution data but, however, implies more constringent operating conditions.

Figure 4. CT scanner (X-ray computed tomography). Copyright: C. Moulhérat.

INDUSTRIAL COMPUTED TOMOGRAPHY PROCESS

Basically any type of industrial CT system uses three principal components: an X-ray Tube, an X-ray Detector, and a rotational stage. Everything is enclosed in a radiation shielding Steel/Lead/Steel cabinet. This allows for the use of the system in a public environment without any additional safety concerns. Adjacent to the enclosure is a computer workstation, consisting of a 2D X-ray console for the set up and acquisition steps, and a 3D CT supercomputer workstation for volume reconstruction and visualization.

Micro-computed tomography (MicroCT) is primarily the same as a standard CT except it uses a microfocus tube instead of a traditional tube. A MicroCT scan yields resolutions in microns due to the fact that the focal spot of a microfocus tube is only a few microns in size. For comparison, MicroCT resolution is about 100 times better than the best CT scan in the medical field. High quality industrial X-ray detectors used for CT often use a new generation Amorphous Silicon Flat Panel Area Detector, offering very high sensitivity, resolution, and bit depth. The resulting 2D X-ray images are very clear and the contrast is unparalleled (Fig. 5).

Acquisition from the Samara Sample: CT is a non-destructive evaluation method that doesn't heat the specimen. In operation, it generates x-ray photons that either travel through the object or are attenuated by it. The photons which penetrate the object enter the imaging detector, carrying detailed information (see image below) with them. The degree of photon attenuation depends on the amount of energy applied and the thickness or density of the material that the photon passes through. A modern high-end CT scan consists of taking several 2D X-ray images around the object, preferably covering 360 degrees (complete rotation).

On the Samara ceramic sample, 1200 images have been acquired (1 image every 0.3 degree). Each image is 8 Megapixels and it is also averaged and filtered to reduce noise. The 2D digital images taken during this step are saved directly into a single folder which will be used in the next step of the CT process.

RECONSTRUCTION AND VISUALIZATION

Once the acquisition process of the CT scan is completed, CT calibration and CT reconstruction algorithms are used to reconstruct the 3D CT volume. These 3D images are made of Voxels (three dimensional Pixels), and, with the use of visualization software, the 3D volume can be manipulated in real time. Therefore, it is possible to slice through anywhere inside the object, inspecting and looking for key features, taking accurate measurements, reconstructing a surface model, etc. Industrial CT technology is improving very quickly. While a few single CT slices could take hours to generate years ago, it is now possible to reconstruct complete 3D models with billions of Voxels in just a few seconds or minutes. In that regard, industrial CT has become a very competitive technology for 3D scanning (Fig. 6 a and b).

Figure 5. View a sherd in Industrial micro-computed tomography. Copyright: C. Moulhérat.

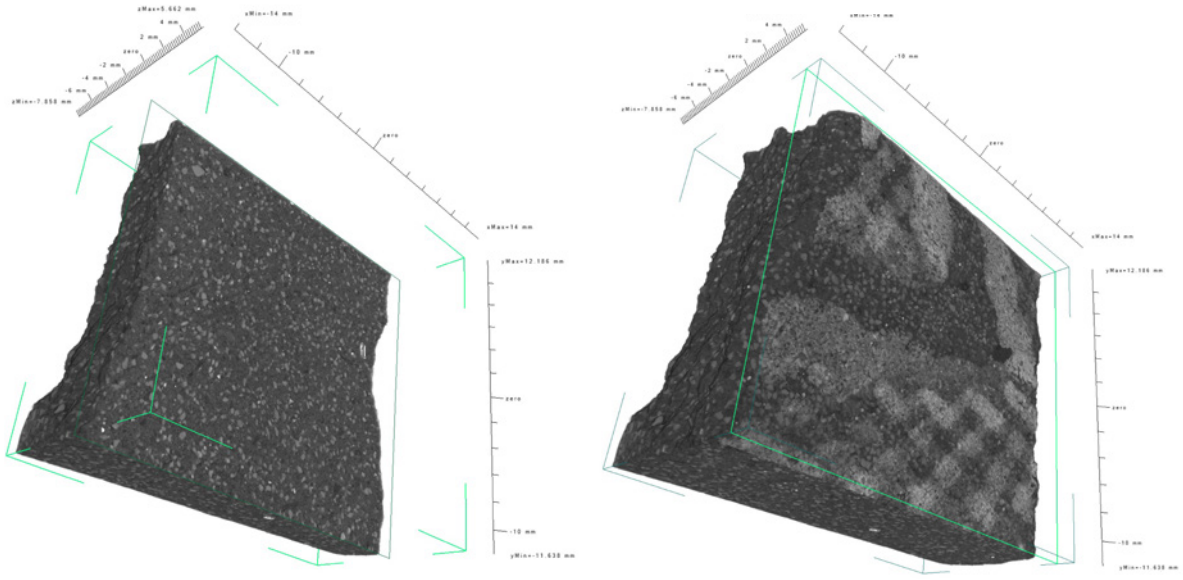

Figure 6 a and b Views of the 3D CT volume. The NSI 3D CT viewer allows that volume to be sliced in every direction and analyze both internal and external features.

The principal benefit of using 3D CT for scanning or digitization is that we obtain a complete model of an object, with both external and internal surfaces, without destroying it. Moreover, CT works with any surface, shape, color or material (up to a certain density and/or thickness penetrable with X-rays). Also, due to the penetration of X-rays, CT scans are unaffected by certain object characteristics such as dark, reflective or transparent surfaces and/or shaded zones on the item which can difficult reading with other 3D scanning methods. Generally, a modern start-to-finish CT scan can be as fast as a few seconds or take longer than an hour, depending on resolution requirements and the size and/or density of the object. Overall, the resolution is excellent

both internally and externally. On the Samara Ceramic Sample for instance, the resolution achieved was 16µm (Fig. 6 a and b).

Within the frame of this conference addressed to ceramic specialists, we presented the exploratory investigation conducted on sherds from Late Neolithic sites of the ancient Near East, using two CT methods nowadays available for such type of studies. In summary, 3D CT is now accessible to Museums as a viable tool for scanning objects. User-friendly interfaces, increased scan speeds, resolution and image quality have all contributed to the rapid development of this technology. CT is quite unique for accessing especially accurate imagery data without destroying the item. There are no shaded zones, it works with all kinds of shapes and surfaces, there is no post-processing work needed – or very little, depending on the application - and the resolution is excellent. Most of all, the greatest benefit is the ability to nondestructively obtain the internal structure of the object, which only CT technology is able to provide.

BIBLIOGRAPHY

BECHTEL, Fr., GOURDON-PLATEL, N. 2000, Cathodoluminescence et archéologie, *Dossiers d'Archéologie* n°253, 36-39.

BECHTEL, Fr., SCHVOERER, M. 1994, La cathodoluminescence. Application à l'étude de la texture de pâtes céramiques, in Hackens T. and Schvoerer M., *Datation-caractérisation de céramiques anciennes*: *actes du colloque de Bordeaux-Talence 6-18 avril 1981*, PACT 10, 247-260.

BRAIDWOOD, R., BRAIDWOOD, L., TULANE, E. and PERKINS A. 1952, Matarrah, a Southern Variant of the Hassuna Assemblage Excavated in 1948, *JNES* 11, 1-75.

BRENIQUET, C. 1991a, Un site halafien en Turquie méridionale : Tell Turlu. Rapport sur la campagne de fouilles de 1962, *Akkadica* 71, 1-35.

BRENIQUET, C. 1991b, Tell es-Sawwan. Réalités et problèmes, *Iraq* 53, 1991, 75-90.

BRENIQUET, C. 1992, Rapport sur deux campagnes de fouilles à Tell es-Sawwan, 1988-1989, *Mesopotamia* XXVII, 5-30.

COURTOIS, L. unpublished : *Echantillons céramiques de Tell es-Sawwan et de Khirbet Derak : rapport préliminaire*.

COURTOIS, L., VELDE, B. 1987, Observations techniques sur quelques poteries de Tell el'Oueili (Phases 'Obeid 0 à Obeid 3), in Huot J.-L. (éd.), *Préhistoire de la Mésopotamie. La Mésopotamie préhistorique et l'exploration récente du Djebel Hamrin*: *actes du colloque International du CNRS, 17-19 décembre 1984*, Paris, Editions du CNRS, 153-162.

COURTOIS, L., VELDE, B. 1991, «Recherches comparées sur les techniques céramiques de l'Obeid 0 à 2», in Huot J.L. (dir.), *Oueili. Travaux de 1985*, ERC, Paris, 285-312.

COURTOIS, L., VELDE, B. 1996, Analyses chimiques des pâtes de quelques céramiques Obeid 4 de Tell el Oueili, in Huot J-.L. (dir.), *Oueili. Travaux de 1987 et 1989*, ERC, Paris, 311-334.

DEMOULE, J.-P. 2006, Archéologie, style et société, in Martinelli B. (éd.), *L'interrogation du style. Anthropologie, technique et esthétique*, Aix-en-Provence, PUP, 49-66.

HUOT, J.-L. 1994, *Les premiers villageois de Mésopotamie. Du village à la ville*, Paris, Armand Colin.

IPPOLITONI, F. 1970-71, The Pottery of Tell es-Sawwan. First Season, *Mesopotamia* V-VI, 105-179.

LE BLANC, M. 1984, Microscopie Electronique à Balayage, in Hackens T. and Schvoerer M., (eds.) *Datation-caractérisation de céramiques anciennes*: *actes du colloque de Bordeaux-Talence 6-18 avril 1981*, PACT 10, 261-276.

LLOYD, S., SAFAR, F. 1944, Tell Hassuna: Excavations by the Iraq Government Directorate of Antiquities in 1943 and 1944. *JNES* 4, 255-289.

MANNONI, T. 1984, Analyses cristallographiques, in Hackens T. and Schvoerer M., (eds.) *Datation-caractérisation de céramiques anciennes*: *actes du colloque de Bordeaux-Talence 6-18 avril 1981*, PACT 10, 237-246.

NIEUWENHUYSE, O., 2008 *Plain and Painted Pottery: The Rise of Neolithic Ceramic Styles on the Syrian and Northern Mesopotamian Plains*, Leiden, Museum of Antiquities (*PALMA* 3).

NIEUWENHUYSE, O., BERNBECK, R., AKKERMANS, P.M.M.G., ROGASCH, J. (eds.) 2013, *Interpreting The Late Neolithic of Upper Mesopotamia,* Brepols (*PALMA*, 9).

SAFAR, F., MUSTAFA, M.A., LLOYD, S. 1981, *Eridu*, Baghdad, State Organization of Antiquities and Heritage.

ROBERT, B. 2000, *Les cultures à céramiques néolithiques et chalcolithiques du Proche-Orient : essai de caractérisation de quelques tessons de céramiques lustrées, Samarra, Halaf*, TER de Recherche Université Michel de Montaigne – Bordeaux 3, 2 vol., 152 p./54 pl. unpublished

ROBERT, B. 2010, *Développement et disparition de la production céramique halafienne : implications techniques et sociales à partir d'études de cas*. Thèse de doctorat: http://theses.univ-lyon2.fr/documents/lyon2/2010/robert_b#p=0&a=top, online on 2010.

SCHMIDTT, A. 2003, Les études de la céramique en laboratoire, in Ferdière A. (dir.), *La céramique, La poterie du Néolithique aux Temps modernes*, Paris, Errance, 49-82.

YOUKANA, D. 1997, *Tell es-Sawwan. The Architecture of the Sixth Millennium B.C*. London, Nabu Publications (*Edubba* 5).

Anna Gómez-Bach, Jörg Becker and Miquel Molist (ed),
II Workshop on Late Neolithic Ceramics in Ancient Mesopotamia: pottery in context,
Monografies del MAC 1, Barcelona 2018,
ISBN: 978-84-393-9750-2 (pàg. 69-84)

TIME AND TECHNOLOGICAL TRANSFER IN PROTO-HALAF AND HALAF SEQUENCES AT CHAGAR BAZAR (KHABUR VALLEY, SYRIA)

Anna Gómez-Bach*, Walter Cruells*

El objetivo de este artículo es presentar los resultados de estudio del Proto-Halaf y el Halaf Tardío en Chagar Bazar centrándose en la transferencia tecnológica presente en las sociedades neolíticas. Se evidencia porqué el proceso de fabricación y las técnicas de modelado han permitido a los arqueólogos construir esquemas tipológicos y cronológicos detallados con énfasis en la uniformidad morfológica y volumétrica.

Proto-Halaf, Halaf tardío, Valle del Khabur, Tecnología cerámica.

This paper presents the main results obtained in the fieldwork related to Proto-Halaf to Late Halaf periods at Chagar Bazar by focusing on technological transfer in Neolithic societies. We discuss why manufacturing processes and information on shaping practices has been used by archaeologists to construct detailed typological and chronological schemes with an emphasis on morphological and volumetric uniformity.

Proto-Halaf, Late Halaf, Khabur valley, pottery technology.

INTRODUCTION

More than 10 years of excavations at Chagar Bazar (Khabur valley, Syria) have recovered a long stratigraphic sequence related to a Neolithic site with a complex settlement pattern and archaeological diversity. In this context, material culture, and especially pottery, becomes one of the best physical materials allowing an approach to the tools, knowledge and crafting techniques developed and used by the first farming communities during the sixth millennium cal BC.

In that sense, the aim of this paper is to summarize the current data from the Proto-Halaf to Late Halaf periods at Chagar Bazar obtained through the materials recovered at the site, predominantly by studying the pottery manufacturing process and shaping practices in context. Traditionally this data has allowed archaeologists to construct detailed typo-chronological schemes with an emphasis on morphological and dimensional uniformity. But these classifications can easily correspond to various technical traditions; different shapes may correspond to the same typology and similar shapes can be achieved with different techniques.

In our proposal, Halaf culture periodization needs to be redefined site by site, in a micro analytical way. As other chronologies in the Near East, the Halaf period is indeed a span of time which still needs to be more accurately defined on the basis of data obtained during the last 30 years. The selected ^{14}C data from several sites (Campbell 2007; Cruells 2006d; Cruells *et al.* 2013) showing the span of the Halaf period suggest that the total length of this period is around 700/800 years. More specifically, the Proto-Halaf is a very short-term phase of around 150 years (Cruells/Nieuwenhuyse 2004), in which two different implantation models have been proposed (Cruells/Molist 2006).

Traditionally, in that sense, two main phases have been

* Grup de Recerca en Arqueologia del Mediterrani i el Proper Orient (GRAMPO), Department of Prehistory, Autonomous University of Barcelona, Edifici Mòdul de Recerca A, Pl. del Coneixement, Campus de la UAB 08193 Bellaterra, Barcelona anna.gomez@uab.cat, cruellsw@gmail.com

emphasized: a formative phase and a development phase. Notice that the formative occupational moments and latest ones are affected by difficulties in their attribution mainly from a regional point of view. Such aspects as focus area, spread *processus* and regional development are still unknown, for example in the Khabur valley, upper Mesopotamia.

On one hand, the difficulties include the very nature of its emergence, which was of a polygenic nature with two well differentiated prototype sites, and a final stage, where exogenous influences surely affected its original character so that it started to adopt different regional differences that are currently recognisable (such as Chagar Bazar, Tell Halula and Nord Iraq eastern assemblages), one of them the Ubaid interaction.

Both sites, in the Euphrates and the Khabur valleys, were occupied at the end of the seventh millennium BC, during the end of Pre-Halaf or Hassuna III. And based on a gradual evolution of these phases, the Halaf appeared (Campbell 1992, 2007; Cruells/Nieuwenhuyse 2004).

On the other hand, in the current knowledge of the "Proto-Halaf" phase, there are two completely different types of manifestations with regard to settlement pattern. At sites like Chagar Bazar or Tell Baghouz, the Proto-Halaf represents an *exnovo* phase of occupation possibly related to an advanced stage of the "transition", comparable to Sabi Abyad's level 4, among others. In contrast, Sabi Abyad, Tell Boueid II or Tell Halula form part of a second group of sites with an internal evolutionary sequence that comes from earlier pre-Halaf and Hassuna phases equivalent to a primitive stage of "transition" relatable to level 6 - 5 at Sabi Abyad (Cruells 2017).

The Proto-Halaf phase in Chagar Bazar is therefore the foundational phase at the site and is characterized by different occupational phases related to an open area, fire places, burials and houses (Cruells *et al.* 2013). Future excavations in extension will surely recover the necessary elements to establish and clarify this earlier pottery phase. These data must contribute more information about its nature as a technological group linked to a clear cultural identity configuring a hinterland that occupies northern Mesopotamia (D'Anna/Binder 1998, Hole/Tonoike 2016).

In the second type of sites the Proto-Halaf represents an evolution of previous stages (Late Neolithic) at Halula or Sabi Abyad and it appears around 150 years earlier (Fig.1).

The earliest date indicates a time between 6200-5800 cal BC while the latest date is around 5500-5300 cal BC. Settlement occupation would therefore be over 700 years.

TECHNOLOGICAL SKILLS

In Near East prehistory, some general transfers have been proposed to analyse the evolution of previous historical stages. The most relevant items are related to pyrotechnology, pottery, technology and architecture but all of them were linked and influenced each other. This short introduction will focus on architectural technology skills (building and domestic facilities), pigment knowledge (acquisition, transformation, application techniques) and clay objects and related processes (pottery, figurines, stamps, tool sherds).

The first of them, architectural technology skills, is related to knowledge of materials (stone, mud-brick, etc.) and the technology of fire. The presence of plaster and limestone has been related to pyrotechnology. Structures like pit ovens or key-hole shape ovens would be able to control temperature. Experience with earthen architecture would be also indispensable for pottery kilns and the circular building tradition, attested with the well-known *tholoi.*

Architectural Technology Skills (building and domestic facilities from the Late PPNB period)

Acquisition of chalk or plaster and its application in architectonic aspects (building elements, floors and walls, benches, niches, etc.) is well documented since the PPNB in such sites as Tell Halula (Molist ed. 1996, 2013). Additionally, domestic facilities like pits, ovens and open-fire places are well attested in all sites. Finally, as is well-known, firing is a complex process which started in Palaeolithic times and temperature control seems to be a gradual process involving a large number of variables (Cruells 2017; Dandrau 2000). Variation in type and shape demonstrate the archaeological difficulties in interpreting these structures in terms of function and complementary activities. The particular combustion structures that are common in the PPNB continue throughout the 7th millennium and reach the Proto-Halaf. The pit-ovens filled with calibrated stones found at Chagar Bazar in the Proto-Halaf stage represent a continuation of these traditions.

The plastered horse-shoe oven shape recovered at Tell Halula belongs to the Proto-Halaf period while circular buildings appear in a *long-durée*. The architectural transitions are slow and progressive.

Pigment Knowledge (acquisition, transformation, application techniques)

In the Middle East, colour application is as old as the 9th millennium cal BC. Pigment, as raw material, can be obtained from several mineral or vegetal sources. From the very beginning, polychrome effects were applied to human skulls but also to floors and walls of buildings,

with clear and well-defined colours like white, red and black

Pigments and colours in the Middle East usually appear related to decoration in the form of geometric or figurative motifs in buildings, and soon afterwards in pottery (Dabbagh 1966; Cruells 2005, 2009; Nieuwenhuyse 2007, Gómez-Bach *et al.* 2013).

Clay Objects And Related Processes (pottery, figurines, personal objects, stamps, tool sherds).

Clay models are well attested since the early Neolithic. PPNB animal figurines are an example. These objects increased in number and presence during the Pottery Neolithic and some of them shared more than one raw material, such as stone or clay (sling balls, seals, rings, pendants, etc.).

This paper will unify and classify these pottery techniques. It aims to demonstrate, as far as possible, the importance of the spatial distribution and the specific location of the potsherds from chronological and stratigraphic points of view.

CHANGING FABRICS IN THE 6TH MILLENNIUM CAL B.C.

The 6th millennium cal BC ceramics were characterized by a fine, largely mineral-tempered fabric, excellent firing properties, thin-walled, complex vessel shapes, and extensive painted decoration in a lustrous red or black. Fabrics changed in the 6th millennium cal BC and the main difference in technology was the change in ovens, as mentioned above. Oxidation preferences and the use of separated chambers (combustion and firing) would offer different aptitudes in thermal and mechanical responses. The main painted Late Pre-Halaf coarse ware traditions displayed red and oxidising colours. A few exceptions exist, related to such other raw materials as bitumen.

The immediate precedents of the halafian painted traditions are the Pre-Halaf fine wares. As an example we can see Phase I at Akarçay Tepe (last third of 7th millennium) sharing slips and painted motifs.

CHAGAR BAZAR AS A CASE STUDY

Chagar Bazar was already settled during the pottery Neolithic. Excavations revealed pottery belonging to the Halaf culture, from Proto-Halaf to the Late Halaf (Cruells 2005, 2006e; Cruells *et al*. 2013). By the Early Bronze Age, in the third millennium BC, Chagar Bazar had turned into a small town 12 hectares / 30 acres in size. The site appears to have been abandoned by the end of the third millennium BC.

Chagar Bazar is located in Al-Hasakah Governorate, approximately 35 kilometres (22 miles) north of Al-Hasakah, on the Wadi Dara, a tributary to the Khabur river (Cornet 2007). The site was excavated by M. Mallowan, the British archaeologist, from 1936 and 1937. Abundant material such as pottery and a large number of cuneiform clay tablets were recovered. Work was resumed at the site in 1999 by a joint mission from the Syrian Directorate of Antiquities, the British School of Archaeology in Iraq and the University of Liège (Belgium) until 2002 and by DGAM, University of Liège and UAB collaboration until 2011(McMahon *et al.* 2001, Tunca *et al*. 2000a and b, Tunca/Bagdho 2006).

The stratigraphical sequence at Chagar Bazar, recovered in Sector F, displays some remarkable aspects. Some Neolithic layers are badly disturbed because of the large Bronze Age building foundations and owing to the very large soundings opened by Mallowan (most of them not reported) (Mallowan 1936, 1937, 1946, 1947, Curtis 1982).

The Neolithic buildings basically have no stone foundation, only with mud brick and *pisé* walls, and most of the round buildings are partly sunk. There is an alternate succession in the position of dwellings and the open areas disturbed the previous installations. Moreover, opportunistic architecture and a rapid succession of architectural phases are predominant. In the lower part, 10 occupational/architectural phases have been defined in around 2 metres of stratigraphic sequence and in the upper part, 11 architectural phases. In this sequence, Halaf intermediate B2 was not dug in extension at Chagar Bazar and only Chantier E (1999/2000) provided a few materials related to this moment.

CHRONOLOGICAL APPROACH TO THE HALAFIAN SEQUENCE

The understanding of the occupation of Chagar Bazar is related to the establishment of a valid and calibrated chronological sequence that allows the stratigraphic sequence previously described to be complemented and validated. This has been achieved through different absolute dates, which have been compared, as far as possible, with existing old dates and a few sequences made in the 1990s and the beginning of the 21st century.

Different series of radiocarbon dates are available for Chagar Bazar. A first radiocarbon date published in the 1970s (Lawn 1973) is documented, and corresponds to the sediment in a layer of ash in Levels 11-12 of Mallowan's Prehistoric Pit. This old sample, numbered P-1487, resulted in a date of 6665±77 BP or 5590±60 cal BC at 1σ (Lawn 1973, Chataigner 1995, Böhner/Schyle 2006).

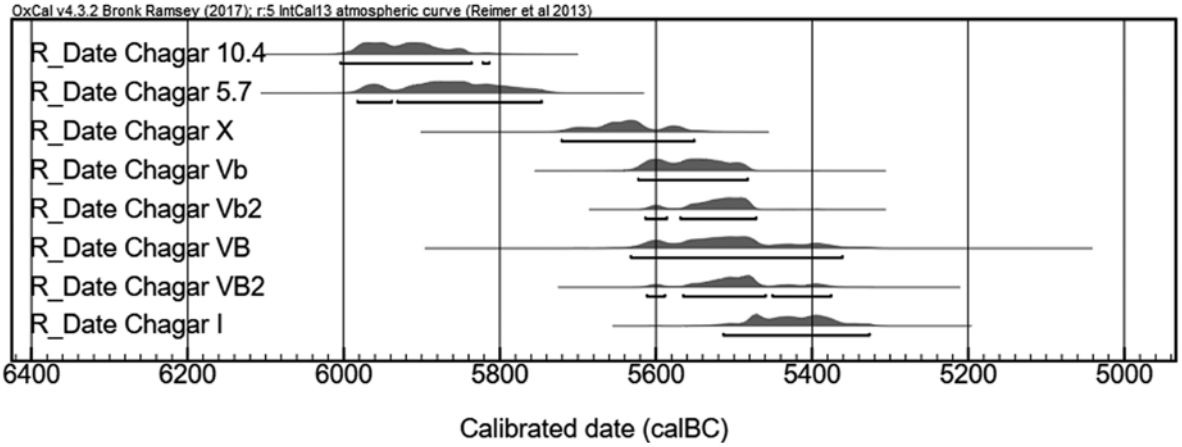

Figure 1. Radiometric data from Chagar Bazar.

The 2000-2010 fieldwork in the Neolithic sector was able to expand and establish a new chronological sequence (Tunca/Baghdo 2006; Cruells 2006d; Cruells *et al*. 2013). Two radiocarbon dates have been published for the earliest occupations at the site. The first of these samples comes from Sounding E, stratum 10.4.1 CB 2723, numbered Beta 174042 and with a date of 7030±40 BP, calibrated to 5990 to 5810 cal BC at 2σ. The second dated sample comes from Survey F, stratum L.5, 5-7, CB 4147, numbered Beta 174043 and with a result of 6980±50 BP, calibrated to 5980 to 5740 cal BC at 2σ. These dates suggest a time for the Proto-Halaf at Chagar in an interval of 6000-5940 cal BC. (Cruells 2006d).

The recent archaeological fieldwork carried out in Chantier F at Chagar Bazar has increased the number of radiocarbon dates (Cruells *et al.* 2013; Gómez-Bach 2011). This new series of unpublished dates includes a set of dates covering from Phase I to Phase X in the Neolithic sector (Late Halaf) and two dates for Pre-Halaf levels (Fig. 1).

The results have identified continuity in important successive occupations, where the shortest sequence, stratigraphically formed by Phase V, with 3 occupation subplots, represents a time of about 100 years of anthropic activity. The rest of the intervals reflect a very compact chronological sequence, making it difficult to discriminate between occupation and abandonment patterns. Between 5600 and 5460 cal BC, the layers offer a context of approximately 150 years of continuous and consolidated occupation where an important set of materials, mainly ceramics, was recovered. It should be noted that this post-burning date of 5600 cal BC is artificial, since, as has been mentioned, the stratigraphic sequence continues whereas the analysis performed has stopped in Phase X.

At the same time, it seems that the time of abandonment of the Neolithic occupation can be defined. As observed in the first tholos recovered (L.65), a period from 5327 to 5514 BC cal at 2σ is defined for the sedimentation of this building. By including the old date obtained by Lawn in this sequence (Lawn 1973; Chataigner 1995; Böhner/Schyle 2002-2006), we can approach the Level 11-12 occupation phase in Mallowan's prehistoric pit with the new stratigraphic succession at Chagar Bazar. This comparison allows Mallowan's Levels 11-12 to be situated next to Phase X in the current stratigraphy of the deposit.

CHAGAR BAZAR: PARTICULARITIES OF PROTO-HALAF AND LATE HALAF POTTERY PRODUCTION

In the Proto-Halaf phase, the ceramic series from Chagar Bazar would remain virtually the same as in the previous phase at other sites (Cruells/Nieuwenhuyse 2004; Cruells 2009). Nevertheless, new series would now appear, like as orange ware (Fig. 2 and Fig. 3.9), burnished red slip or the painted fine series (Fig. 2 and Fig. 6.11). Proto-Halaf coarse ware ceramics evolved from previous 7th millennium traditions, where geometric motifs and figurative ones, such as dancing ladies and derivates are present (Fig. 3, 1-8). The second moment within this first phase corresponds to the primitive Halaf.

The latest archaeological levels at Chagar Bazar display great variety in architectural layout patterns. In turn, they have yielded great variety in shapes and decorations in the ceramic assemblages, and complete sets with the same decoration are well documented. The exterior surface of most vessels was completely painted in a dazzling variety of geometric designs, such as bands, crosshatching, zigzags, triangles and checkerboards.

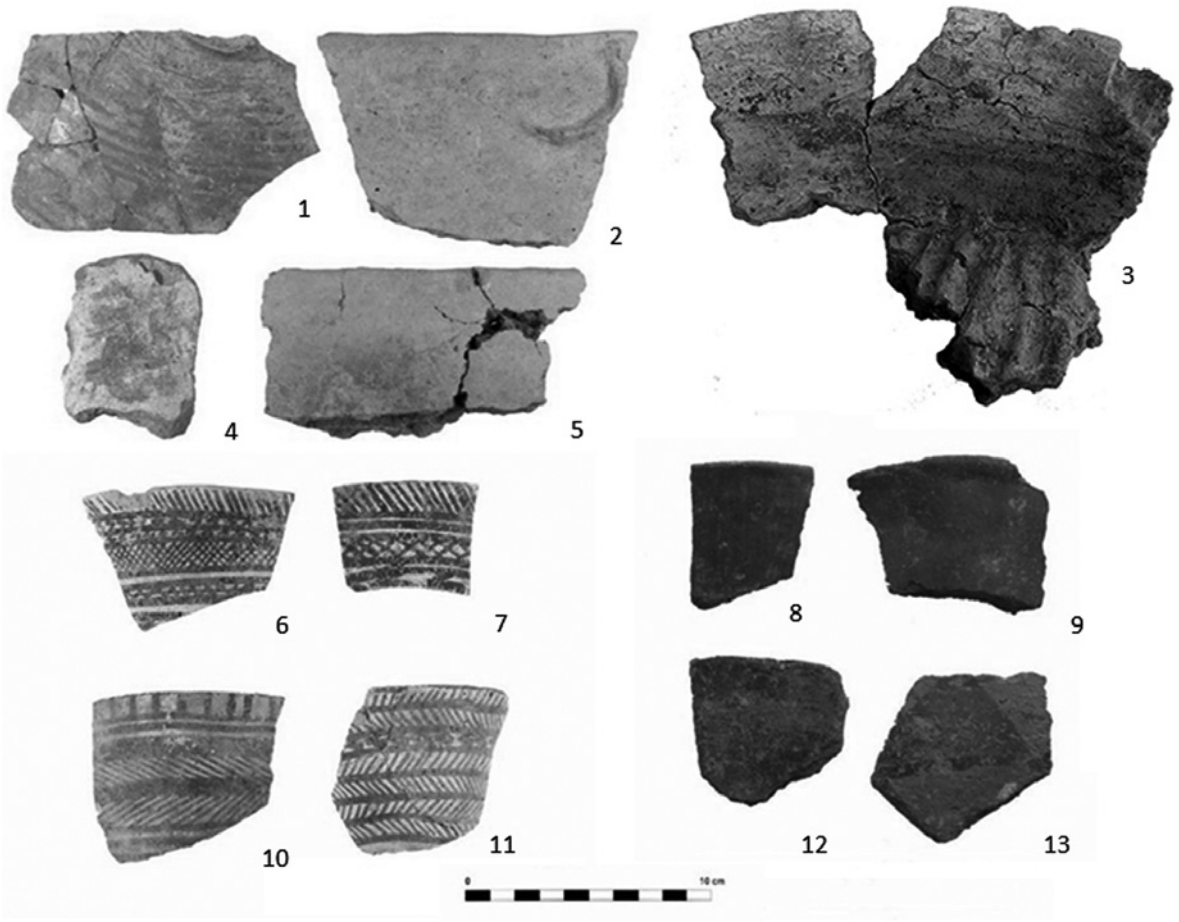

Figure 2. Proto-Halaf layers, L.10.4, 7030±40 BP. (6005-5837 cal BC).

There are also many examples of naturalistic decoration incorporating plants, birds, quadruped animals and the renowned *bucranium* (a bull's head with horns).

The vast majority of fragments collected during excavations belong to the category of fine ceramics. One of the advantages this group presents when classifying it is that, despite a great diversity of shapes and types, almost all the fragments possess a characteristic paste, very purified and with limestone, quartz and mica inclusions that can often be identified at a glance. Therefore, the initial classification has focused on differentiation in the manufacturing and shape and the final treatment (finishing and firing) (Gómez-Bach 2008, 2011; Gómez *et al.* 2015). The diversity of techniques in the manufacture and finishing processes indicate a change starting from a gradual complexity. Warping, coiling, basketry and moulds, the use of RKE (Rotational Kinetic Energy) and mixed type techniques have been identified (the most frequent are moulds and coiling).

A proposal of identification between the morphological and metric variables and the technological variables has been made from the metric data. If the dimensional variable is omitted, different manufacturing processes are documented, from early to late moments, and can be summarised in:

Process 1: Manufacture of small containers or containers of medium size. These are closed bowls, with full or partial oxidation firing and refined paste (Fig. 4).

Process 2: Manufacture of medium-sized containers, with full or partial reduction firing, linked to a form of jar, and made with a paste with medium size quartz and biotite inclusions.

Process 3: Manufacture of small open containers, in the form of an open bowl with complete or partial oxidation firing and undefined mineral ware, which have a reticulated incised decoration on the exterior surface (Fig. 5).

Process 4: Manufacture of small straight-walled closed containers or medium-sized containers.

These are closed straight wall bowls, with full or partial oxidation firing and a singular clay group (Fig. 6).

Process 5: Manufacture of large containers, mainly a group of jars, made with a similar fabric containing quartz inclusions and fragments of limestone, and complete oxidation firing (Fig. 7).

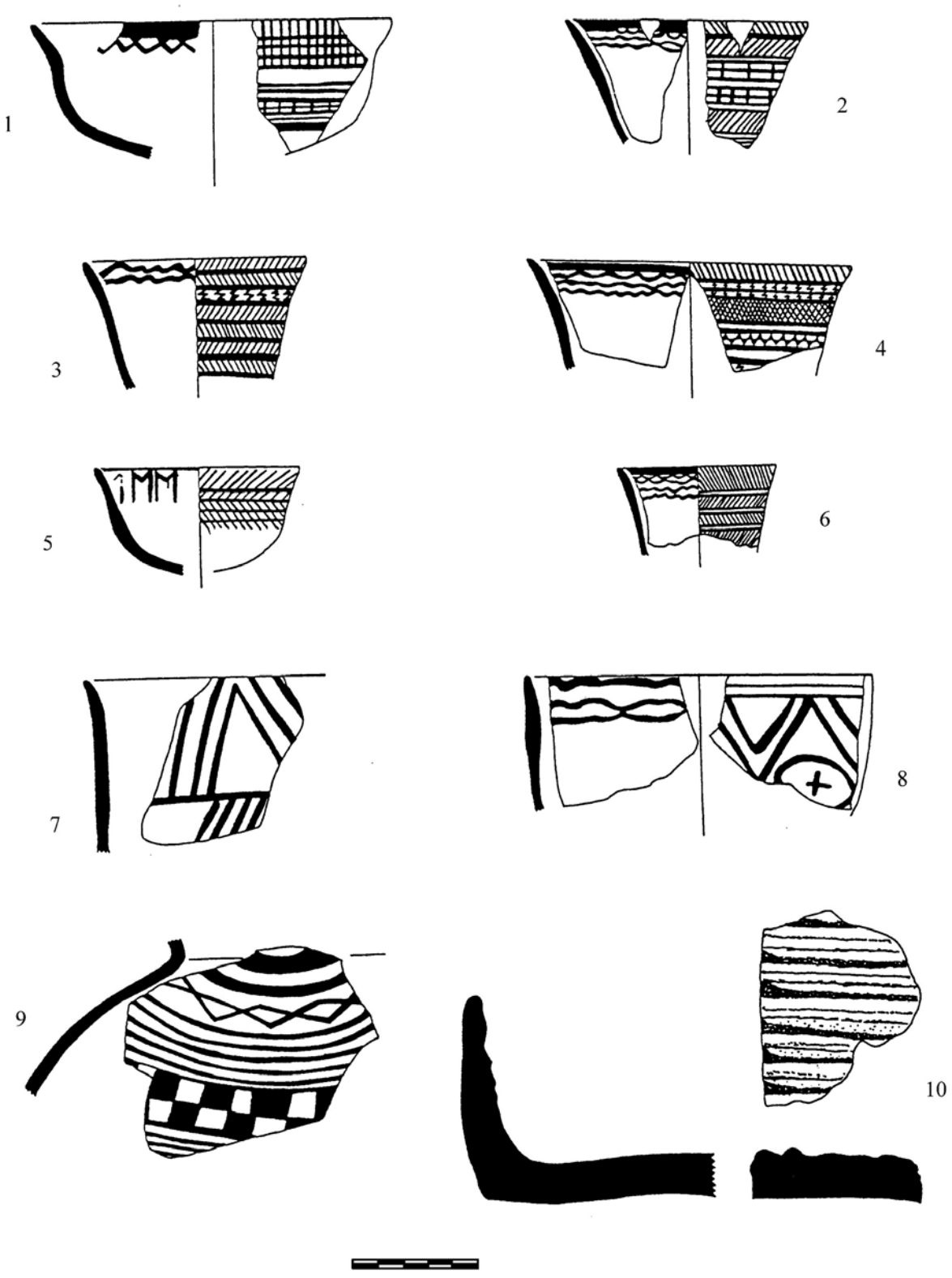

Figure 3. Proto-Halaf layers. L.5.7, 6980±50 BP. (5932-5747 cal BC).

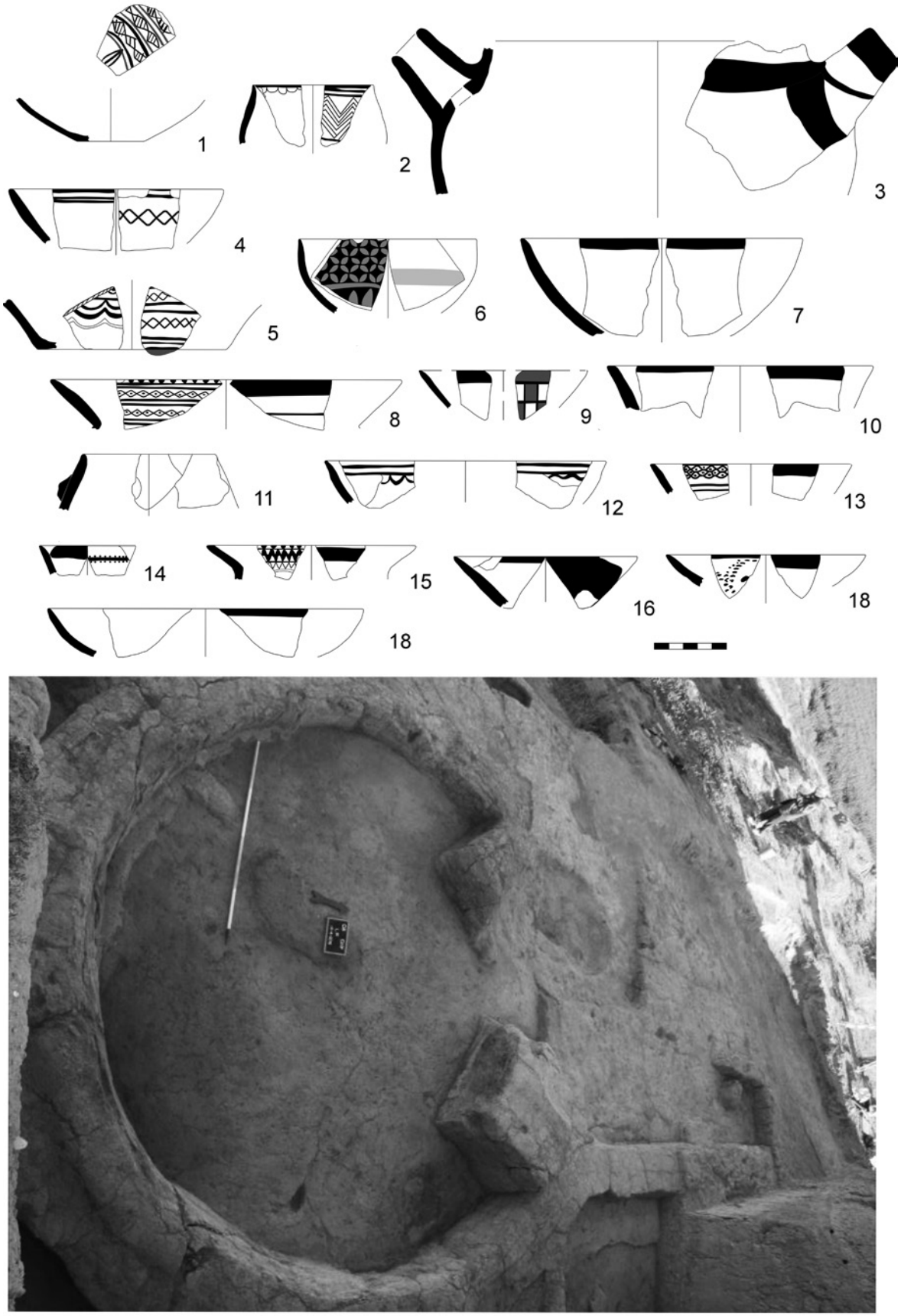

Figure 4. Late Halaf, phase X, pottery assemblage and stratigraphy data 6720±50 BP (5721-5552 cal BC)., 6610±50 BP. (5623-5483 cal BC).

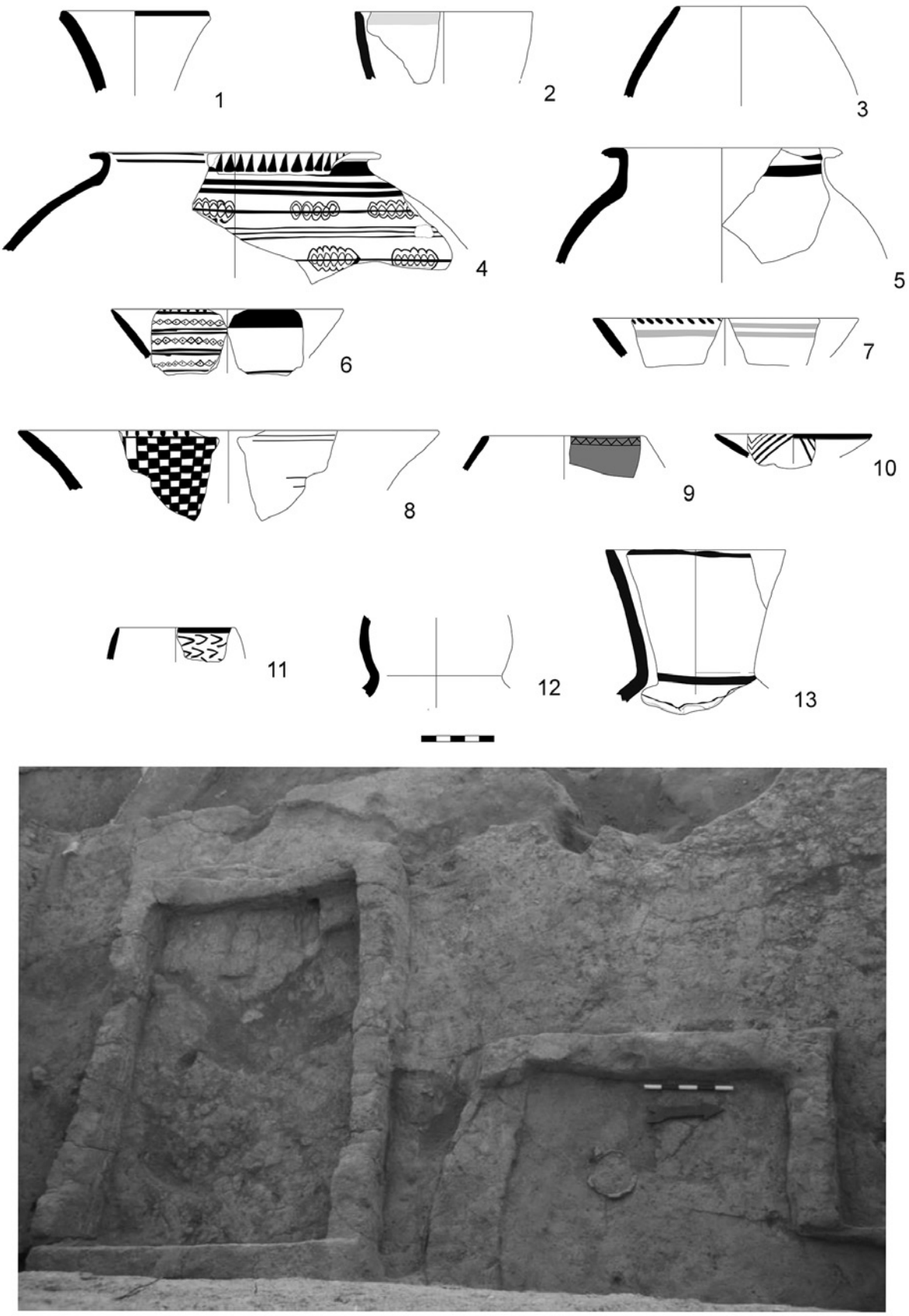

Figure 5. Late Halaf, phase V, pottery assemblage and stratigraphy data 6560±40 BP. (5569-5472 cal BC).

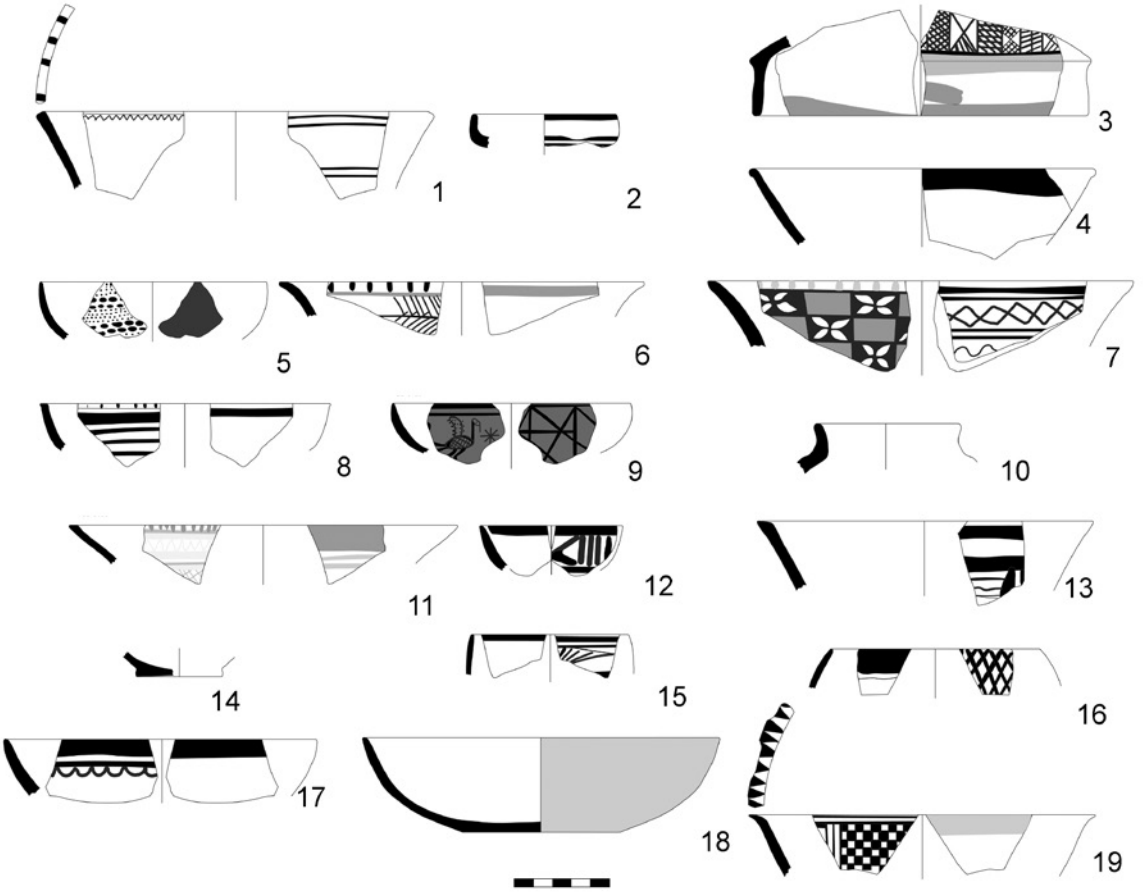

Figure 6. Late Halaf, phase V, pottery assemblage and stratigraphy data 6550±80 BP. (5633-5362 cal BC).

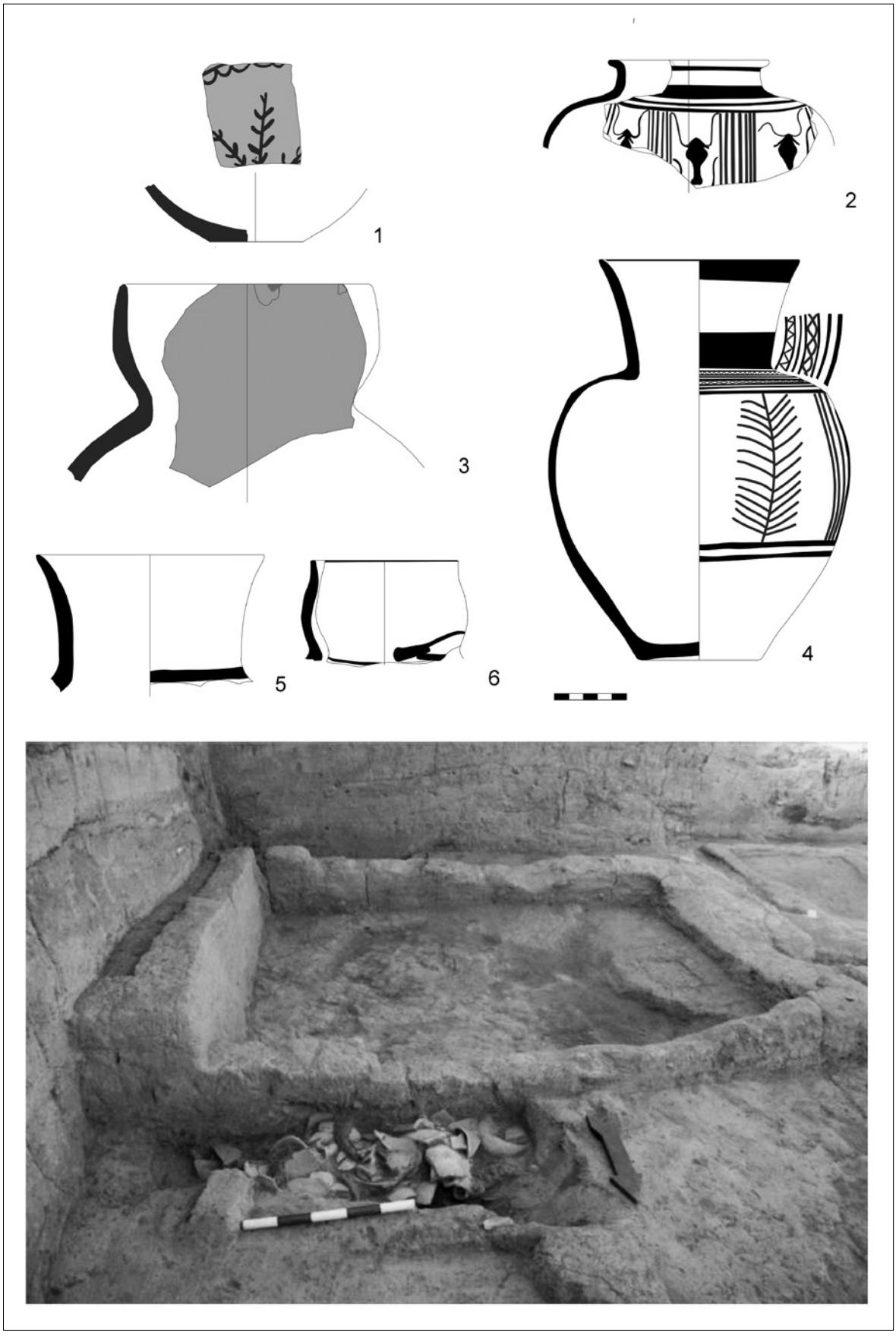

Figure 7. Late Halaf, phase V, pottery assemblage and stratigraphy data 6530±50 BP. (5566-5460 cal BC).

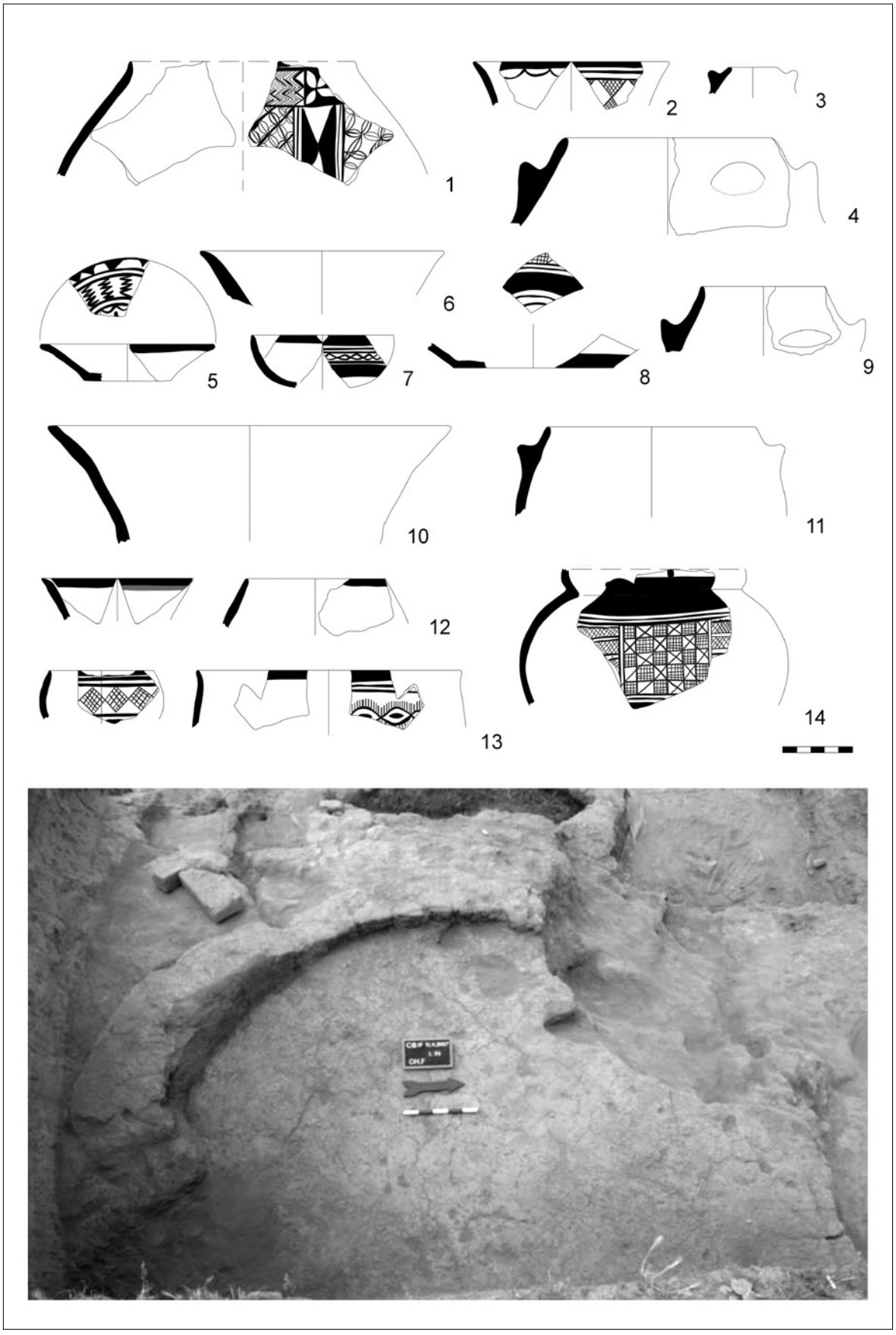

Figure 8. Late Halaf, phase I, pottery assemblage and stratigraphy data 6470±50 BP (5514-5327 cal BC).

Process 6: Coiling technique, for open bowls made with several local fabrics. These correspond both to bowls about 20cm in diameter and to larger pieces.

Process 7: Containers in the form of open bowls, full oxidation firing, made with RKE (Fig. 8). This set was recovered from the last levels.

At a preliminary level and considering that it is difficult for a part-time artisan / craftsperson to produce this formal variability, it is thought that the differential characteristics between groups may respond to criteria of a more utilitarian / functional type than that of artisanal flexibility. Some pieces, for example those involving the use of RKE, could have been made by an experienced and consolidated craftsman.

B*oth sequences* allow differences to be established in these productions. First of all, domestic sets are well represented. This huge diversity in pottery production was focused on functionality, albeit in a symbolic way (Nieuwenhuyse 2007). Some of the vessels display a great investment in polychrome or colour combination and, others, a profusion of colours in drawings and scenes.

An important element is the lesser investment in the finishing of some products and vessels. A decrease in the investment of labour in finishing and decorating some pieces of fine and coarse wares has been documented. This may respond to a greater demand for vessels and an increase and optimization in their production.

Another phenomenon is the increase in the use of mineral raw materials in pictorial decoration, related to an improvement in firing techniques. The presence of manganese oxide can be considered an element of optimization in production, provided that the process of obtaining and handling the raw material is within the reach of the community.

Another element is the variability in part of the vessels produced. The presence of new typologies with a greater diversity of forms has been evidenced, mainly in groups I, III, VI, VII, VIII and IX, that is, simple and complex bowls, pots, jars, lids and containers with handles and spouts. This extension may indicate a transformation in culinary practices.

The presence of incised and burnished ceramic productions, as well as the documentation of the basketry technique and other technological variables, indicates that these manufacturing traditions seem to have played an important role in the different communities at the end of the Halaf. These pieces, together with vessels for the manipulation and transformation of food, are a new source to identify regional variability.

UNCOMMON ITEMS

Some type of shapes and finishing traditions will disappear during the Halaf. One of them is the husking trays. They appear in early layers at Chagar Bazar (from Proto-Halaf to Early Halaf) but none has been recovered from later levels (Fig.2.3). Another missing element is the investment in finishing surfaces, as impressed and burnished vessels (grey and dark-faced ware) disappear and there is no evidence of these traditions in Phase X (Middle-Late Halaf). Early painted vessels become rare and fine painted sherds become predominant in limited shapes related to “serving ware” (Fig.3, 1-8). In this sense, the increasing early painted and changes in slips are frequent at the very beginning of the early Halaf. Moreover, new shapes such as carinated long-necked jars, bow rim jars, covers and spouts, lids and plates appear in Phase X.

SHARED ELEMENTS

Coarse ware and culinary pottery shapes are very homogeneous throughout the sequence (Fig. 9). Based on a first approximation to the measurements of the set of potsherds studied at Chagar Bazar, we should point out that the ceramic vessels to which they corresponded were almost all of medium size (between 14 and 25 cm) and only a small percentage of vessels can be considered small (less than 0.20 litre). This can be observed at the volumetric level, as can be seen in the following table prepared from the set of whole pieces.

The association of the typologies with the respective volumetric capacities of the different pieces allows us to observe how the closed forms had capacities of 1.14 litres, of 1.55 and 1.93 litres, while the open forms held 1.5 to 2 litres, and up to 3 litres. It is observed, then, how the maximum capacity is provided by a closed form, a jar type, which can reach 5 litres, and in only one case 8 litres volumetric capacity.

It is clear that a strong tradition linked to painted decoration exists. While the whole Halaf sequence presents a “homogeneous” tradition in decorative motifs (geometrical, figurative and symbolic animals as *bucrania*), the Khabur region and Chagar Bazar seem to have a specific code, repeating similar motifs in different sets.

There are numerous geometric patterns of symmetrical type that also have clear parallels in the Khabur valley, particularly the Tell Halaf productions (Oppenheim, 1943, bunttafel I and II), Table of Decorations of Tell Halaf p.25, Typological Table of the sherds from Tell Halaf p.252 and 254.

Decoration in the form of a Maltese cross stands out in Chagar Bazar (Oppenheim 1943: Der Tell Halaf, n.9 p.180, tafel 51) or the reiterative use of the double trian-

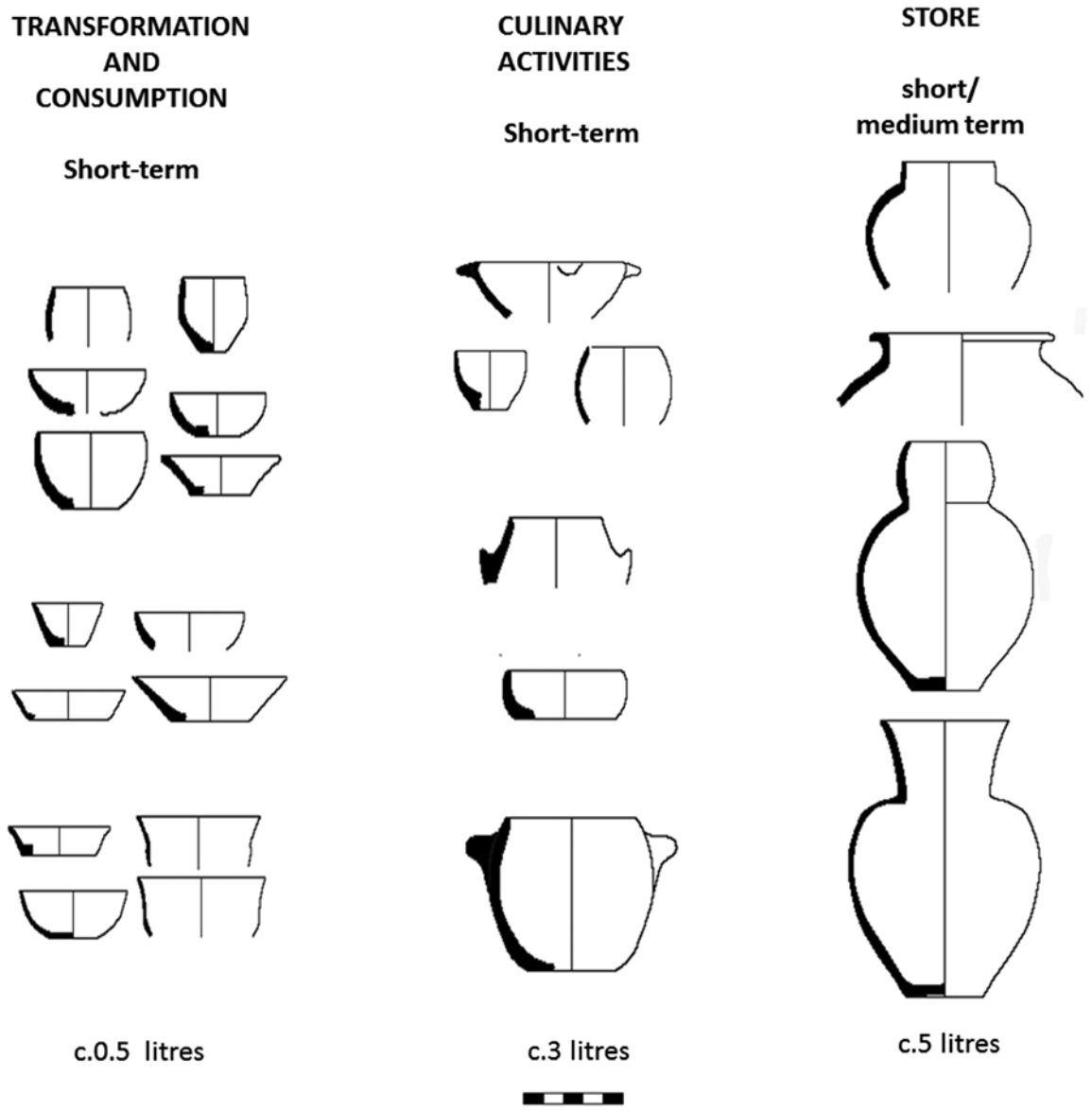

Figure 9. Main sets in a volumètric approach from Late Halaf levels.

gle (Oppenheim 1943: tafel 52) with different geometric motifs next to floral type elements (Oppenheim 1943: tafel 52). Likewise, the vegetal elements are repeated; the most significant is that of cereal, present in Phases V and XI at Chagar Bazar and well documented in Tell Halaf (in Oppenheim 1943: tafel 53) (Cruells 2017).

The recovered zoomorphic representations correspond to seated or standing quadrupeds, namely oxen, bulls, deer and non-determinable. Fragments of the bull's head or bucrania are frequent in the whole sequence.

The next most represented animal group is that of birds. These form scenes in standing position or with wings spread out, as if they were flying; sometimes they also appear as if they were eating. At the typological level, the presence of pieces reminiscent of the rim jar bowls stands out, but they display an S-shaped profile, a globular type body and a raised foot, which can be associated with very late forms.

FINAL CONSIDERATIONS

Chagar Bazar sequences allow variations to be detected in the spatial distribution and density of artefacts. These data are relative to activities taking place within households and can be identified in them, even though most of them belong to secondary deposits.

Intra-site analysis enables Halaf pottery heterogeneities to be appreciated throughout a valid radiometric data sequence spanning between 6005 and 5327 cal BC. These approaches can be useful for further contemporary Halaf sequences._

At Chagar Bazar, the chronological and stratigraphic position of the ceramic assemblages shows a repertoire consisting, in general terms, of open-pit jars, low and open round bottom bowls, straight wall bowls with decorated lip, small plates, low bowls with flattened lips or open bowls. One clearly identifiable feature is the decoration: the decorative motifs continue to be geometric but their sequence varies and the appearance of polychrome paint on a clear slip is also an innovation. The catalogue differs with forms such as the closed bowls of well-defined low crest with a mixed decoration of incised and painted motifs; this technique is traditionally associated with the final Halaf or Post-Halaf.

One of the difficulties when contextualizing the ceramic productions documented in these deposits lies in the small comparative sample. In the case of Chagar Bazar, the results of the different surveys carried out in the high Khabur allow this site to be complemented with those in the surroundings (Lyonnet 2000), as well as with the excavations at Tell Aqab (Davidson 1977) and at Umm Qseir (Tsuneki/Miyake 1998). More recently, with the Khabur survey project of Yale University (Hole/Tonoike 2016) and Tell Arbid Abyad (Vsiansky/Mateicuicová 2017).

All in all, the site has yielded a complete stratigraphic sequence at a settlement with a long chronology where it is possible to delimit the Neolithic ceramic sequence and to specify the characteristics and typologies of these groups.

Thus, it should be noted that the material studied mainly comes from the 11 anthropic occupation levels so far excavated in area A of Chantier F, associated with architecture and where the material has been differentiated according to its context. Despite these particularities, the Chagar Bazar assemblage has been related to other comparable sites in order to observe concordances and differences.

Both assemblages let us identify shared substrate evidence. Some of them from structural elements like building patterns and other facilities, but others related to cultural traits such as local pottery traditions.

All sets reveal probable exogenous influences. We cannot verify whether these productions (orange ware, Hassuna-related shapes, Ubaid-related shapes) belong to exchange networks or acculturation processes (Gómez-Bach 2011, 2017). In addition, it has been possible to determine specific pottery productions for specific purposes. This seems to be the case of agricultural motifs in decoration that appear throughout the sequences (Cruells 2017). Sporadically, ritual items related to burial practices or deposits indicate greater investment in time in some shapes, which can be related to complexity, from a technological point of view, or value and prestige from a social point of view.

Finally we would like to note that the Chagar Bazar sequence reveals variations in the spatial distribution and density of artefacts. This is related to activities taking place within households and variation exists in the use and function of each one. Additionally, the Halaf heterogeneity can be appreciated at *intra-site* level within a valid radiometric data sequence and we expect that this exercise will be useful for comparing further contemporary Halaf sequences.

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REFERENCES

BÖHNER, U., SCHYLE, D. 2006, *Radiocarbon CONTEXT database 2002-2006* http://context-database.uni-koeln.de/

CORNET, Y. 2007, "Approche du contexte géomorphologique de Chagar Bazar et restitution de la paléosurface 'naturelle' sous le tell", in Tunca, Ö.; McMahon, A.; Baghdo, A.M. (eds.), *Chagar Bazar (Syrie) II. Les vestiges "post-akkadiens" du Chantier D et études Diverses*, Publications de la Mission archéologique de l'Université de Liège en Syrie. Louvain-Paris-Dudley, 285-310.

CAMPBELL, S. 1992, *Culture, Chronology and Change in the Later Neolithic of North Mesopotamia,* PhD, University of Edinburgh.

CAMPBELL S. 2007, Rethinking Halaf Chronologies, Banning E.B. (ed), *Time and Tradition : Problems of Chronology in the 6th-4th Millennia in the Levant and Greater Mesopotamia/ Temps et Tradition: Problèmes de chronologie aux 6e-4e millénaires dans le Levant et en Mésopotamie septentrionale, Paléorient,* 33, 1, 103-136.

CHATAIGNER, C. 1995, La Transcaucasie au Néolithique et au Chalcolithique, *Maison de l'Orient Méditerranéen y BAR, British Archaeological Reports,* International Series, 624.

CRUELLS, W. 2005, *Orígens, emergència i desenvolupament de la ceràmica Halaf a Síria,* PhD, Departament de Prehistòria, Universitat Autònoma de Barcelona, 1-135.

CRUELLS, W. 2006a, Les sondages préhistoriques (Chantiers E-FI-FII-K), in Tunca, Ö.; Baghdo, A.M (eds.), *Chagar Bazar (Syrie) I. Les Sondages Préhistoriques (1999-2001)*, Ed. Petters Louvain, París, 5-24.

CRUELLS, W. 2006b, La poterie, in Tunca, Ö.; Baghdo, A.M. (eds.), *Chagar Bazar (Syrie) I. Les Sondages Préhistoriques (1999-2001)*, Ed. Petters Louvain, París, 25-80.

CRUELLS, W. 2006c, Les objets, in Tunca, Ö.; Baghdo, A.M. (eds.), *Chagar Bazar (Syrie) I. Les Sondages Préhistoriques (1999-2001)*. Ed. Petters. Louvain. París, 81-94.

CRUELLS, W. 2006d, Chantier E et F. Les datations C14, in Tunca, Ö.; Baghdo, A.M. (eds.), *Chagar Bazar (Syrie) I. Les Sondages Préhistoriques (1999-2001)*, Ed. Petters. Louvain. París, 117-119.

CRUELLS, W. 2006e, Chagar Bazar préhistorique. Esquisse de la séquence d'évolution et la périodisation, in Tunca, Ö.; Baghdo, A.M. (eds.), *Chagar Bazar (Syrie) I. Les Sondages Préhistoriques (1999-2001)*, Ed. Petters. Louvain, París, 121-140.

CRUELLS, W. 2009, Nouvelles données sur les origines et le développement de la céramique Halaf en Syrie, in Astruc, L.; Gaulon, A.; Salanova, L. (eds.), *Méthodes d'approche des premières productions céramiques: étude de cas dans les Balkans et au Levant*, Table-ronde de la Maison de l'Archéologie et de l'Ethnologie (Nanterre, France) 26 février 2006, Verlag Marie Leidorf, 93-103.

CRUELLS, W. 2017, Transitions and their Chronologies in the Pottery Neolithic of the Near East, in Cruells, W., Mateiciucová, I., Nieuwenhuyse, O. *Painting Pots, Painting People,* Oxbowbooks, 11-29.

CRUELLS, W., NIEUWENHUYSE, O. 2004, Proto-Halaf period in Syria. New sites, new data, *Paléorient, 30/1*, 47-68.

CRUELLS, W., MOLIST, M., 2006, Chagar Bazar au Sein de la Préhistoire du Bassin du Khabur, in Tunca Ö., Baghdo, A.M. (eds.), *Chagar Bazar (Syrie) I. Les Sondages Préhistoriques (1999-2001).* Peeters, Louvain - Paris - Dudley (MA), 143-155.

CRUELLS, W., GÓMEZ, A., BOUSO, M., GUERRERO, E., MOLIST, M., TORNERO, C., TUNCA, Ö. 2013, Chagar Bazar: A new Halafian sequence for Upper Mesopotamia in *Interpreting the Late Neolithic of Upper Mesopotamia, Leiden* 26-28 mars 2009, 467-477.

CURTIS, J. 1982, Chagar Bazar, Curtis, J. (ed.), *Fifty Years of Mesopotamian Discovery*, British School of Archaeology in Iraq, London, 79-85.

D'ANNA, A.; BINDER, D. (eds.) 1998, *Production et identité culturelle. Actualité de la recherche,* Rencontres méridionales de Préhistoire récente, Actes de la deuxième session, Arles (Bouches-du-Rhone), Antibes, 8 et 9 novembre 1996.

DABBAGH, T. 1966, Halaf pottery, *Sumer, XXII*, 23-43.

DANDRAU, A. 2000, Les enduits peints antiques, *Les Dossiers d'Archéologie, 253*, 41-47.

DAVIDSON, T.E. 1977, *Regional Variation within the Halaf Ceramic Tradition*, PhD. University of Edinburgh.

GÓMEZ-BACH, A. 2008, Las producciones cerámicas del Halaf Final en Siria: Tell Halula (Valle del Éufrates) y Tell Chagar Bazar (Valle del Khabur), in Córdoba, J.M.; Molist, M.; Perez, M.C.; Rubio, I.; Martinez, S. (eds.), *Proceedings of 5th International Congress on the Archaeology of the Ancient Near East,* Madrid in April of 2006, UAM editor, 113-122.

GOMEZ-BACH, A. 2011, *Caracterización del producto ceràmico en las comunidades neolí*ticas *de mediados del VI milenio cal BC: El valle del* Éufrates *y el valle del Khabur en el Halaf final.* PhD Universitat Autònoma de Barcelona - Université de Liège.

GÓMEZ-BACH, A. 2013, Las producciones cerámicas del Halaf final en Tell Halula, in Molist, M. (ed.), *Tell Halula: un poblado de los primeros agricultores en el valle del* Éufrates*, Siria*. Ministerio de Educación y Ciencia, 212-231.

GÓMEZ-BACH, A. 2017, Investigating painted, incised and impressed ware from the Late Halaf Period, Cruells, W., Mateiciucová, I., Nieuwenhuyse, O. *Painting Pots, Painting People,* Oxbow books, 38-51.

GÓMEZ-BACH, A.; CRUELLS, W.; MOLIST, M. 2013, Black, red and white: characterizing neolithic ceramic productions in middle Euphrates Valley, *7th International Congress on the Archaeology of the Ancient Near East. BritishMuseum,* London 12-16 abril 2010, vol III, 527-536.

GÓMEZ-BACH; CRUELLS, W.; MOLIST, M. 2015, Late Halaf Pottery Productions in Syria: technological approach. Evidences from Tell Halula (Euphrates Valley), *EMAC'09, September 2009, London, European Meeting on Ancient Ceramics*, British Museum, Martinon-Torres, m. ed. Craft and Science: International perspectives on archaeological ceramics, Doha, Qatar, 1-11.

HOLE, F., TONOIKE, Y. ed. 2016, *Homesteads on the Khabour, Tell Ziyadeh and Other Settlements,* BAR International Series 2827, Archaeopress.

LAWN, B. 1973, University of Pennsylvania radiocarbon dates XV, *Radiocarbon, 15, 2,* 367-381.

LYONNET, B. (ed.) 2000, *Prospection archéologique du Haut-Khabur Occidental (Syrie du Nord-est),* Bibliothèque archéologique et historique CLV, Beyrouth.

MALLOWAN, M.E.L. 1936, The Excavations at Tall Chagar Bazar and an Archaeological Survey of the Habur Region, 1934-5, *Iraq, III*: 1-86.

MALLOWAN, M.E.L. 1937, The Excavations at Tall Chagar Bazar and an Archaeological Survey of the Khabur Region: Second Campaign, 1936, *Iraq, IV*: 91-177.

MALLOWAN, M.E.L. 1946, Excavations in the Balikh valley, 1938, *Iraq, VIII*: 111-162.

MALLOWAN, M.E.L. 1947, Excavations at Brak and Chagar Bazar: Third campaign, 1939, *Iraq, IX*: 1-266.

McMAHON, A., TUNCA, Ö; BAGHDO, A.M. 2001, New excavations at Chagar Bazar 1999-2000, *Iraq, LXIII*: 201-221.

MOLIST, M. (ed.). 1996, *Tell Halula (Síria): un yacimiento neolítico del valle medio del Éufrates: campañas de 1991 y 1992*. Ministerio de Educación y Cultura. Dirección General de Bellas Artes y Bienes Culturales. Instituto del Patrimonio Histórico Español.

MOLIST, M. (coord.) 2013,*Tell Halula: un poblado de los primeros agricultores en el valle del Éufrates, Siria*. Memoria Científica – Tomo I y II. Ministerio de Educación, Cultura y Deporte. Secretaria General Técnica. Subdirección General de Documentación y Publicaciones, Madrid.

NIEUWENHUYSE, O. 2007, *Plain and painted pottery. The rise of Neolithic Ceramic Styles on the Syrian and Northen Mesopotami Plains.*Palma, Near Eastern Archaeology Paper on Archaeology of the Leiden Museum of Antiquities, Brepols Publisher.

OPPENHEIM M. F. 1943, *Tell Halaf I. Die prähistorischen Funde*. Berlin, bearbeitet von Hubert Schmidt, Berlin.

TSUNEKI, A.; MIYAKE, Y. (eds.) 1998, *Excavations at Tell Umm Qseir in Middle Khabur Valley, North Syria,* Al-Shark 1, Department of Archaeology, Institute of History and Anthropology, University of Tsukuba.

TUNCA, Ö. 2006, Introduction, in Tunca, Ö.; Baghdo, A.M. (eds.), *Chagar Bazar (Syrie) I. Les Sondages Préhistoriques (1999-2001)*, Ed. Petters, Louvain, París, 1-4.

TUNCA, Ö.; BAGHDO, A.M. (eds) 2006, *Chagar Bazar (Syrie) I. Les Sondages Préhistoriques (1999-2001)*, Ed. Petters, Louvain, París.

TUNCA, Ö.; McMAHON, A.; BAGHDO, A-M. 2000a, Première campagne de fouille à Chagar Bazar (Syrie), *Orient-Express, notes et nouvelles d'archéologie orientale2000/1*: 8-9.

TUNCA, Ö.; McMAHON, A.; BAGHDO, A. M. 2000b,-Deuxième campagne de fouille à Chagar Bazar (Syrie), *Orient-Express, notes et nouvelles d'archéologie orientale 2000/4*, 91-94.

VSIANSKY,D., MATEICIUCOVÁ, I. 2017, Analysis of paint on prehistòric pottery from Late Neolithic Tell Arbid Abyad (north-eastern Syria), in Cruells, W., Mateiciucová, I., Nieuwenhuyse, O. *Painting Pots, Painting People,*Oxbow books, 38-51.

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II Workshop on Late Neolithic Ceramics in Ancient Mesopotamia: pottery in context,
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A SHORT NOTE ON PREHISTORIC POTTERY FROM ASHUR (QAL'AT SHERQAT)

Claudia Beuger*

La fundación de Ashur, núcleo del Imperio Asirio tardío, se ha adscrito al 3rd milenio aC. Recientemente, Reinhard Dittmann recuperó dos recipientes in situ *considerados indicadores de actividad neolítica en el yacimiento. Esta adscripción cronológica se puede confirmar por algunas de las nuevas observaciones procedentes de los fragmentos cerámicos de las excavaciones del siglo XX.*

Centro de Irak, Hassuna, Samarra, Halaf, Ubaid.

The foundation of Ashur, the core of the later Assyrian empire, is generally ascribed to the 3rd millennium BC. Reinhard Dittmann recently quoted two vessels of an in situ *context as an indicator for some Neolithic settlement activities. This attempt can be confirmed now by some new observations on shreds from excavations from the 20th century.*

Central Iraq, Hassuna, Samarra, Halaf, Ubaid.

INTRODUCTION

The date of the earliest settlement at Ashur, the later core of the Assyrian empire, is still a matter of debate. Walter Andrae (1938, 98), who excavated Ashur at the beginning of the 20th century, already discussed a prehistoric presence on the basis of some simple pits and fire places which were observed on the natural rock below the massive structures of the 3rd millennium BC and beyond. Nevertheless, he also stressed that such interpretation is weak since lithics or prehistoric sherds were never found. Jürgen Bär (1999) lastly discussed some objects which may belong to the Djemdet Nasr period (late 4th/early 3rd millennium BC), but he had to reject them. Meanwhile the discussion on Ashur's earliest date concentrated generally on the 3rd millennium BC – so far accepted by the scientific community. However, recently, Reinhard Dittmann (2010, 51 n. 17) also assumed a Neolithic age (proto-Hassuna/Hassuna-Samarra) for three vessels from Ashur, which were published on a photograph of an *in situ* feature[1] below the central court of the later Ashur temple (Haller/Andrae 1955, pl. 25a).[2] The character of the vessels is quite coarse, which is not common for the later pottery finds of Ashur. Besides this, the profiles resemble typical jars from Tell es-Sotto (Bader 1993,

1. Referring to Dittmann a pottery kiln with a perforated floor – like the earliest known two-stage kilns from Yarim Tepe I,7 (Merpert/Munchaev 1993, 85 Fig. 6:2:3) – which probably belongs to the same level.
2. Helen Gries (2017) will also publish a sketch of the vessel`s profile, which was made by the excavators within the Ashur-documentary (I thank her for this advice). But note that such sketches were generally not very precise.

* Faculty Member, Martin-Luther-Universität Halle-Wittenberg, Seminar für Orientalische Archäologie und Kunstgeschichte, Emil-Abderhalden-Str. 28, 06108 Halle (Saale), Alemanya, claudia.beuger@orientarch.uni-halle.de

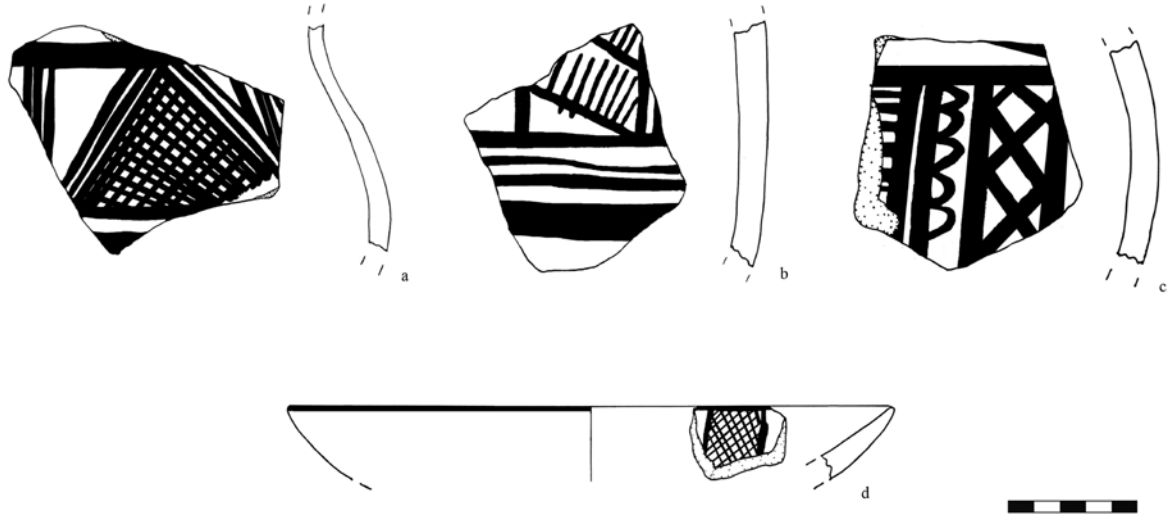

Figure 1. Ashur: sherds dedicated to the Late Northern Ubaid/LC1-2 period.

48 fig. 3.5), Yarim Tepe I (Merpert/Munchaev 1993, 106 fig. 6.18 type I) or Sabi Abyad lev. 8/Pre-Halaf IIIC (Nieuwenhuyse 2007, 340-341 Pl. 19.2).[3]

DISCUSSION

The work on the prehistoric pottery of Tell Nader (Beuger/Kopanias *this volume*) initiated a re-evaluation of the pottery from Ashur, since some vessel types and decoration patterns never really fit within the 3rd millennium assemblages. At first this review was focussed on the pottery corpus of the deep trench at Ashur, which was excavated in the late 1980's by Reinhard Dittmann (Dittmann *et al*. 1988; Dittmann 1990; Beuger 2007) and on the pottery corpus of the so called Archaic Ishtar temples, which were excavated by Walter Andrae in the early 20th century (Andrae 1922; Bär 2003).[4] Both complexes were studied years ago within a dissertation project, but the general stage of investigations on Ashur set clear limits on the perception of this question at that time. At a conference in Athens (Beuger 2016) a preliminary attempt was made to demonstrate a Chalcolithic presence (Ubaid, LC1-2 and probably LC3-4) in Ashur. Later, while checking some sherds which were identified as Scarlet Ware by Nagel (1964)[5] at the Vorderasiatisches Museum in Berlin, additionally, a handful of Neolithic sherds from varying contexts in Ashur came into view. With the permission of the Vorderasiatisches Museum[6], some examples which support this early date can be published now. Indeed, the number is quite small, but the sherds definitively do exist, so they shall allow a new interpretation on Ashur's early steps:

The Chalcolithic presence at Ashur may be confirmed by some further examples (Fig. 1; Late Northern Ubaid/LC 1-2 period[7]). Especially the relatively coarse fabric with some organic temper is used as an indicator of a Chalcolithic instead of Halaf age. The decoration pattern and fine fabric of the sherds in Fig. 2 suggests a Late Halaf date.[8] The Halafian zoomorphic vessel fragment (Fig. 2a) finds a good reference at Tell Arpachiyah: a hollow vessel interpreted as a hedgehog with red painted bristles on buff clay (Mallowan/Rose 1935, 88 Pl. 5 A99, "found in TT 6 adjoining the burnt house"; ht. 12 cm, l. 19 cm, cup-shaped mouth on

3. Another reference is probably Bader 1993, 12-13 Fig. 2.6: a "grain storage bin" of unbacked clay at Tell Maghzaliyah.
4. The deepest level H of this temple complex presents the only architecture in Ashur founded on natural rock (Miglus 1996, 53; Bär 2003, 39-41; Beuger 2013, 3-4), however this is not a criterion for a prehistoric age: The structures of level H were cut down before they were copied and reused in parts by the following structures which clearly date to the late 3rd millennium BC. Finally a handful of finds from the H contexts also point to the 3rd millennium BC.
5. Actually the examples mentioned by Nagel 1964, 14 (Beuger 2016, 22 n. 14) are elaborately painted pieces of Djemdet Nasr/Scarlet Ware.
6. I thank Prof. Dr. Markus Hilgert and Dr. Lutz Martin for their kind support.
7. Fig. 1b: Tobler 1950, Pl. CXXVIII, 184 (Gawra XIII), Pl. CXXXIII, 243-245 (Gawra XII), Pl. CXXXVII, 294-295 (Gawra XII); Fig. 1c: Tobler 1950, Pl. LXXVIII,a = CXXXIX, 309 (Gawra X); Fig. 1d: Tobler 1950 CXXXV, 263 (Gawra below XII).
8. Fig. 2b: Becker 2012, 169; Mallowan/Cruikshank Rose 1935, 139 Fig. 64,6.8 (TT7/TT10 or earlier); Fig. 2c: decor: Mallowan/Cruikshank Rose 1935, Fig. 38,1 (Ubaid); Fig. 2d: decor: Tobler 1950, Pl. LXVII (Halaf: level E, Area A), Pl. CXXXVI,278 (Strat. XII), vertical S-shaped bowl ref. Nieuwenhuyse 2007, Pl. 102-103 Sabi Abyad lev. (8)7-5/4; Fig. 2e: Mallowan/Cruikshank Rose 1935, 153 Fig. 70,2 (early Halaf before TT10, conical bowl); decor: Mallowan/Cruikshank Rose 1935, 134 Fig. 63,3 (TT6-TT7, cream bowl).

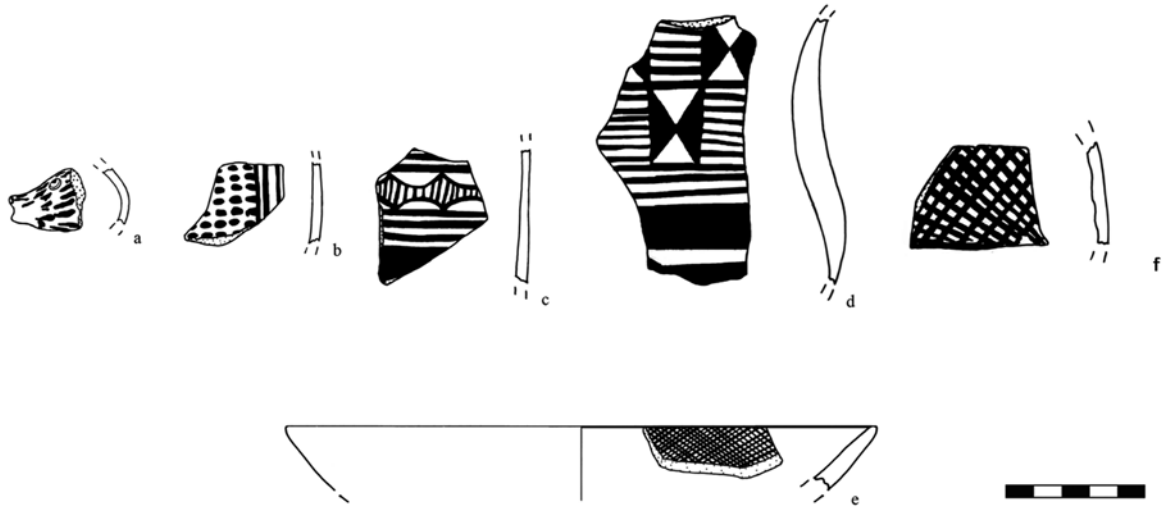

Figure 2. Ashur: sherds dedicated to the Halaf period (2.a to 2.e). 2.f- sherd dedicated to the Hassuna/Samarra period (?).

top of the hedgehog's back); also without a hole in the snout. However, the excavator documented the piece from Ashur as a wild boar (with question mark). The sherd (Fig. 2.f) with red painted decoration on a light slip (?) resembles the typical Samarra style (Gut 1995, 85 Taf. 25,435). However, the motive of a triangle built of crossed lines seems to be more relevant for the Hassuna painted ware (Gut 1995, Taf. 14, 18-19). The fabric does not contradict a Neolithic age, although the inside shows quite regular deep grooves, which might belong to the potters' work on a wheel, which makes this example a weak candidate for this early age (Fig.3).

CONCLUSION

In sum, we shall assume some kind of prehistoric activity within the later limits of Ashur. Similar to the later 3rd millennium settlement, a concentration on the northern fringe should be supposed. Here, the topography functioned as a natural fortress on a steep rock overlooking the Tigris plains, especially to the north (Andrae 1938, 98). Nevertheless, the prehistoric sherds are scattered across the entire area of the city ruins.

In regard to the workshop topic if "using pots is useful for crossing chronology and archaeological stratigraphic sequences", it is clear that using pots – or in this case sherds – is the only possibility. They add an important aspect to the settlement history of Mesopotamia and Ashur in particular, or help to write a short settlement history about Tell Nader (Beuger/Kopanias *this volume*), since so far nothing else but the pottery proves the Neolithic age of these sites.

Additionally, the geographical position of Ashur for all periods is a crucial marker in all maps. It ties in the southern and the northwestern spheres through the millennia. Unfortunately, we cannot provide more accurate information at the moment about how these ties are to be defined by the material culture of the prehistoric periods.

BIBLIOGRAPHY

ANDRAE, W. 1922, *Die archaischen Ischtar-Tempel in Assur*, Wissenschaftliche Veröffentlichungen der Deutschen Orient-Gesellschaft 39, Leipzig.

ANDRAE, W. 1938, *Das wiedererstandene Assur*, SDOG 9, Leipzig.

BADER N. O. 1993, The Early Agricultural Settlement of Tell Sotto, in N. Yoffee, J. J. Clark (eds.), *Early Stages in the Evolution of Mesopotamian Civilization*, Tucson/London, 41-54.

BÄR, J. 1999, "Djemdet Nasr" in Assur?, in *Munuscula Mesopotamica. Festschrift für Johannes Renger*, edited by B. Böck, E. Cancik-Kirschbaum, and T. Richter, 1.52. Alter Orient und Altes Testament 267, Münster.

BÄR, J. 2003, *Die älteren Ischtar-Tempel in Assur. Stratigraphie, Architektur und Funde eines altorientalischen Heiligtums von der zweiten Hälfte des 3. Jahrtausends bis zur Mitte des 2. Jahrtausends v. Chr.*, Wissenschaftliche Veröffentlichungen der Deutschen Orient-Gesellschaft 105, Saarbrücken.

BECKER J. 2012, *Ḥalaf- und 'Obēd-Zeit in Nordost-Syrien am Beispiel von Tell Ṭawīla, Tell Ḥalaf und Wādī Ḥamar, Regionale Entwicklungen, Gemeinsam-*

Fig.	Assur No. Museum No. (site square)	Description
1a	Ass. 6429 VA Ass 3466 (eD6l)	body sherd (dm 20,0 cm); (no fresh break:) fine clay, a lot of medium sized organic temper, some fine mineral inclusions, medium hard burnt, o./i./c. greenish-buff, wheel-made (?), o./i. wet finished, slightly smoothed, o. painting of dark brown clay-colour (partly eroded)
1b	Ass. 13751 VA Ass 3464 (-)	body sherd (dm c. 32,0 cm ?); (no fresh break:) fine clay, a lot of organic inclusions, medium hard burnt, o. greenish-grey/grey-buff, i. light greenish-buff, c. greyish-buff, roughly hand-made, o. some burnish, irregular but smooth, i. irregular rough burnish, o. painting of black clay-colour
1c	Ass. 4628 VA Ass 3466 (hE5l)	body sherd (dm c. 44,0 cm), orientation unclear; fine clay, frequent fine and medium size organic temper and medium size black minerals, some small stones and fine lime, medium hard burnt, o. light greenish-buff, i./c. greyish-buff, hand-made (irregular thickness), o./i. smoothed (some vertical irregular burnishing), o. painting of dark brown clay-colour (partly transparent)
1d	Ass. 21371 VA Ass 3466 (fE6ll)	rim sherd (dm 24,0 cm); very fine clay, frequent medium size organic temper, some fine lime, medium hard burnt, o./i. light greenish-buff, c. light rose-orange-buff, hand-made, o./i. smoothed, i./o. painting of dark brown clay-colour
2a	Ass. 4926c VA Ass 3466 (h3?)	zoomorphic vessel fragment (head of hedgehog?); very fine clay, some fine mica and black mineral inclusions, hard burnt, o./i. greyish-buff, c. light rose-orange, hand-made (?), o./i. smoothed, o. painting of dark brown clay-colour, eye appliqué, pupil painted, mouth and nostril impressed
2b	Ass. 4992 VA Ass 3466 (hE5l)	body sherd (dm 18 cm ?); very fine clay, some fine mica and black mineral inclusions, very hard burnt, o./i. rose-buff, c. light rose-orange, hand-made, o. polished, i. smoothed, o. painting of dark brown clay-colour
2c	Ass. 5022a VA Ass 3466 (hE4V)	body sherd (dm 9,0 cm); (no fresh break:) very fine clay, no inclusions, very hard burnt, o./i./c. light buff, hand-made, o. smoothed (not polished), i. wet finished, o. painting of dark brown clay-colour
2d	Ass. 16027a VA Ass 3464 (hC11ll)	body sherd (dm 11,0 cm); (no fresh break:) fine clay, a lot of mineral inclusions, some fine lime, medium hard burnt, o. greenish-buff, i. buff, c. rose-buff, hand-made, o. some burnish, smooth, i. wet finish, o. painting of brownish-black clay-colour
2e	Ass. 5829b VA Ass 3466 (eC6l)	rim sherd (dm 22,0 cm); fine clay, (no fresh break:) some fine mica, very hard burnt, o./i. light buff, c. rose-light orange, hand-made, o./i. slightly smoothed/polished, i. and rim painting of dark brown clay-colour
2f	Ass. 4550 VA Ass 3466 (fD4lll)	body sherd (dm c. 26,0 cm) (no fresh break:); fine clay, frequent fine mineral inclusions and fine lime, some fine organic inclusions, hard burnt, o. light buff, i./c. rose-buff, wheel-made (?), o. slip (?), o./i. smoothed (some irregular burnishing), o. painting of reddish brown clay-colour

Figure 3. Catalogue.

keiten und Unterschiede (unpublished habilitation, University of Halle-Wittenberg).

BEUGER, C. 2007, *Keramik der spätfrühdynastischen bis spät-assyrischen Zeit aus Assur. Eine Bearbeitung unter chronologischen Gesichtspunkten*, (Dissertation, internet-publication: http://www.diss.fu-berlin.de/ diss/receive/FUDISS_thesis_000000003202).

BEUGER, C. 2013, *Die Keramik der Älteren Ischtar-Tempel in Assur, Von der zweiten Hälfte des 3. bis zur Mitte des 2. Jahrtausends v. Chr.*, Wissenschaftliche Veröffentlichungen der Deutschen Orient-Gesellschaft 138, Wiesbaden.

BEUGER C. 2016, Short notes on Chalcolithic pottery research: The pottery sequences of Tell Nader (Erbil)

and Ashur (Qal'at Sherqat), *in* Kopanias, K./MacGinnis, J. (eds.), *Archaeological Research in the Kurdistan Region of Iraq and the Adjacent Areas. Conference Proceedings, Athens, November 1st-3rd 2013*, Oxford, 19-27.

DITTMANN, R., T. EICKHOFF, R. STENGELE, R. SCHMITT, and S. THÜRWÄCHTER. 1988. 'Untersuchungen in Kar-Tukulti-Ninurta (Tulul al-'Aqar) 1986.' *Mitteilungen der Deutschen Orient-Gesellschaft* 120, 97-138.

DITTMANN, R. 1990, Ausgrabungen der Freien Universität Berlin in Assur und Kar-Tukulti-Ninurta/Iraq in den Jahren 1986-89, *Mitteilungen der Deutschen Orient-Gesellschaft* 122, 157-71.

Gries, H. 2017. *Der Assur-Tempel in Assur*, Das assyrische Hauptheiligtum im Wandel der Zeit, Wissenschaftliche Veröffentlichungen der Deutschen Orient-Gesellschaft 149, Berlin.

GUT, R. V. 1995, *Das prähistorische Ninive, Zur relativen Chronologie der frühen Perioden Nordmesopotamiens*, Baghdader Forschungen 19, Mainz.

HALLER, A./ ANDRAE, W. 1955, *Die Heiligtümer des Gottes Assur und der Sin-Šamaš-Tempel in Assur*, Wissenschaftliche Veröffentlichungen der Deutschen Orient-Gesellschaft 67, Berlin.

MALLOWAN, M. E., CRUIKSHANK ROSE, J. 1935, Prehistoric Assyria: the excavations at Tall Arpachiyah 1933, *Iraq* 2, 1-178.

MERPERT, N. Y./MUNCHAEV, R. M. 1993, Yarim Tepe I, in N. Yoffee/J. J. Clark (eds.), *Early Stages in the Evolution of Mesopotamian Civilization*, Tucson/London, 73-114.

MIGLUS, P. A. 1996, *Das Wohngebiet von Assur, Stratigraphie und Architektur*, Wissenschaftliche Veröffentlichungen der Deutschen Orient-Gesellschaft 93, Berlin.

MORTENSEN, P. 1970, *Tell Shimshara: The Hassuna Period*, Kopenhagen.

NAGEL, W. 1964, *Djamdat Nasr-Kulturen und frühdynastische Buntkeramiker*, Berliner Beiträge zur Vor- und Frühgeschichte 8, Berlin/Hessling.

TOBLER, A. J. 1950, *Excavations at Tepe Gawra II. Joint Expedition of the Baghdad School and the University Museum to Mesopotamia,* University of Pennsylvania Press, Philadelphia.

VÉRTESALJI, P. P. 1984, *Babylonien zur Kupfersteinzeit*, Beihefte zum Tübinger Atlas des Vorderen Orients. Reihe B, Geisteswissenschaften 35, Wiesbaden.

Anna Gómez-Bach, Jörg Becker and Miquel Molist (ed),
II Workshop on Late Neolithic Ceramics in Ancient Mesopotamia: pottery in context,
Monografies del MAC 1, Barcelona 2018,
ISBN: 978-84-393-9750-2 (pàg. 91-98)

NEOLITHIC POTTERY FROM TELL NADER (ERBIL)

Claudia Beuger*, Konstantinos Kopanias**

Tell Nader (Erbil, Kurdistan Iraquí) fue excavado por la Universidad de Atenas (Grecia) del 2011 al 2013. Los niveles principales del yacimiento pueden asignarse a los periodos Ubaid y post-Ubaid y con fragmentos Halaf en estos estratos calcolíticos. La enorme cantidad de cerámica con inclusiones vegetales permite también proponer una ocupación proto-Hassuna extensa.

Norte de Irak, Hassuna, Halaf, Ubaid, post-Ubaid.

Tell Nader (Erbil, Kurdistan Iraq), was excavated by the University of Athens (Greece) between 2011 and 2013. The main levels of the site so far can be assigned to the Ubaid and post-Ubaid periods. Some Halafian sherds are known from these chalcolithic layers. Finally, the huge amount of plant coarse ware sherds lets us assume some more extensive Proto-Hassuna presence.

Northern Iraq, Hassuna, Halaf, Ubaid, post-Ubaid

INTRODUCTION

Since 2011, the University of Athens (Greece) in cooperation with the Directorate of Antiquities of Erbil conducts excavations in Tell Nader (Kurdistan Region Iraq). The site lies on the outskirts of the city of Erbil (36.173148°, 44.075490°), approximately 6,3 km E-NE of the citadel. It is c. 1 hectare big and c. 5 m high. Prior to its discovery it was partially destroyed by a bulldozer during construction works. Preliminary reports about the finds from the excavation seasons 2011-2013 have already been published (Kopanias *et al.* 2013; Kopanias *et al.* 2014) and a series of more detailed papers appeared in the Conference Proceedings "*Archaeological Research in the Kurdistan Region of Iraq and the Adjacent Areas*" (Beuger 2016 [pottery]; Fox *forthcoming* [human remains]; Hadjikoumis 2016 [animal remains]; Kourtessi-Philippakis *forthcoming* [lithics] and Kopanias 2016 *[Burials]*).

The youngest finds in the site date from the Late 2nd or Early 1st millennium BC but those levels are completely eroded. The prehistoric levels, in contrast, lie directly under the modern surface. The excavation so far revealed three undisturbed stratigraphic layers. *Layer 4* includes a number of pyrotechnic constructions (mainly ovens and kilns) with pottery and characteristic small finds (e.g. clay nails) from the Late Ubaid period (Fig. 1). Shortly after the abandonment of the kilns and ovens the area was used for the disposal of sherds, animal bones and various items (*layer* 3, Fig. 2). Tell Nader must now be added to the growing list of Ubaid period sites demonstrating a circumferential form of headshaping, since a skeleton with such a feature was buried rudely in one

* Faculty Member, Martin-Luther-Universität Halle-Wittenberg, Seminar für Orientalische Archäologie und Kunstgeschichte, Universitätsplatz 10, 06108 Halle (Saale), Alemanya, claudia.beuger@orientarch.uni-halle.de
** Assistant Professor at the Department of History and Archaeology of the National & Kapodistrian University of Athens, University Campus, GR 157 84 Athens, Grècia, kkopanias@arch.uoa.gr

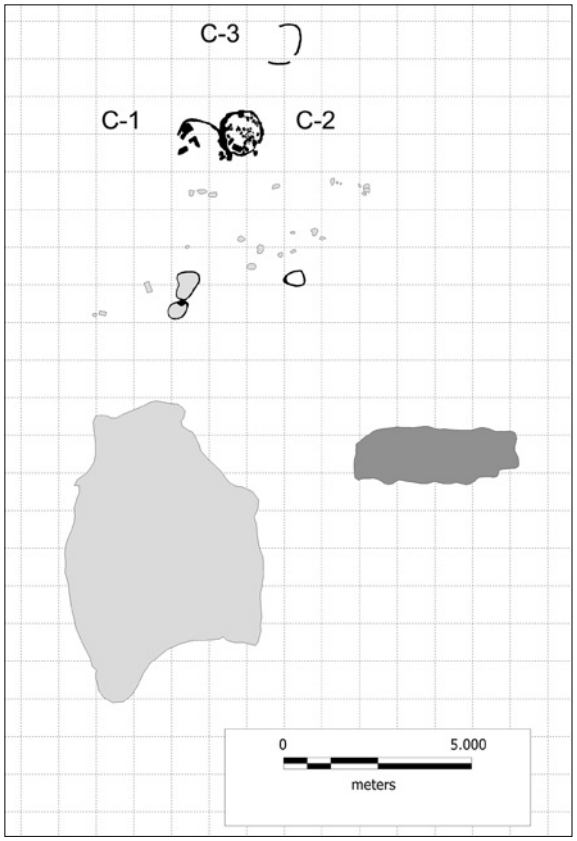

Figure 1. Tell Nader, Layer 4: pyrotechnic constructions.

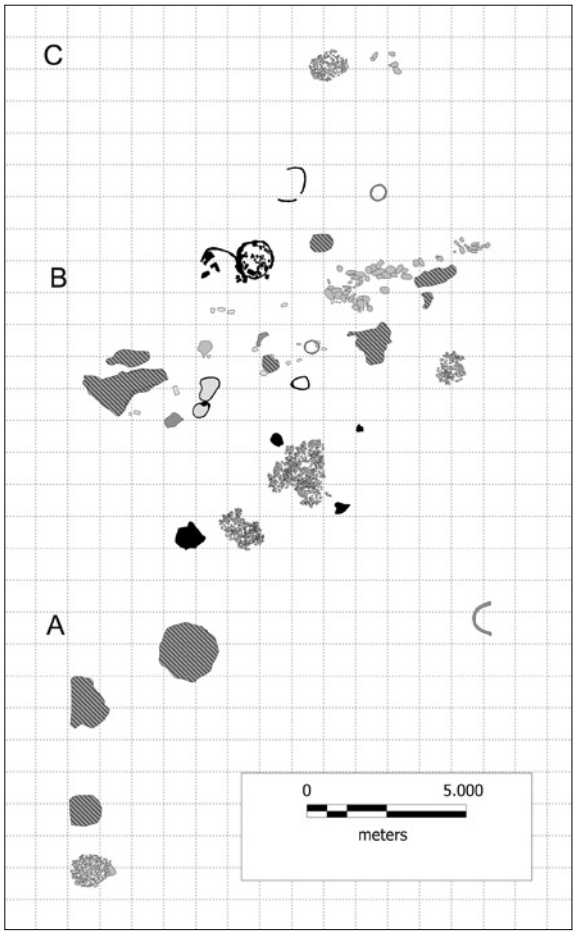

Figure 2. Tell Nader, Layer 3: pyrotechnic constructions used as dumps.

of the earlier kilns of *layer 4* (Kopanias/Fox 2016)[1]. The excavation season 2013 brought to light a deeper layer (*Layer 5*) of slightly older pyrotechnic constructions; one of them had a particularly complex design and was not used for pottery production, but for other small objects (Fig. 3), Kopanias *forthcoming*.

We do not comment the pottery on the Chalcolithic periods in detail since this aspect of Tell Nader was recently published within another conference volume (Beuger 2016).

DISCUSSION

For the Neolithic period at Tell Nader we still lack any stratigraphic context, but it is well presented by several sherds, which have been found on the surface or in later layers. The earliest Neolithic material of Tell Nader has good parallels with the well-known Proto-Hassuna sites (summarizing: Nieuwenhuyse 2007: 177). The undecorated carinated shoulder fragments, (Fig. 4a-d) which are frequent in some more or less homogeneous collections, are reminiscent of vessels for example at Tell Sotto or Yarim Tepe I (Bader 1993, 48, Fig, 3.5; Merpert/Munchaev 1993, 106 Fig. 6.18 type I). Even the coarse fabric with a high amount of organic temper and the often brownish or greyish colour is the same (Merpert/Munchaev 1993, 105). Other candidates for a Proto-Hassuna date are fragments with an application (Fig. 4e-f; Bader 1993, 49-50 Fig. 3.6-7). However, such decoration at Sabi Abyad seems to be more associated with the slightly later transitional phase Pre-Halaf/Early Halaf IIIA around 6000 BC (Nieuwenhuyse 2007, 174). Unfortunately we cannot provide a new clue to a more accurate date of this material at this stage of the excavation.

The bitumen painted rim sherds are of some interest. This kind of decoration, mainly on coarse plant tem-

1. For other cases of headshaping in the Ubaid period, see Lorentz 2010.

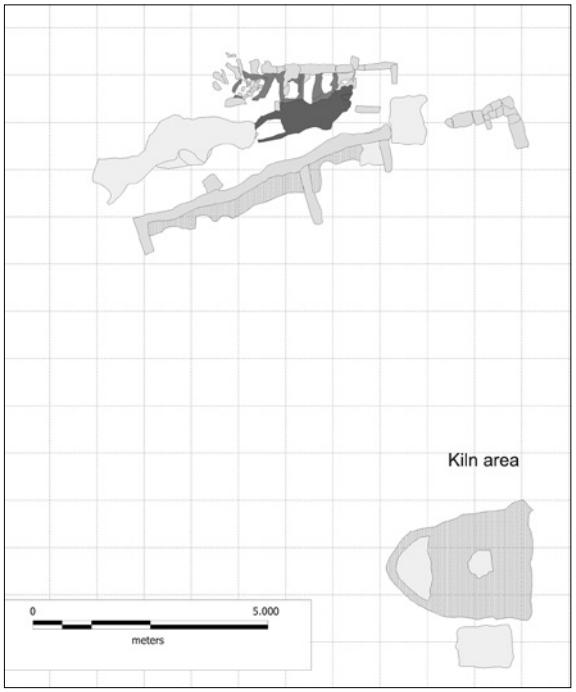

Figure 3. Tell Nader, Layer 5: pyrotechnic constructions.

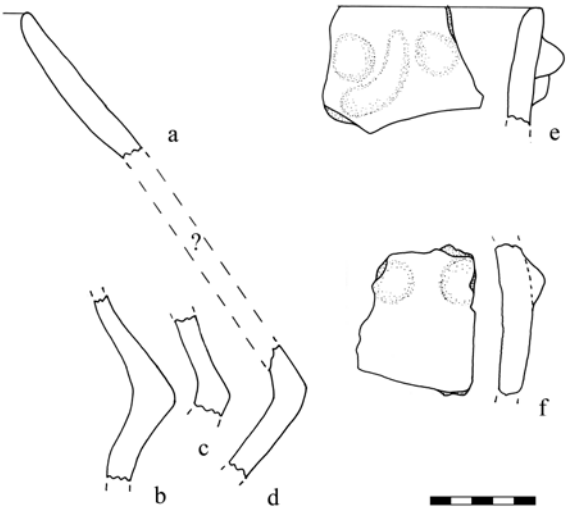

Figure 4. Tell Nader: sherds dedicated to the Proto-Hassuna period.

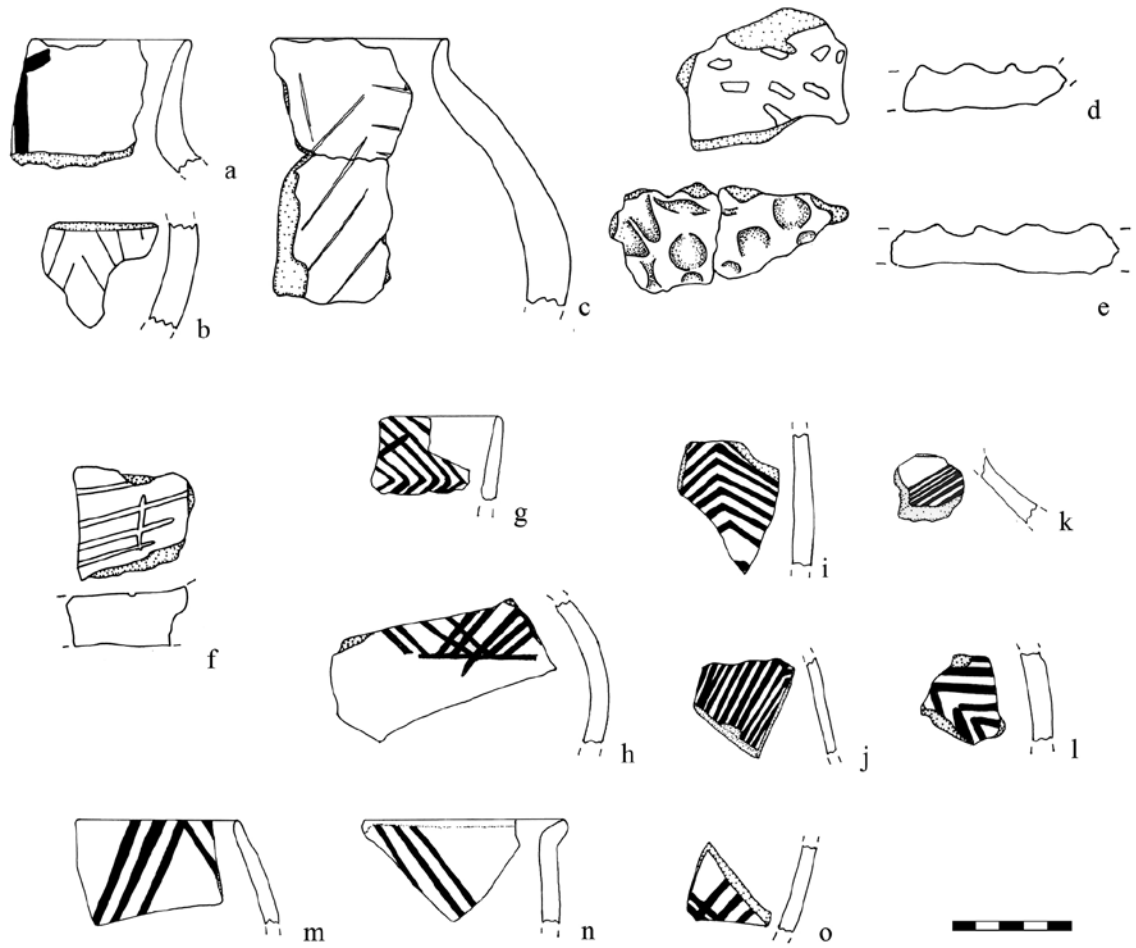

Figure 5. Tell Nader: sherds dedicated to the Pre-Halaf period.

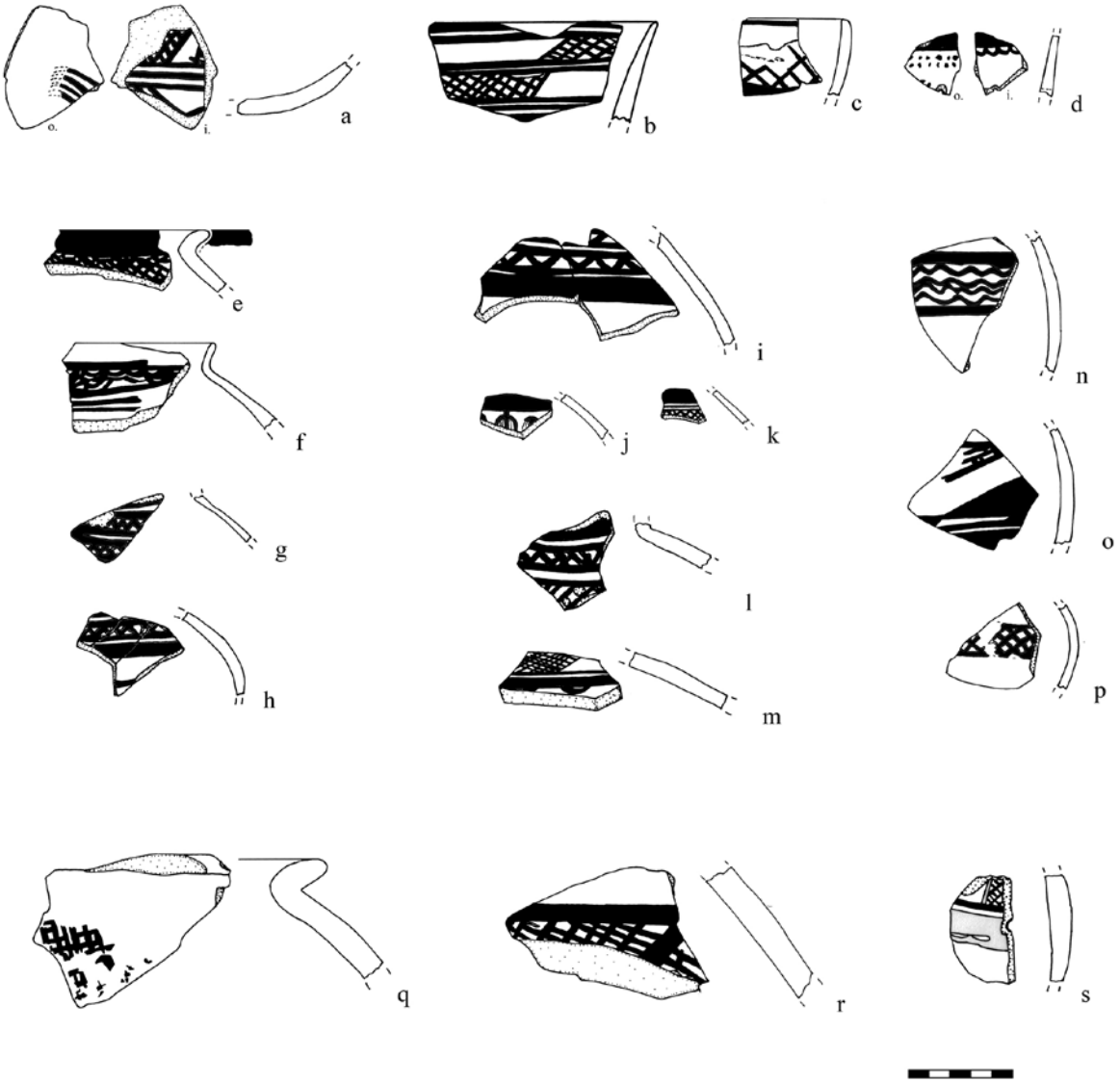

Figure 6. Tell Nader: sherds dedicated to the Halaf period.

pered vessels like (Fig. 5a), is known at Sabi Abyad especially from levels 6-7 (Pre-Halaf/Early Halaf IIIA; Nieuwenhuyse 2007, 36, 177; Connan *et al.* 2004). They might be more or less contemporary[2] with the painted sherds of the Hassuna (Fig. 5g-l)[3] and Samarra style (Fig. 5m-o)[4]. The latter pieces show the typical cream-coloured slip with a reddish brown paint. Sherds with a roughly shaped but often very fine incised herringbone pattern (Fig. 5b-c) should be assigned to the Early Hassuna as the best parallels can be found in Nineveh 1.[5] Additionally, we observed several fragments of the so called husking trays (Fig. 5d-f).[6] The style of the inner surface with finger or other imprints is still seen as a marker for the Hassuna period, but referring to Nieuwenhuyse (2007, 117) more for the later part.

All sherds which were dedicated to the Halaf-complex

2. Chronological framework referring to Nieuwenhuyse 2007, 10-11, 36, 177.
3. The character of the bundled lines is generally denser than for the Samarra style; for example Gut 1995. The fabric of (Fig. 5g) is more reminiscent of the Halafian material. It was added here because of the herringbone pattern, which seems to be more characteristic for Hassunian bowls.
4. Fig. 4 m: Although the typical 3 or 4 horizontal lines which frame the banded decoration are missing (Gut 1995, 87) we can refer to examples from Nineveh which were dedicated to the Samarra style: Gut 1995, Taf. 25.435-436. Fig. 4 n: shape cf. Gut 1995, Taf. 24.431, 28.462.
5. At Tell Hassuna 80 % of the Early Hassuna sherds were incised (Gut 1995, 183) and Proto-Hassuna is not present at Nineveh (Gut 1995, 80). For references see Gut 1995, Taf. 2.20,21,23; 3.2.
6. Nieuwenhuyse 2007, 116-117: (Fig. 5d-e) cf. level 8 type (End Pre-Halaf), (Fig. 5f) cf. lev. 7-5 type (trans. Pre-Halaf/Early Halaf IIIA).

fig.	description	fabric/technology	color	dm in cm
4a	jar	very fine clay, a lot of organic temper (partly not burned), sometimes pieces of lime, some black mineral temper, rough structure, hand, wet finish, soft-middle hard	o. greyish beige, i. beige, c. grey	i. 34,0
4b	jar, shoulder	like 4a	o./i. light orange-orange, c. beige	i. carin. 18,0
4c	jar, shoulder	like 4a	o./i. beige, c. grey	-
4d	jar, shoulder	very fine clay, a lot of large pieces of chamotte (?), some black mineral incl., lamellar structure, some long pores, hand, wet finish, soft (fragile)	o./i. beige, c. grey	i. carin. 27,0
4e	deep bowl, o. application	very fine clay, a lot of organic temper (partly not burned), often larger pieces of lime, sometimes black mineral incl., rough structure, a lot of large pores, hand, wet finish, middle hard-hard	o. orange, i. beige, c. grey	i. 24,0
4f	body sherd, o. application	like 4e	o. greyish beige, i. beige, c. dark grey	-
5a	bottle, o. bitumen painting	very fine clay, a lot of organic temper (partly not burned), sometimes pieces of lime, some black mineral temper, rough structure, hand, wet finish, soft-middle hard	o./i./c. orange	i. 10,0
5b	body sherd, o. fine incisions	like 5a	o./i./c. light orange	i. 14,0
5c	pot, o. fine incisions	like 5a	o. brownish grey, i. beige/light orange-brownish, c. grey/ dark grey	i. 14,0
5d	“husking tray”, i. notches	fine clay, a lot of middle organic temper, some larger pieces of lime, sometimes larger black mineral incl. and fine lime, lamellar structure, a lot of larger pores, hand, wet finish, hard	o./i. beige-light orange, c. grey/ dark grey	-
5e	“husking tray”, i. finger impressions	fine clay, a lot of middle organic temper and fine-middle lime, sometimes larger pieces of lime, rough lamellar, a lot of larger pores, hand, wet finish, middle hard	o. light orange, i. reddish beige, c. greyish beige	-
5f	“husking tray”, i. rough incisions	very fine clay, a lot of middle organic temper (partly not burned), some middle-large lime pieces, some black stones, rough lamellar structure, a lot of larger pores, hand, wet finish, soft-middle hard	o./i. beige, c. greyish beige	-
5g	bowl, o. reddish painting (almost disappeared)	very fine clay, no temper, very dense structure, hand, wet finish, very hard	o. light greyish beige i. light beige, c. grey	i. 16,0
5h	body sherd, o. yellowish brown painting	fine clay, a lot of fine mineral and lime, some not intended organic temper, dense structure, wheel (?), wet finish, hard	o./i. beige, c. grey	i. 18,0
5i	body sherd, o. brown painting	very fine clay, frequent fine and middle lime, a lot of middle black mineral, some organic temper, dense structure, some fine-middle pores, hand, o. slip (?), i. rough burnish, very hard-hard	o. light beige, i. reddish beige, c. light orange	-
5j	body sherd, o. dark brown painting	fine clay, a lot of fine mineral and lime, some not intenden organic temper, dense structure, hand, o. slip, i. scratches, hard	o. beige, i. greyish beige, c. grey	-
5k	body sherd, o. dark reddish brown painting	fine clay, a lot of fine-middle lime and fine organic temper, fine lamellar structure, some lager pores, hand, wet finish, middle hard	o. light beige, i. reddishbeige-beige c. beige	i. 8,0
5l	body sherd, o. dark brown painting	very fine clay, frequent fine and middle lime, a lot of middle black mineral, some organic temper, dense structure, some fine-middle pores, wheel (?), wet finish, very hard-hard	o./i. light orange, c. reddish beige	-
5m	bowl, o. brown painting	fine clay, a lot of fine-middle lime, some larger pieces of lime, dense structure, frequent larger pores, hand, wet finish, hard	o./i. beige cortex, c. reddish beige	i. 26,0

fig.	description	fabric/technology	color	dm in cm
5n	bowl, o. aubergine painting	fine clay, mineral incl., frequent fine organic temper, sometimes middle-a lot of fine-middle large lime, dense structure, larger pores, hand, o. slip, i. erased slip (?), hard	o. beige, i./c. orange	i. 24,0
5o	body sherd, o. orange painting	very fine clay, mineral incl., some fine organic incl. (not intended), some fine lime, dense structure, some fine pores, hand, o./i. slip (?), hard	o./i. light beige, c. orange	-
6a	base, o. reddish brown painting, i. light orange brown painting	fine clay, a lot of fine-middle lime, some larger pieces of lime, dense structure, frequent larger pores, hand, o. wet finish, i. slightly smoothed, hard	o. beige, i. reddish beige, c. orange	-
6b	bowl, o. reddish brown painting	fine clay, some mineral, mica, organic and lime inclusions, dense structure with some larger pores, hand, wet finish, hard	o./i. light beige, c. reddish beige	i. 40,0
6c	bowl, o. reddish orange painting (almost invisible)	very fine clay, no temper, very dense structure, wheel (?), wet finish, very hard	o. light beige, i./c. reddish beige- light orange	i. 18,0
6d	pot (?), o./i. reddish brown painting, secundary perforation	fine clay, some mineral, organic and lime inclusions, dense structure with some extended pores, wheel (?), o./i. slightly smoothed, hard	o./i. light orange, c. orange	i. 10,0
6e	pot, o. dark brown and transparent black painting	like 6d, but hand, wet finish	o. beige, i./c. reddish beige	i. 12,0
6f	pot, o. brown painting	very fine clay, no temper (some not intended organic incl.), very dense structure with some fine pores, hand, wet finish, very hard	o./i./c. beige	i. 8,0
6g	pot (?), o. brown painting	like 6f, but wheel	o./i./c. beige	-
6h	pot (?), o. brown painting	like 6f, but wheel	o./i./c. beige	i. 18,0
6i	pot (?), o. orange brown painting	like 6f, but o. smoothed, i. wet finish	o./i./c. beige	i. 20,0
6j	pot (?), o. brown painting (partly transparent)	like 6b	o. beige, i./c. greenish beige	i. 22,0
6k	pot (?), o. orange brown painting	like 6f	o./i./c. light orange	-
6l	pot (?), o black painting	like 6f, but o. slightly smoothed	o./i. light greenish beige, c. reddish beige	i. 8,0
6m	pot (?), o. black painting	fine clay, frequent mineral incl. and organic temper, dense structure, larger pores, hard	o./i./c. light orange-orange	-
6n	pot (?), more or less transparent orange brown painting	fine clay, a lot of fine-middle lime, some larger pieces of lime, dense structure, frequent larger pores, hand, wet finish, hard	o./i./c. beige	i. 22,0
6o	pot (?), o. reddish painting (almost invisible)	fine clay, frequent black mineral incl. and a lot of fine lime, some not intended organic incl., dense but fine lamellar structure, some larger pores, o. wet finish, i. rough burnish, hard	o. beige, i./c. orange	-
6p	pot (?), o. reddish brown painting	very fine clay, mineral incl., some fine organic incl. (not intended), some fine lime, dense structure, some fine pores, hand, wet finish, hard	o./i. light orange, c. orange	i. 12,0
6q	pot, o. reddish brown painting	fine clay, no temper (some not intended organic incl.), very dense structure with some fine pores, hand, wet finish, very hard	o. light beige, i./c. light orange	i. 18,0
6r	pot (?), o. reddish brown painting	very fine clay, no temper, very dense structure, hand, o. slightly smoothed, i. wet finish, very hard	o./i. beige, c. light grey	i. 49,0
6s	body sherd/lid (secondary perforation), reddish brown bichrome painting	like 6a, but o./i. wet finish	o./i./c. beige	-

Figure 7. Table with sherd description.

were chosen because of their fine fabric and the more or less buff colour. Indeed some examples show few organic inclusions, although without an intended character. The excavated chalcolithic layers in comparison provided mostly organic tempered, buff material or the typical greenish highly burnt conical bowls of fine fabric. Furthermore, Becker (2012, 126) stressed that the addition of organic temper can be seen as an important criterion to separate Halafian and Ubaidian painted pottery. Only (Fig. 6a, d, i, l, r) have a slight polish, but we are dealing with predominately a wet finish (Fig 7).

The following attempt of a finer chronological placement of the sherds refers mainly to the results of Becker (2012), which were developed on the basis of the Tawila material. The flat bowl (Fig. 6a) might be dedicated to the Halaf Ib in regard to its rounded shape and the dense decoration.[7] The dots in Fig. 6d are very typical in the Late Halaf (Becker 2012, 169). The general character of this selection (Fig. 6b-c,e-r) is Middle Halaf (Halaf IIa).[8] The Halaf-Ubaid-transition, which is proved especially at the nearby Tepe Gawra (Becker 2012, 22), so far lacks any support at Tell Nader. Only the decoration pattern of Fig. 6s finds a good reference at Tepe Gawra XIX, which was dedicated to this horizon.[9] The example of Tell Nader was a lid in secondary use, so we cannot identify the original shape and we should not overestimate this piece.

CONCLUSION

As already mentioned, the excavation at Tell Nader has not reached the Neolithic layers yet. However the large size and high frequency of the coarse Hassuna material lets us assume a more extensive settlement activity for that era. We estimate that below the currently excavated layer of the Late Ubaid/Early Uruk period, there are 2.5-3 m of earlier archaeological strata, which will hopefully enable us to provide a new prehistoric reference sequence for a more precise placement of the earlier excavations at Tepe Gawra and especially the nearby Qalinj Agha.

BIBLIOGRAPHY

BADER, N. O. 1993, The Early Agricultural Settlement of Tell Sotto, in N. Yoffee, J. J. Clark (eds.), Early Stages in the Evolution of Mesopotamian Civilization, Tucson/ London, 41-54.

BECKER, J. 2012, *Ḥalaf- und 'Obēd-Zeit in Nordost-Syrien am Beispiel von Tell Ṭawīla, Tell Ḥalaf und Wādī Ḥamar, Regionale Entwicklungen, Gemeinsamkeiten und Unterschiede* (unpublished habilitation, University of Halle-Wittenberg).

BEUGER, C. 2016, Short notes on Chalcolithic pottery research: The pottery sequences of Tell Nader (Erbil) and Ashur (Qal'at Sherqat), *in* K. Kopanias, J. MacGinnis (eds.), Archaeological Research in the Kurdistan Region of Iraq and the adjacent areas, Oxford, Archaeopress, 19-28.

CONNAN, J., NIEUWENHUYSE, O. P., VAN AS, A., JACOBS, L. 2004, Bitumen in Early Ceramic Art: Bitumen-Painted Ceramics From Late Neolithic Tell Sabi Abyad (Syria), *Archaeometry* 46/1, 115–124.

FOX, S.C. 2016, The People from Tell Nader and their Burial Customs, *in* KOPANIAS and MacGINNIS 2016.

GUT, R. 1995, *Das Prähistorische Ninive, Zur relative Chronologie des frühen Perioden Nordmesopotamines*, Baghdader Forschungen 19, Mainz.

HADJIKOUMIS, A. 2016, Animal husbandry and other human-animal interactions in Late Ubaid-Early Uruk northern Iraq: the faunal remains from the 2012 excavation season at Tell Nader, 2011 and 2012 excavation seasons, *in* K. Kopanias, J. MacGinnis (eds.), Archaeological Research in the Kurdistan Region of Iraq and the adjacent areas, Oxford, Archaeopress, 87-100.

KOPANIAS, K. *forthcoming*, An Ubaid Kiln at Tell Nader (Kurdistan Region in Iraq), in M.G. Masetti-Rouault and O. Rouault (eds.), *Proceedings of the International Congress Archaeology and History of the Empires: Models, projects and work in progress in Northern Mesopotamia. New programs in Iraqi Kurdistan, Paris, Ecole Pratique des Hautes Etudes, Sorbonne, 14-15 juin 2013*. EMMS I.

KOPANIAS, K., FOX, S.C. 2016, Headshaping at Tell Nader, *in* M. Mina, S. Triantaphyllou and I. Papadatos

7. For the rounded shape and a dense decoration see Tepe Gawra, Area A (Tobler 1950, Pl. CXI, 14-15; CXIII,25). For the Halaf Ib-date of this context see Becker 2016, 22.
8. References in Tell Tawila: deep conical bowl (Fig. 6b) cf. Becker 2016, 144-146 type S7b (because of the large diameter not identified as the earlier "cream bowl" S7a), rounded bowl (Fig. 6c) cf. Becker 2016, 143-144 type S6 (Halaf IIb-Ubaid, but most frequent in Halaf II), rounded pots with a conical rim (Fig. 6e-f,q and probably the body sherds g-p,r) cf. Becker 2016, 151-152 type T[5-]7 (mainly Halaf IIa/b but also present in Ubaid contetxs). Please note that sherd (Fig. 6j) does not show bukrania, but also a known motif of the Halaf period (cf. Mallowan/Cruikshank Rose 1935, Fig. 69 [horizontal]).
9. Tobler 1950, Pl. CXXII,101. For the chronological placement cf. Becker 2016, 22.

(eds.), An Archaeology of Prehistoric Bodies and Embodied Identities in the Eastern Mediterranean. Oxbow books, Oxford, JSTOR, www.jstor.org/stable/j.ctt1ggjkqm.24.

KOPANIAS, K., MacGINNIS, J. (eds.) 2016, *Archaeological Research in the Kurdistan Region of Iraq and the Adjacent Areas. Conference Proceedings, Athens, November 1st-3rd 2013*, Oxford.

KOPANIAS, K., BEUGER, C., CARTER, T., FOX, S.C., HADJIKOUMIS, A., KOURTESSI-PHILIPPAKIS, G., LIVARDA, A., MacGINNIS, J. 2013, The Tell Nader and Tell Baqrta Project in the Kurdistan Region of Iraq: Preliminary Report of the 2011 Season, *Subartu* 6-7, 23-57 (http://tinyurl.com/qy63mee).

KOPANIAS, K., BEUGER, C., FOX, S.C., 2014, Preliminary Results from the Excavation at Tell Nader in the Kurdistan Region of Iraq, *in* P. Bieliński, M. Gawlikowski, R. Koliński, D. Ławecka, A. Sołtysiak and Z. Wygnańska (eds), *Proceedings of the 8th International Congress on the Archaeology of the Ancient Near East 30 April - 4 May 2012, University of Warsaw*, Vol. 2, *Excavation and Progress Reports, Posters*, Wiesbaden, 140-163 (http://tinyurl.com/pl75elp).

KOURTESSI-PHILIPPAKIS, G. *forthcoming*, "Lithics in the Ubaid culture: an overview from Tell Nader," *in* K. Kopanias, J. MacGinnis (eds.), Archaeological Research in the Kurdistan Region of Iraq and the adjacent areas, Oxford, Archaeopress.

LORENTZ, K. O. 2010, Ubaid Headshaping: Negotiations of Identity through Physical Appearance? in R.A. Carter/G. Philip (eds.), *Beyond the Ubaid: Transformation and integration in the late prehistoric societies of the Middle East*, SAOC 63, 125-148.

MALLOWAN, M. E., CRUIKSHANK ROSE, J. 1935, Prehistoric Assyria: the excavations at Tall Arpachiyah 1933, *Iraq* 2, 1-178.

MERPERT, N. Ya., MUNCHAEV, R.M. 1993, Yarim Tepe I, *in* N. Yoffee, J. J. Clark (eds.), Early Stages in the Evolution of Mesopotamian Civilization, Tucson/London, 73-114.

NIEUWENHUYSE, O. 2007, *Plain and Painted Pottery - The Rise of Late Neolithic Ceramic Styles on the Syrian and Northern Mesopotamian Plains*. Turnhout: Brepols Publishers.

TOBLER, A. J. 1950, Excavations at Tepe Gawra II. Joint Expedition of the Bagdhad school and the University Museum to Mesopotamia. University of Pennsylvania Press, Philadelphia 1950.

Anna Gómez-Bach, Jörg Becker and Miquel Molist (ed),
II Workshop on Late Neolithic Ceramics in Ancient Mesopotamia: pottery in context,
Monografies del MAC 1, Barcelona 2018,
ISBN: 978-84-393-9750-2 (pàg. 99-108)

THE COOKING POT IN PERSPECTIVE: THE CASE OF SIXTH MILLENNIUM TELL KURDU

Rana Özbal*

Este artículo aborda la producción de vasos con borde engrosado del sexto milenio de Tell Kurdu (Turquía). Su correlación con hogares y grasas animales han confirmado su uso culinario. Sus dimensiones y distribución sugieren la presencia de grupos familiares extensos y la vida cotidiana de las comunidades de Neolítico final en el norte de Mesopotamia.

Vasijas de cocina, Tell Kurdu, Arqueología doméstica, Sexto milenio, Vasos de borde engrosado.

This paper considers splayed rimmed cooking vessels from the sixth millennium levels of Tell Kurdu (Turkey). Their correlation with hearths and animal fats confirm their use for cooking. Their large sizes and distribution suggest extended household groups and lets to approach to daily lives in Late Neolithic communities in upper Mesopotamia.

Cooking vessels, Tell Kurdu, household archaeology, sixth millennium BC, splayed rimmed vessels.

INTRODUCTION

Not only a habitual everyday task driven by the necessity of sustenance, but also the jell of a social group, cooking lies at the heart of community life (Atalay/Hastorf 2006; Graff/Rodriguez-Alegria 2012; Barthes 1979). Cooking and food preparation imply far more than caloric sustenance and must be viewed as important building blocks of a community (Graff/ Rodriguez-Alegria 2012; Meigs 1988; Mintz/Du Bois 2002; Weismantel 1989). Insights into this everyday task and other accompanying activities allow us to understand how a community sustained itself and how it functioned in a social sense. This paper deals with cooking pots, archaeologically speaking, one of the clearest indicators of cooking activities.

Cooking pots contain residues and countless insights into one of the most central daily activities of past societies, yet they often become relegated to a secondary position within ceramic studies. Frequently, this class of pottery is ignored or underrepresented in publications because fine ware vessels, used for serving and display, remain not only better chronological indicators sensitive to fluctuations in fashion and style but they attract more attention given their decorations and elegant profiles. The general propensity to study fine wares is perhaps even more pronounced for periods where painted or decorated wares play a prominent role in the pottery repertoire.

The Halaf Period of Northern Mesopotamia, when painting becomes prolific in pottery assemblages, provides a case in point. With few exceptions specifically focused on coarse wares (Diebold 2004; Hopwood 2010), the general trend for this period of north Mesopotamia, has been to analyze motifs from the painted repertoire of designs and to consider fine-ware shape typologies (Akkermans 1993; Campbell 1992; Davidson 1977; Nieuwenhuyse 1997; Perkins 1949).

* Faculty member, Archaeology and History of Art, Koç University. Rumelifeneri Mahallesi, Rumelifeneri Yolu, 34450 Sarıyer/İstanbul, Turquia. rozbal@ku.edu.tr

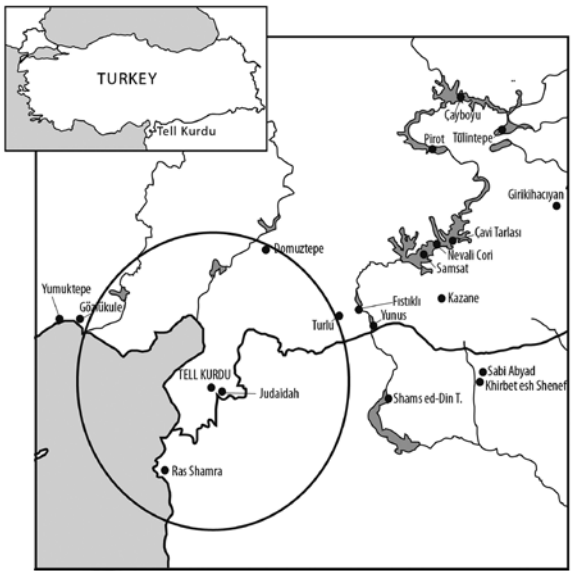

Figure 1. Map showing the location of the Amuq Valley and the site of Tell Kurdu.

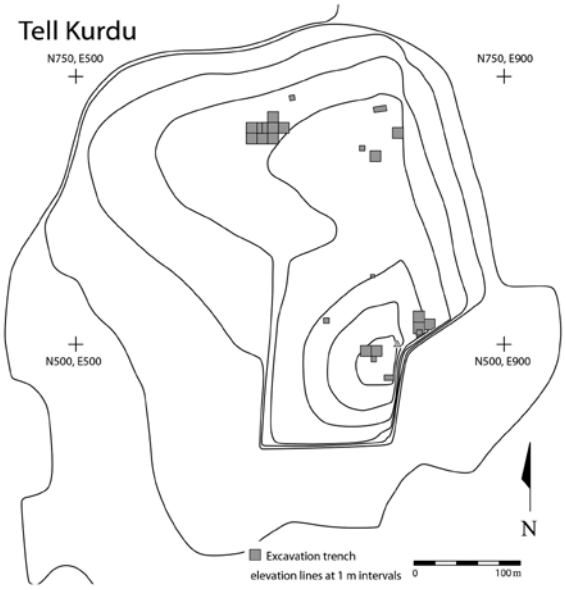

Figure 2. Topographic map of the site of Tell Kurdu.

Admittedly, though less informative when it comes to chronological questions, cooking pots can, nonetheless, give very definite clues about food preparation routines, as well as insights into social life and community relations given cooking's central role in daily life. The very necessity and mundaneness of this task is noteworthy. Cooking not only supplies individuals with nutrition but it creates and maintains social bonds between people that partake together in this act.

This chapter presents a study of cooking pots from the early sixth millennium levels of Tell Kurdu, located in the Amuq Valley of southern Turkey in the province of Hatay (Fig. 1). Excavated in 1938 by Robert and Linda Braidwood and then between 1999-2001 under the directorship of Aslıhan Yener, Tell Kurdu is the largest known prehistoric site in the valley (Fig. 2) (Braidwood and Braidwood 1960; Özbal *et al.* 2004; Yener *et al.* 2000a, 2000b). The site occupation spans from the sixth millennium (where Amuq C levels contemporaneous with the Halaf Phase are present) to the fifth millennium levels (where Amuq E deposits contemporaneous with the Ubaid Phase are present). Focusing specifically on the pottery excavated during the 2001 season, when sixth millennium deposits were excavated, this paper provides a general overview on this long-neglected ware (Özbal *et al*. 2004; Özbal 2006). The 2001 excavations at Tell Kurdu yielded a neighborhood dating to the first half of the sixth millennium BC of small residential houses aligned along streets. This settlement layout enables a contextual study of pottery distributions and concentrations (Fig. 3, Özbal *et al.* 2004; Özbal/Gerritsen 2013). Ultimately, this paper aims to investigate the practice of cooking and food preparation primarily through a ceramic based study.

Unlike typical North Mesopotamian sites in the early sixth millennium BC, the quantity of painted and decorated wares at Tell Kurdu remains quite low, comprising only 5.7% of the pottery by count and 9.2% by weight (Özbal 2006). In fact, coarse wares (unburnished wares and cooking wares) comprise over two thirds of the assemblage both by count and by weight (72% by count and 68.6% by weight). Yet, given the settlement's connections with sites to the east where painted Halaf vessels are a typical part of the assemblage, Kurdu painted wares have often received more interest (Akkermans 1993:132; Davidson 1977:265-72; Matthews 2000:101; Özbal 2017 a and b; Özbal/Gerritsen 2013; Watkins/Campbell 1987:439). This chapter attempts to put cooking vessels in the foreground and to give them the attention they deserve.

Focusing specifically on the sixth millennium splayed rimmed vessel which must have functioned as the main cooking pot of the Amuq Valley at the time, the chapter's aim is to present the attributes, the characteristics and the spatial distribution of this vessel type in order to provide some information on the ware and offer insights about how and where it was used. Furthermore, two splayed rim vessel examples with positive residue results provide an overview of the types of food cooked in such vessels.

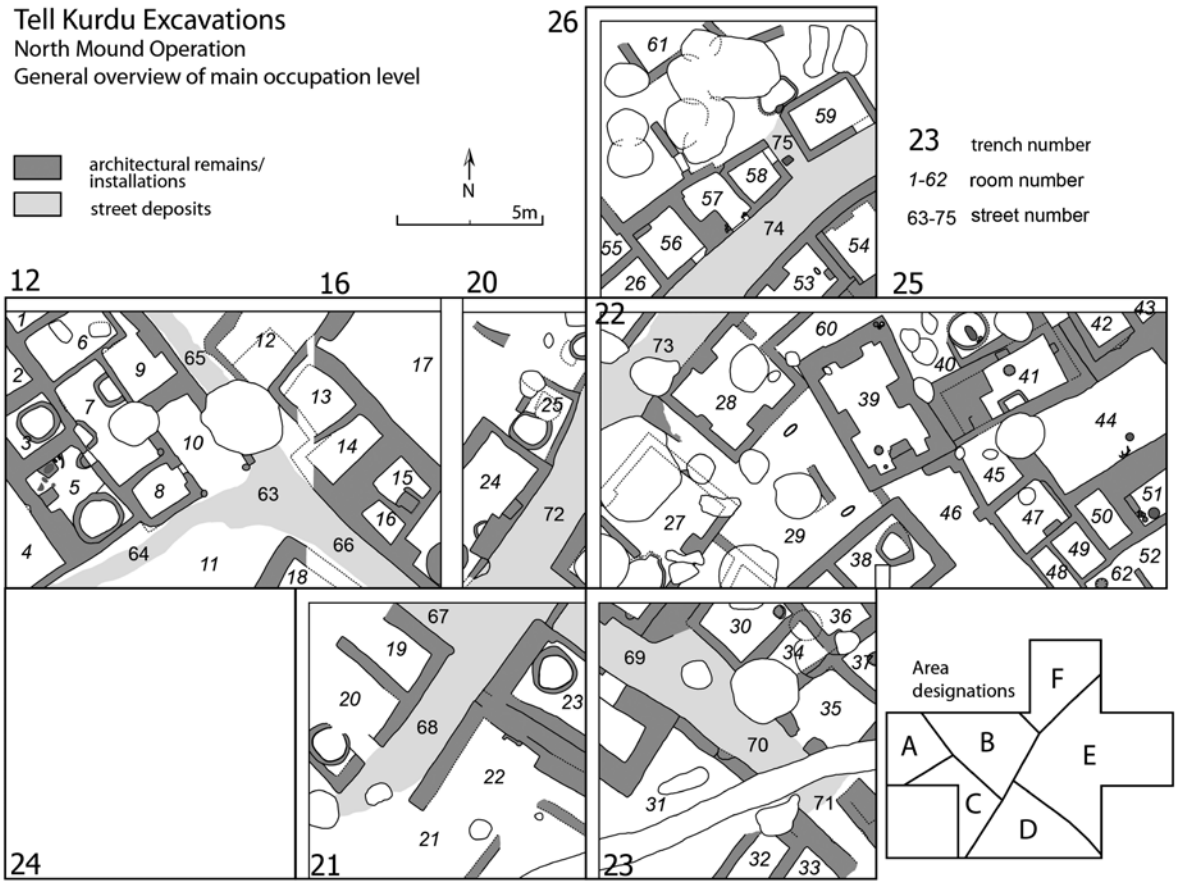

Figure 3. Plan of excavated portion of the sixth millennium settlement at Tell Kurdu.

SPLAYED RIM VESSELS: AN OVERVIEW

As prolific as they are at Amuq C Period Tell Kurdu - with one in every five diagnostics belonging to a splayed rim vessel - as well as at other sites in the Amuq Valley yielding notable quantities such as Tell Rasm, AS80, Hasanuşağı and Tell Judaidah (Casana 2003; Diebold 2004:54), the shape and ware, surprisingly, does not appear to extend far beyond the valley into surrounding regions. In other words, the geographic distribution of splayed rim vessels is remarkably narrow. With the exception of closely related types discovered during the Qoueiq survey (Mellaart 1981:fig. 90-91), examples are conspicuously absent among other published sherd assemblages. The shape has not been identified (or published) among the pottery repertoire of the neighboring Rouj Basin, specifically at Tell Aray I, among Ras Shamra's IVB levels, nor among Hama and Tarsus Gözlükule's prehistoric levels (de Contenson 1992; Goldman 1956:65-75; Ingholt 1934; Iwasaki *et al.* 1995:fig. 16-17, see Özbal 2017a).

Albeit restricted in their geographic extent, splayed rim vessels were used extensively starting in the Amuq Phase B and continuing through the First Mixed Range, Phase C and Phase D. Though they remained a steadfast feature of the Amuq for millennia, they were eventually replaced with the "New-Style Cooking Pot Ware" in the fifth millennium with the advent of the Amuq Phase E. This remarkable continuity may result from the conservatism societies exhibit when it comes to cooking. Consequently, pots, utensils and traditions have been known to remain unchanged for exceedingly long timespans sometimes regardless of their functional effectiveness (Pierce 2005; Villing/Spataro 2015:12). Often this persistence highlights the loyalty that societies feel towards unwavering daily routines like the task of preparing food and explains why cooking vessels tend to lack the typo-chronological sequencing that short-lived and readily refashioned serving and display vessels often exhibit. The inability of archaeologists to apply form and design based frequency seriations may explain why cooking vessels received a subordinate role in the archaeological study of ceramics.

Accordingly, considered here is the distribution of splayed rim cooking vessels across the settlement and a narrow time range (not a chronological overview of changing vessel types). Insights gained on how such vessels were used and whether they are found in spac-

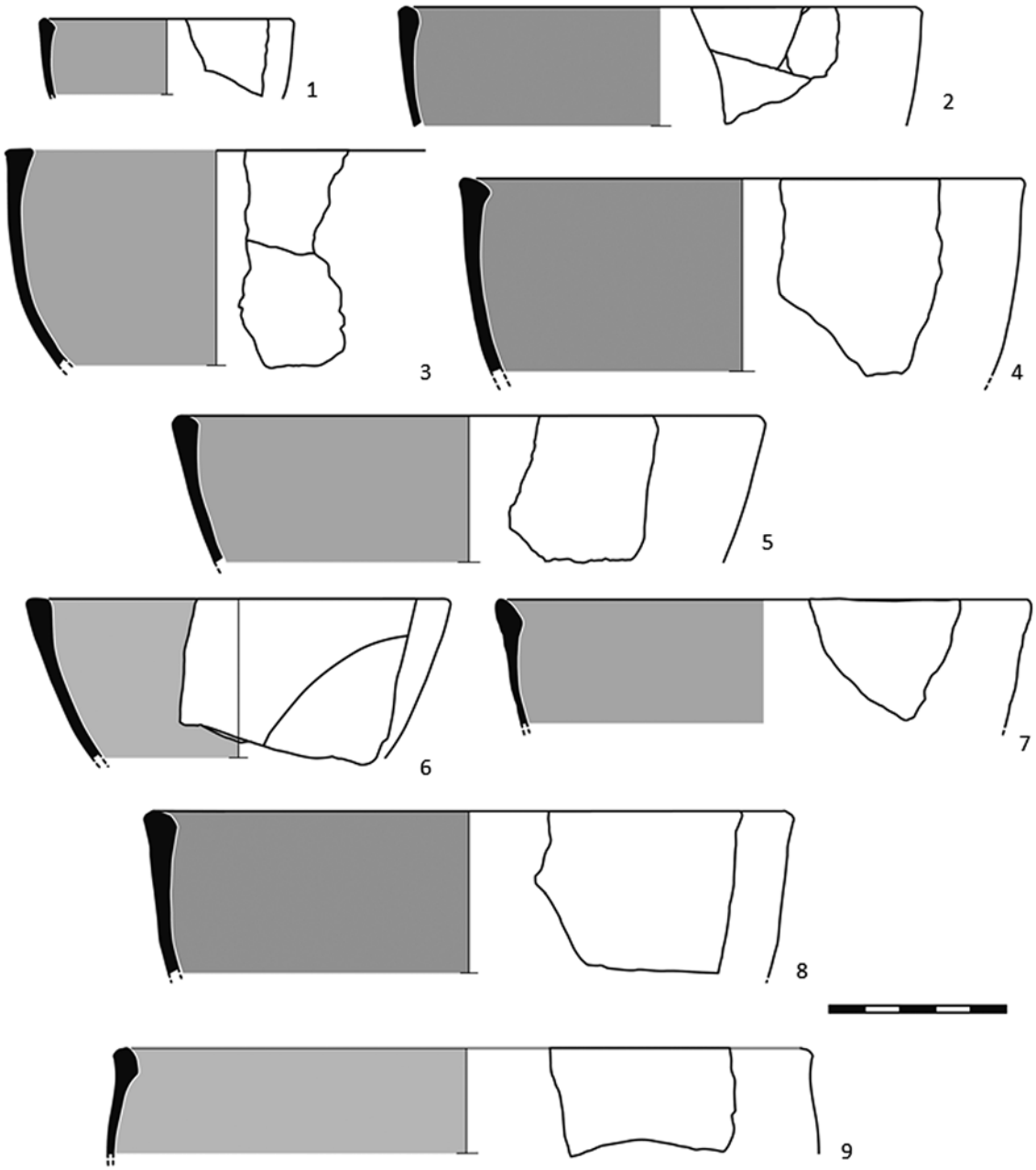

Figure 4. Examples of straight-sided splayed rim vessels.

es equipped with other cooking related facilities may inform us about the provisioning of meals and preparation of food in this sixth millennium settlement.

Comprising 20% of all form diagnostics in Amuq Phase C, splayed rim vessels at Tell Kurdu are immediately recognizable given their surprisingly thin walls and yet remarkably thick lips (Braidwood/Braidwood 1960:142; Diebold 2004, Fig. 4-6). Their thickened rims, often 1 cm thick, must have given the brittle vessel walls some tensile strength. The soot that some sherds display on their exterior surface is clearly suggestive of placement on an open-fire. Splayed rim vessels from Phase C come both in bowl and hole-mouth variants and often have large diameters.

Apart from a small burnished component comprising around 1-2% of the overall assemblage, splayed vessels from the Amuq C Period are unburnished and typicalfall within the Amuqian Dark Faced Unburnished Ware (DFUBW) category. Braidwood and Braidwood further place splayed rim vessels from Tell Kurdu's sixth millennium levels in DFUBW Variant 2, known for its large mineral, shell, sand and grit inclusions (Braidwood/Braidwood 1960). Using Rye (1976), Diebold suggests the high frequency of large inclusions could have added re-

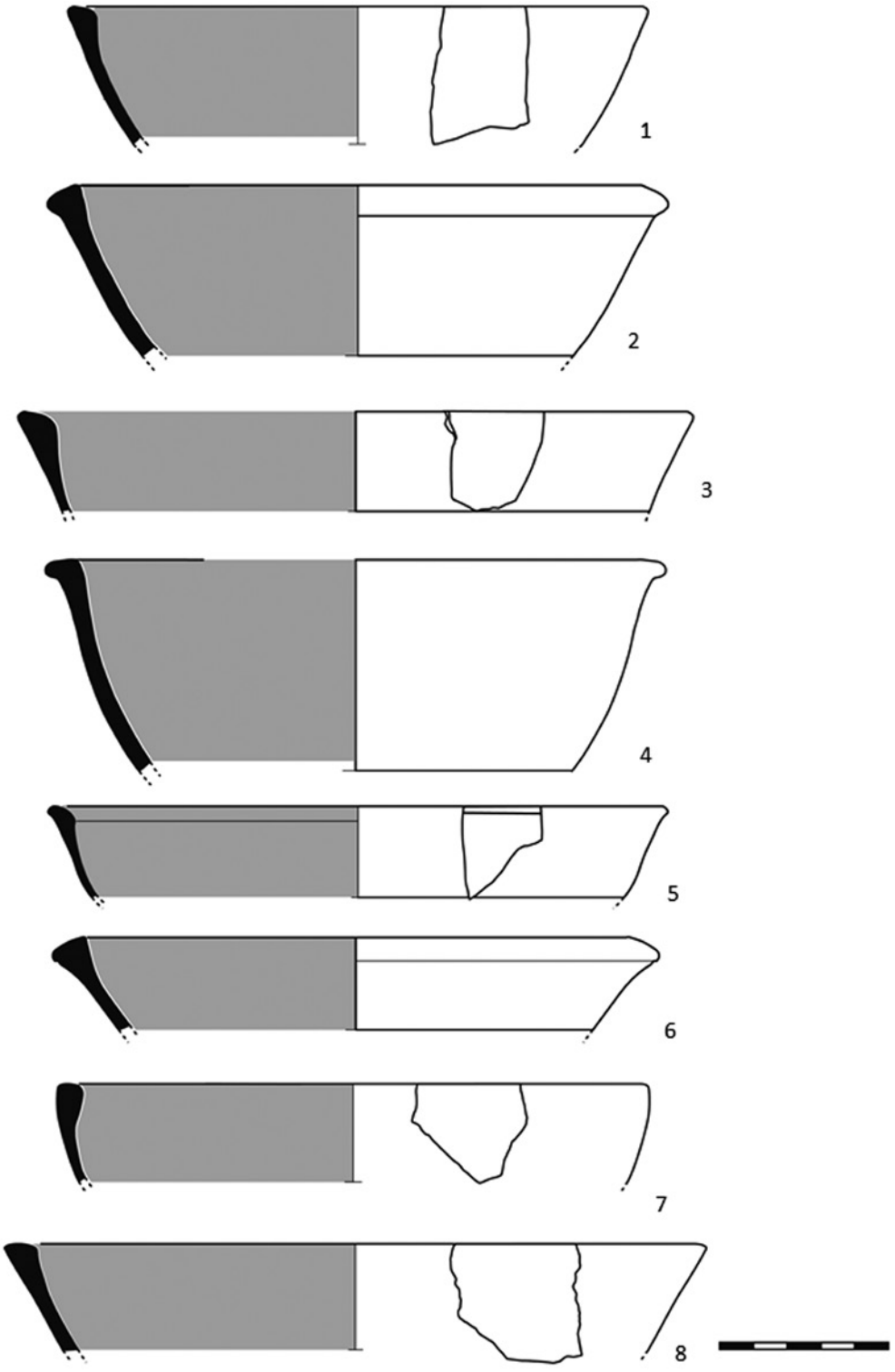

Figure 5. Examples of open-mouthed splayed rim vessels.

sistance to the vessel against thermal shock (2004:54). In fact, the sand-grit temper is so intensely added that it gives the surface a sandpapery look and feel. This, combined with the thin vessel walls, which range between 3 and 8 mm (Braidwood/Braidwood 1960:141-142; Diebold 2004:54), must have equipped them with exceptional thermodynamic properties, allowing the effective conduction of heat to cook the foods within. Though thin, the cores of splayed rim vessels, mostly brown, grey or black on their outer surfaces even when

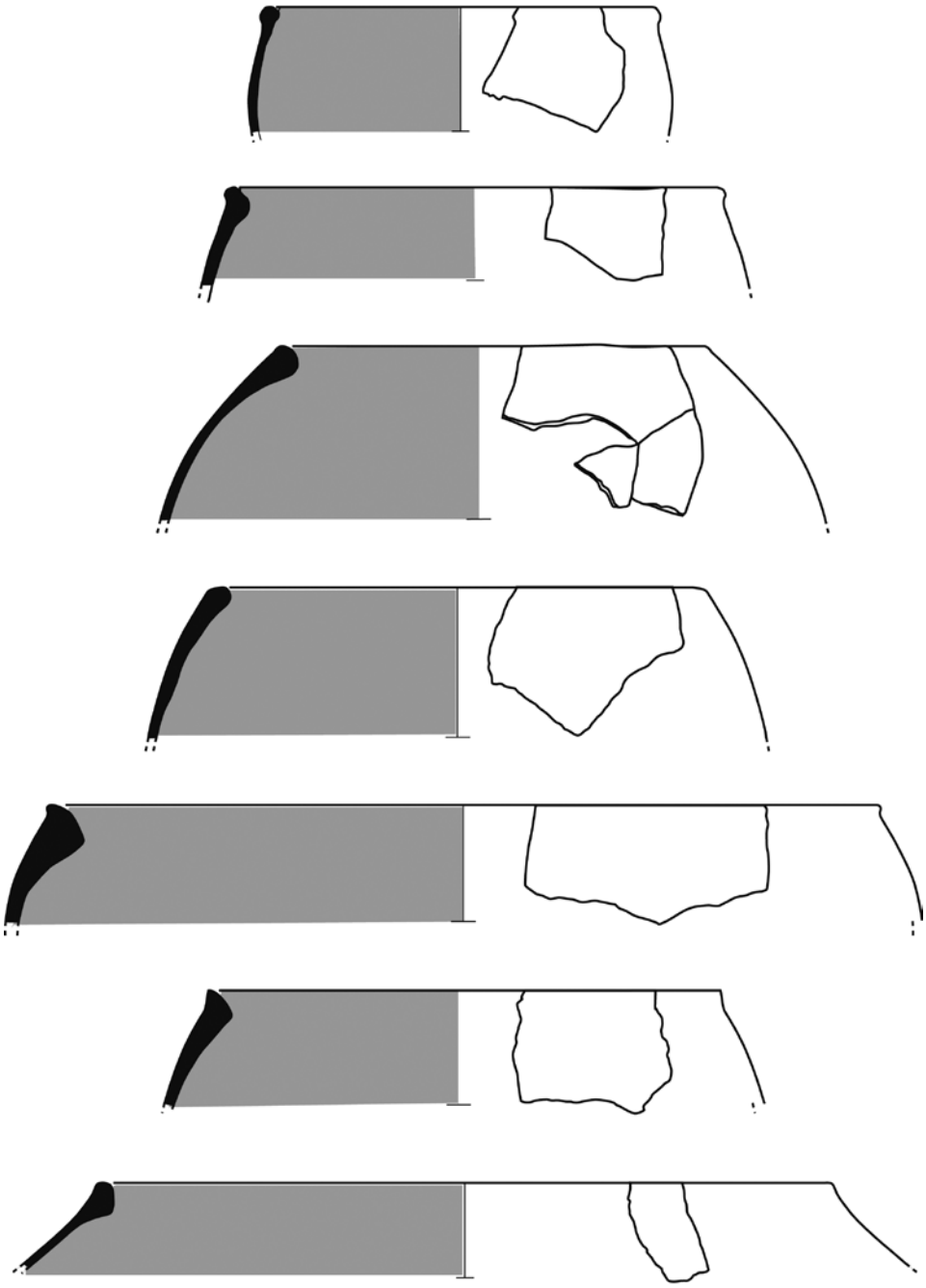

Figure 6. Examples of closed-mouthed splayed rim vessels.

oxidized, are always dark black and often show a sandwich type effect with the oxidized surfaces surrounding a darker sherd center.

Splayed rim vessels tend to be quite large and must have held a large volume of food, potentially making them suitable for commensal dining. The average rim diameter (based on around 250 open and straight-sided rims) ranged around 37 cm (Fig. 4). However, open deep bowls (Fig. 5) and closed hole-mouthed pots (Fig. 6) were found equally as often as straight sided splayed-rim vessels. A sample of nearly 400 splayed rim vessels revealed that about 39% were straight-sided, while approximately 35% were slightly open shapes. Of the remaining 36%, approximately half were slightly constrained in shape while the other half had restricted orifices and could be called true hole-mouth shaped splayed rim vessels. Especially with the open shapes, rim diameters approached 50 cm (also see Diebold 2004:54). Diameters were naturally smaller for closed

vessels and ranged around 29 cm (based on around 150 rims). Bases were generally rounded, probably for efficient heat distribution and for thermal shock absorption. Even the most conservative volume estimation suggests that vessels could contain in excess of 15 liters of liquid. Such substantial sizes suggest that foods were prepared and cooked for relatively large groups.

In fact, a general look at the cooking pot diameters for splayed rim vessels across the various Amuq Phases indicates that there is an increase in the diameters of Dark Faced Un-burnished Ware splayed rim cooking pots in Amuq Phase C (Fig. 7). Based on the data generated by Braidwood and Braidwood, splayed rim cooking pots showed a 40% increase in diameter size after the First Mixed Range, reaching 34 cm by Phase C[1] and continuing into Phase D (1960). However, the assemblage becomes inundated by the so-called "New Cooking Pot Ware" first with an initial trickle in Phases D and thereafter fully in Phase E.

Jack Goody (1982:86-87) and others point out that a one-to-one relationship between vessel size and group size is not always substantiated, given that communal meals can be cooked in multiple smaller containers (Villing/Sparato 2015:6). However, a large vessel diameter implies a large volume and hence quite undeniably must suggest that considerable amounts of food were being prepared. Using an unwieldy vessel with a 15-20 liter capacity to prepare food for small nuclear family groups is unlikely and suggests the provisioning of food for a large group and the practice of commensal dining (Pollock 2012). Addressed below are basic insights towards answering where, how, and what these vessels were used for, what types of foods were cooked in them, as well as how and under what conditions foods were prepared across the settlement and the various neighborhoods of Tell Kurdu's sixth millennium settlement.

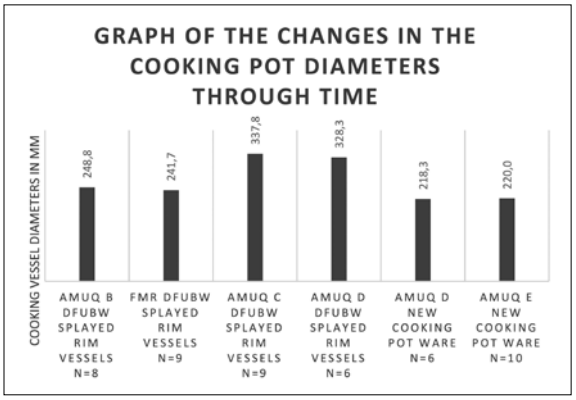

Figure 7. A comparison of diameters of various types of cooking pots across different phases based on Braidwood and Braidwood's (1960) data.

SPLAYED RIM VESSEL RESIDUES FROM TELL KURDU

One of the best ways to understand vessel usage in recent years has been to analyze the residues of the remaining lipids captured inside vessel walls. When complemented by faunal studies, such analyses allow for a thorough reconstruction of the consumption of animal based products. A range of vessels from Tell Kurdu were analyzed for residues at the Boğaziçi University Archaeometry Laboratory in Istanbul. Interestingly, two of the Tell Kurdu vessels that yielded positive residue results were splayed rim vessels: while TK 6227.5 yielded porcine residues (H. Özbal *et al.* 2015:180), TK 6760C lies within the ruminant lipid range (Türkekul Bıyık 2009: 102). In addition to providing unequivocal information that splayed rim vessels were used for the processing of meat-based products, they show that both pork as well as beef and/or mutton was prepared in these vessels. Indeed, faunal studies have shown that ruminants dominate the Tell Kurdu assemblage with average NISP values ranging around 40.5% for cattle and 42.5% for ovicaprines. Suids comprise only 8.5% of the identifiable faunal remains, although this value reaches 10.3% for Area E (Loyet/Nardulli 2004). It is notable that residues belonging to a species comprising such a small part of the assemblage were discovered within a splayed rim vessel wall. This and the expected discovery of ruminant fats confirm that these vessels, as presumed, are indeed reserved for cooking, boiling and the preparation of daily meals, from soups to other pot dishes.

CONTEXTUAL DISTRIBUTION OF VESSELS ACROSS TELL KURDU'S SIXTH MILLENNIUM PHASE

Given attributes like soot and thermal shock discussed above, splayed rimmed vessels at Tell Kurdu can function as excellent indicators of cooking activities. Their distribution across the various rooms and courtyards of the Amuq C neighborhood at Tell Kurdu could potentially provide firsthand information on the location of food preparation activities. As part of this contextual study,

1. This value is based on the nine vessels measured by the Braidwood's, yet, our sample of 250 vessels shows that the average diameter range is actually 37 cm.

the distribution of splayed rim vessels across rooms and courtyards of the settlement that yielded at least 20 form diagnostic sherds was considered.[2]

Interestingly, the main splayed rimmed vessel concentrations appear, contrary to initial expectations, not to be located in rooms with large walled ovens (such as R05, R23 and R20, see Fig. 3) but rather in rooms with small fire-pits (such as R52, R41 and R47). In each of the latter rooms, splayed rim cooking vessels comprise more than a third of their diagnostic sherds. This is significant, especially when the site average of 18.5% is considered. Also remarkable is the fact that all three rooms/ spaces with the highest percentage of splayed rimmed vessels contain or have immediate access to fire pits. Note that R47's fire-pit dates to an early use phase in the history of the room, prior to the construction of the west wall and may not be directly related to the room, but the ceramics are also likely to be from an earlier floor as well. R52's fire-pit, on the other hand, is in the associated eastern extension, R62.

Nonetheless, the connection between splayed rim vessels and fire-pits is especially strengthened by floor 25:82 in R41. R41 went through several use phases as various features such as a bench, a bin, wall niches, and a platform appeared and disappeared throughout the use-life of the structure. The eighth floor from the top (25:82) was the only one in this room to yield a fire-pit. Interestingly, the splayed rim vessel ratios from this floor are remarkably high; 16 of the 38 identifiable form diagnostics from this floor or 42.1% are from different splayed vessels. The vessels have diameters that range between 19 and 50 cm, with an average of 38 cm. All the fire-pits found in Tell Kurdu, interestingly, are located in Area E, which correspondingly yielded the highest quantities of splayed rim vessels across the site. The lack of these features in other areas is unexplained at present. Interestingly, both splayed rimmed sherds that yielded residues come from Area E. The one yielding ruminant adipose fat comes directly from R41, the room described above, while the porcine lipids come from a mixed context from Area E.

Other rooms like R62, R37 and R30 also have fire-pits, but none of these spaces yielded more than 20 diagnostic sherds, and the percentages obtained for splay-rimmed sherds or other vessel types may be less representative. Rooms with walled ovens such as R05 and R23, on the other hand, range below the site average at 12-13 percent when splayed rimmed vessel sherd ratios are considered. This could indicate that walled ovens were not used in conjunction with splayed rimmed vessels, which were likely employed for foods that were boiled or left to simmer, such as porridges and soups. This is corroborated by the lipid residue data that yielded adipose fats from various animals. In fact, in many cases, a walled ovens' proximity to concentrations of grinding stones suggests that they were instead used for baking bread, similar to the tall-walled ovens (called tannours or tandırs) as supported by ethnographic studies in the Near East (Horne 1994:145; Kamp 2000:88; Sweet 1960:274; Yakar 2000:164).

DISCUSSION AND CONCLUSION

Beyond a means to provide an intake of nutrients and a way of acquiring our daily subsistence needs, cooking is a social activity that fosters families, sharing, strengthens community ties and forms the foundation of a household unit (Graff/Rodriguez-Alegria 2012, Hendon 1996). Although often ignored in archaeological interpretations given the mundaneness of the activity, its very necessity and routineness makes cooking a fundamental part of society. Splayed rimmed cooking pots of the Amuq Valley were used as cooking vessels as confirmed by residue analyses yielding positive lipid signatures for animal fats.

Overall, the paper has demonstrated that also for periods where painted and chronologically idiosyncratic fine ware serving vessels remain the main ceramic type studied, cooking pots too can provide important insights into the functioning of a community. By approaching cooking as a multifarious task including the spatial distribution of cooking vessels and hearths, as well as lipid residue results, the paper aimed to address this often-neglected activity and gain insights into social organization across the settlement. Hearths and cooking vessels seem to occur together in the sixth millennium levels of Tell Kurdu in a rather concentrated manner in Area E while bread ovens often appear in other areas. Ultimately, this separation enables the distinction of tasks and the identification of designated boiling and baking locales.

The exceptional size of the cooking pots in this phase is remarkable and suggest the presence of extended household groups as vessels of such unwieldy sizes were unlikely used when cooking for small restricted

2. Form diagnostics refer to sherds with features that include aspects such as rims and necks that enable the functional determination of the vessel to be established. Sherds with interesting surface features are thus not considered form-diagnostics. The measure of 20 diagnostic sherds was taken to ensure a representative breakdown of the pottery, given that percentage values are skewed for rooms with less than this number. The values are always calculated as Minimum Number of Vessel (MNV) values. Two rim sherds from the same vessel are thus always considered as one vessel.

groups. The juxtaposition between the small room sizes and the sizeable cooking pots is remarkable and suggests household groups likely crosscut residential groups. Large pot sizes are suggestive of the processing of considerable food quantities and also imply the presence of a system for the division of labor and allocation of food/cooking related tasks. Overall, these insights provide a deeper understanding of daily life within the Tell Kurdu community in the sixth millennium BC.

BIBLIOGRAPHY

AKKERMANS, P.M.M.G. 1993, *Villages in the Steppe: Later Neolithic Settlement and Subsistence in the Balikh Valley, Northern Syria*. Archaeological Series 5. International Monographs in Prehistory, Ann Arbor, Michigan.

ATALAY, S., HASTORF, C.A. 2006, Food, meals, and daily activities: Food habitus at Neolithic Çatalhöyük. *American Antiquity 71.2*, 283-319.

BARTHES, R. 1979, Towards a Psycho-sociology of Contemporary Food Consump-tion, in Forster, R. and Ranum, O. (eds.), *Food and Drink in History,* Baltimore, Johns Hopkins University Press, 266-173.

BRAIDWOOD, R.J., BRAIDWOOD, L.S. 1960, *Excavations in the Plain of Antioch,* Oriental Institute Publication 61.

CAMPBELL, S. 1992, *Culture, Chronology and Change in the Later Neolithic of North Mesopotamia,* Unpublished PhD Dissertation, Edinburgh, University of Edinburgh.

CASANA, J. 2003, *From Alalakh to Antioch: settlement, land use, and environmental change in the Amuq Valley of southern Turkey*, Dissertation, University of Chicago, Department of Near Eastern Languages and Civilizations.

DAVIDSON, T. E. 1977, *Regional Variation within the Halaf Ceramic Tradition, Unpublished PhD Dissertation, Edinburgh*, University of Edinburgh.

DE CONTENSON, H. 1992, *Préhistoire de Ras Shamra*, Paris, Editions Recherche sur les Civilisations.

DIEBOLD, B. 2004, Excavations at Tell Kurdu 2001: The Pottery, in Özbal, R *et al*., Tell Kurdu Excavations 2001, *Anatolica 30*, 52-55.

GOLDMAN, H. 1936, Excavations at Gözlü Kule, Tarsus: II: From the Neolithic Through the Bronze Age, *American Journal of Archaeology 41.2*, 262-286.

GOODY, J. 1982, *Cooking, Cuisine and Class: a Study in Comparative Sociology*. Cambridge, Cambridge University Press.

GRAFF, S. R., RODRÍGUEZ-ALEGRÍA, E. 2012*, The Menial Art of Cooking: Archaeo-logical Studies of Cooking and Food Preparation*, Colorado, University Press of Colorado.

INGHOLT, H. 1934, *Rapport préliminaire sur le première campagne des fouilles de Hama*, Copenhagen, Levin & Munksgaards Forlag.

HENDON, J. 1996, Archaeological Approaches to the Organization of Domestic Labor: Household Practice and Domestic Relations. *Annual Review of Anthropology 25*, 45-61.

HOPWOOD, M. H. 2010, *The Fed Community: Food Preparation and Community at The Halaf Site of Fıstıklı Höyük, Turkey,* Unpublished PhD Dissertation, Binghamton, State University of New York.

HORNE, L. 1994, *Village Spaces: Settlement and Society in Northeastern Iran,* Washington, Smithsonian Institution Press.

IWASAKI, T., H. *et al.* 1995, The Prehistory of the Rouj Basin, Northwest Syria: A Preliminary Report, *Anatolica 21*,143-187.

KAMP, K. 2000, From Village to Tell: Household Ethnoarchaeology In Syria, *Near Eastern Archaeology 63.2*, 84-93.

LOYET, M., NARDULLI, F. 2004, Tell Kurdu Fauna Analysis. In Tell Kurdu Excavations 2001, by R. Özbal *et al. Anatolica 30*, 64-68.

MATTHEWS, R. D. 2000, *The Early Prehistory of Mesopotamia 500,000 to 4,500 BC*, Brussels, Subartu.

MEIGS, A. S. 1988, Food as a Cultural Construction, *Food & Foodways 2.1*, 341-357.

MELLAART, J. 1981, The Prehistoric Pottery from the Neolithic to the Beginnings of the E.B.IV in Matthers (ed.), *The River Qoueiq, Northern Syria and its Catchment: Studies arising from the Tell Rifa'at Survey 1977-1979,* Oxford, BAR. International Series 98, 131-320.

MINTZ, S. W., DU BOIS, C. M. 2000, The anthropology of food and eating, *Annual Review of Anthropology 31*, 99-119.

NIEUWENHUYSE, O. 1997, Following the Earliest Halaf: Some Later Halaf Pottery from Tell Sabi Abyad, Syria, *Anatolica 23*, 227-242.

ÖZBAL, H., DOĞAN, T., TÜRKEKUL-BIYIK, A. 2015, Çömleklerde Organik Kalıntı Analiz-leriyle Neolitik Sürecin Anadolu'ya Yayılma-sının Değerlendirilmesi. *Arkeometri Sonuçları Toplantısı 30*, 175-188.

ÖZBAL, R., 2006, *Households, Daily Practice, and Cultural Appropriation at Sixth Millennium Tell Kurdu.* Ann Arbor, ProQuest.

ÖZBAL, R. 2017a, Painted Pottery and Visual Representation at Tell Kurdu.In Cruells, Mateiciucová and Nieuwenhuyse (Eds*) Painting Pots, Painting People Late Neolithic Ceramics in Ancient Mesopotamia*, Oxford, Oxbow Books, 141-151

ÖZBAL, R. 2017b, Reconsidering Identity in the Halaf World: A Study of Coarse Wares in Sixth Millennium North Mesopotamia *Adalya 20*, 1-20.

ÖZBAL, R., *et al.* 2004, Tell Kurdu Excavations 2001, *Anatolica 30,* 37-107.

ÖZBAL, R., GERRITSEN, F. A. 2013, Burnishing, Painting and Fenestrating: The Social Use of Pottery at Tell Kurdu, in Nieuwenhuyse O. *et al.* (eds,) *Interpreting the Late Neolithic of Upper Mesopotamia*. Rogasch, Brepols Publishers, 107-116.

PERKINS, L. A. 1949, *The Comparative Archaeology of Early Mesopotamia*, Chicago, University of Chicago Press.

PIERCE, C. 2005, Reverse Engineering the Ceramic Cooking Pot: Cost and Performance Properties of Plain and Textured Vessels, *Journal of Archaeological Method and Theory, 12.2,* 117-157.

POLLOCK, S. (ed.) 2012, *Between Feasts and Daily Meals. Toward an Archaeology of Commensal Spaces, Berlin*, e-Topoi Journal for Ancient Studies, special volume 2.

RYE, O. S. 1976, Keeping Your Temper Under Control: Materials and The Manu-facture of Papuan Pottery. *Archaeology and Physical Anthropology in Oceania 11.2*, 106-137.

SWEET, L. E. 1960, *Tell Toqaan: A Syrian Village.* Anthropological Papers 14, Ann Arbor, University of Michigan Press.

TÜRKEKUL BIYIK, A. 2009, *Chemical Characterization of Lipid Residues in Neolithic and Chalcolithic Pottery from Anatolia.* Un-published Doctoral Dissertation, Boğaziçi University Department of Chemistry, Istanbul.

VILLING, A., SPATARO, M. 2015, *Ceramics, Cuisine and Culture: The archaeology and science of kitchen pottery in the ancient Mediterranean world*. Oxford, Oxbow books.

WATKINS, T., CAMPBELL, S. 1987, The Chronology of the Halaf Culture, in Aurenche, O., Evin J., Hours F. (eds.), *Chronologies in the Near East,* Oxford, BAR International Series 379, 429.

WEISMANTEL, M. J. 1989, *Food, gender, and poverty in the Ecuadorian Andes, Philadelphia*, University of Pennsylvania Press.

YAKAR, J. 2000, *Ethnoarchaeology of Anatolia: Rural Socio-Economy in the Bronze and Iron Ages,* Tel Aviv, University Monograph Series 17.

YENER, A. *et al.* 2000a, The Amuq Valley Regional Project, 1995-1998, *American Journal of Archaeology 104*, 163-220.

YENER, K.A. *et al.* 2000b, Tell Kurdu Excavations 1999, *Anatolica 26*, 32-117.

Anna Gómez-Bach, Jörg Becker and Miquel Molist (ed),
II Workshop on Late Neolithic Ceramics in Ancient Mesopotamia: pottery in context,
Monografies del MAC 1, Barcelona 2018,
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AT THE PERIPHERY OF THE OIKOUMENE: THE HALAF AND UBAID 'BICHROME WARE' TRADITION IN THE LEVANT

Eva Gabrieli*

Los conjuntos cerámicos Halaf y Ubaid del Levante contienen pequeñas cantidades de cerámica con decoración policroma. Estas cerámicas, tales como las monocromas, se distinguen por su carácter "glocal" o exógeno. Aunque los mecanismos que condujeron a su difusión no han sido bien entendidos, su presencia debe ser concebida como una de las muchas manifestaciones producidas por las complejas interacciones que existen en la base de las extensas redes sociales y materiales Halaf y Ubaid.

Halaf; Ubaid; Levante; Redes supraregionales; Cerámicas policromas.

The Halaf and Ubaid ceramic assemblages from Levant contain small quantities of pottery with polychromous decorations with «glocal» character. Even mechanisms for its diffusion have not been fully understood, its presence must be conceived as one of the many products of the interaction complex which is at the base of the wide social and material halafian and ubaidian networks.

Halaf; Ubaid; Levant; Supraregional networks, Polychrome pottery.

INTRODUCTION

Apart from the most spectacular finds like those from Arpachiyah, polychromatic pottery has never attracted as much attention as its monochrome counterpart. Most 'classic' Halaf and Ubaid assemblages, however, contain small quantities of polychromatic pottery alongside the commoner monochrome-painted ceramics. Like other Halaf or Ubaid pottery groups, Levantine 'Bichrome Ware' is distinguished for both its intraregional differences and cross-regional correlations. Its careful consideration, therefore, allows us to further explore through the glocal character of Halaf and Ubaid pottery, their technological, stylistic and social dimensions. This paper, offering an overview of the available evidence, outlines some of the basic issues and attempts to provide some pointers as to how and why these ceramic styles were adopted.

TECHNOLOGY

Basically, as known, three paint colours were used in decorating Halaf and Ubaid polychromatic pottery: black or brown, red and white, occurring in different shades according to the type of pigments, firing conditions and surface treatments. Based on the use of two or three colours for decoration, pottery is usually labelled respectively as bichrome or polychrome. The vast majority of ceramics are decorated with two colours, normally black or brown and red; bichrome painted decorations, however, can be applied on a white or light slip, which plays a part in determining the chromatic aspect of pottery (being lighter than or different from the clay body). Polychrome vessels are mostly found among assemblages retrieved to the east of the Euphrates (Breniquet 1996; Cruells 2013).

* Università degli Studi di Milano, Via Festa del Perdono 7, 20122 Milano, Italia. evagabrieli@hotmail.com

The manufacture of bichrome-painted pottery can entail considerable expertise, since bichromy is often obtained in one single firing by varying the thickness of the aqueous slurries or iron-rich clays used as 'paint slips' and by alternating reducing with oxidising firing conditions (Noll *et al.* 1975)[1]. Black colours, however, can be also obtained by using manganese or other heavy minerals. Manganese black can be fired in an oxidizing atmosphere and be easily combined with iron-oxide red to give bichromy, thus not requiring a change in the firing atmosphere nor higher temperatures (Noll/Holm/Born 1975; Robert 2010). Similarly, red colours can be also applied after firing (Matson in Braidwood/Braidwood 1960, 201), making it easier to achieve the desired colour contrast.

Although analyses of the pigments used in decorating Halaf and Ubaid ceramics have been rarely undertaken so far (Gilbert 2004; Diebold/Speakman/Glascock 2005; Robert/Blanc/Masetti-Rouault 2008; Robert 2010; Gómez-Bach *et al*. 2012), an increase in the use of manganese or other heavy minerals for the black can be documented over time (Diebold/Speakman/Glascock 2005; Robert/Blanc/Masetti-Rouault 2008). According to some authors (Robert 2010), such use would have spread during the transition between the Halaf and Ubaid periods as a result of an Ubaidian technological 'influence'. Far from representing a loss of knowledge, it would be due to a deliberate choice, in line with a broader tendency to rationalize pottery production including the use of vegetable temper, and the reduction and simplification of decoration (Akkermans 1988).

THE LEVANT AND THE HALAF AND UBAID PHENOMENA

The Levant, here subdivided into its canonical and geographical tripartition, is considered to lie outside the area where both Halaf and Ubaid ceramic traditions emerged. The mechanisms through which Halaf and Ubaid pottery diffused through the Levant remain little understood, and over-reliance on legacy data and gaps in our knowledge further obscure the picture. It can be said, however, that Levantine sites lay on the periphery of both Halaf and Ubaid *oikoumenai* or socio-material interaction spheres. 'Peripheral' can be a highly connotative term, but its use in this paper denotes a factual occurrence rather than evoking a 'core-periphery' model with all the inherent implications in terms of asymmetrical interaction. Thus, although the label 'Halaf/Ubaid-related' adopted by many scholars to characterise Levantine assemblages containing Halaf and Ubaid pottery can find some justification in the "derivative" character of such components, those assemblages should probably be viewed as a peculiar expression of the broader Halaf and Ubaid phenomena, and, in the first place, considered in the very light of their spatial occurrence at the boundaries of both *oikoumenai* rather than being conceived in terms of presence/absence of the 'core traits' constituting the so-called Halaf or Ubaid 'packages'.

THE NORTHERN LEVANT

HALAF BICHROME WARE

Available evidence indicates that the earliest Levantine bichrome-painted wares are found among Halaf-related ceramics at Ras Shamra in phase IVC (de Contenson 1992), namely in a context marked by the occurrence of important changes despite a certain continuity with the previous phase VAII. Phase IVC is characterized by the appearance of painted ceramics[2] as well as of other new types of pottery, like Red-Washed Ware or a finer, slipped ware reminiscent of Dark-Faced Burnished Ware of the Amuq phase C. Also, more complex forms come into use, and considerable effort seems to be put into decorating pottery: pattern-burnish decoration on fine Dark Faced Burnished Ware, sporadically present in the previous phase, reaches its peak in the IVC levels, and slipping and burnishing are much commoner than before. In general, compared to the past, the pottery assemblage exhibits a greater specialization, with a clearer association between fabric, shapes and finishing treatments.

De Contenson distinguished two different varieties of Halaf pottery, lustrous- and matt-painted wares, which were clearly differentiated in forms and the decorative repertoire. The first one is described as 'particularly well-finished', which, alongside the lustrous appear-

1. *"The paint slips (consist) of clays that are either themselves naturally very rich in iron or were enriched by ferruginous earths. [...] The decisive difference between the two paint layers lies in their thickness, which is three to four times as great for the black as for the red layers. We thus have here a black/red painting which was fired by the iron reduction and reoxidation principle, the paint layer intended to remain black being protected against reoxidation simply by being made thicker"* (Noll/Holm/Born 1975, 610-611). Black colours, however, can be obtained also by adding organically based pigments like charcoal (Diebold/Speakman/Glascock 2005).

2. The appearance of the Halaf-like painted pottery was preceded by that of the Orange Painted Ware (*'poterie orangé peinte'*), though in the final publication de Contenson preferred not to distinguish an earlier phase due to the light thickness of the level defined by the presence of such ceramics and attributed its materials to phase IVC (1992, I, 21).

ance of the paint, led it for long time to be considered as imported. Analyses carried out by Liliane Courtois (de Contenson 1992 I, 209-222), however, showed that this was not the case, just as for other lustrous-painted wares featured in the Levantine Halaf assemblages.

Bichrome-painted sherds are found among both ceramic categories, and also feature in a third, the yellow or creamy burnished pottery (*'poterie lustrée jaune ou crème'*), included by de Contenson among burnished wares in his final publication (notwithstanding its close similarity to lustrous-painted Halaf pottery)[3]. Bichrome pottery has a restricted form repertoire, comprising bowls and jars decorated with geometric or linear motifs. Lustrous-painted 'cream bowls' stand out for their peculiar characteristics: the flaring rim is nearly always decorated with triangles opposed by the vertices interspersed with series of parallel traits and separated by empty areas. Illustrated specimens, yellow or orange in colour, are burnished.

No quantitative information about bichrome pottery contained in phase IVC levels is available. Regarding lustrous-painted cream bowls, de Contenson said that the coexistence of black and red lines in the decoration was not rare, but, based on the frequency of decorative motifs (de Contenson 1992 I, 258-260, tab. 15 A-C), it would seem that bichrome sherds represented only a fraction of the painted pottery repertoire. In phase IVC (*ibid*., 156-172), the pottery assemblages were dominated by the Red-Washed Ware, progressively increasing from 43 to 68%[4]. Halaf pottery never reached such percentages. The lustrous variant increased from 2.6 to 5.7% to drop at the end of the phase to 0.5%. The matt version, starting from 2% at the beginning of the phase, reached 15% by the end. Yellow or creamy burnished pottery accounted only for the 0.5% of the assemblage. Although Halaf matt-painted pottery was the third most abundant ware within phase IVC assemblages, at Ras Shamra Halaf pottery never reached the quantities attained in the Upper Mesopotamian Halaf sites, evidently playing a very different role. In such sites, Halaf pottery first flanked and then rapidly displaced most other ceramics, amounting up to 80% or even higher percentages of the assemblage, a phenomenon Olivier Nieuwenhuyse described as 'painted pottery revolution' and which entailed important modifications in ceramic technology, vessel shape and decorative style (2007). Interestingly, however, even in Upper Mesopotamia, Halaf bichrome pottery never occurred in greater quantities, particularly west of the Khabur (Cruells 2013).

Apart from Ras Shamra, so far bichrome-painted fragments have not been found among the Halaf ceramics at any other northern Levantine site. Likewise, no central Levantine sites have yielded bichrome pottery. Actually, 6th-millennium central Levant is still rather poorly known, but Halaf influence is considered to extend as south as 'Ard Tlaili in the Beqa'a (Kirkbride 1969), although Halaf pottery was not recovered at coastal settlements like Byblos (Dunand 1973), and a more northerly, inland site like Arjoune has actually yielded a very small amount of Halaf painted sherds (Campbell 2003)[5]. Of course, even if bichrome pottery has not been retrieved so far, it could have been sporadically present, but its absence has nonetheless to be evaluated in view of the progressively rarefication of Halaf painted pottery moving from north to south. In the southern Levant, as first envisaged by Jacob Kaplan (1960), Halaf influence is evidenced by the presence of typical (or so alleged) Halaf forms among burnished rather than painted wares, and, based on the evidence from sites like Arjoune or Byblos, this seems to hold true for parts of the central Levant as well. In such areas, Halaf-like painted-pottery was manufactured only on a very limited scale or not at all, and possibly the rarer bichrome vessels were not even imported[6].

'TRANSITIONAL' BICHROME WARE

A few post-Halaf northern Levantine assemblages include bichrome-painted pottery. At Tell Kurdu, in the Amuq valley, bichrome-painted sherds are found starting from phase D, which was defined by Robert and Linda Braidwood on ceramics grounds *"as the range exhibiting wares in transition from the Halaf and Halaf-inspired families of Phase C to the 'Ubaid-inspired wares which appear in overwhelming preponderance in Phase E"* (1960, 157)[7]. The actual meaning of traditional terms like 'transitional', however, is being challenged

3. Bichrome-painted decorations, however, characterised another further category, the rare Corrugated Pottery (de Contenson 1992, II, fig. 191, 11).
4. At sites like Ras Shamra or Tell Kurdu, prehistoric levels were excavated by arbitrary levels (unless in the presence of discernible floor surfaces or architectural remains), and phases were distinguished based on pottery contained in such levels (de Contenson 1992; Braidwood/Braidwood 1960). The percentages provided in the final publications are therefore to be considered as indicative.
5. Recently, some Halaf(/Halaf-related?) sherds were also found in the Damascus basin, at Tell Baharia (Sulaiman 2012), and in the southern Levant, at Ein el-Jarba (Streit 2015).
6. With regard to Arjoune, where Halaf painted sherds make up 3,6% of the ceramic assemblage and include a restricted range of shapes, Stuart Campbell observes that *"(i)t may be that either everyone in the settlement used painted pottery for specific functions on very special occasions or a smaller group of people used the decorated pottery for a similarly specific range of functions but on a more frequent basis"* (2003, 36).
7. Phase D was isolated only in one trench, and *"is represented by the smallest bulk of material from the most restricted exposure"* (Braidwood/Braidwood 1960, 157). Even newer excavation, however, uncovered only pits that can be related to this phase (Yener *et al*. 2000).

by more recent studies. Stuart Campbell and Alexandra Fletcher (2010), for instance, warn about how the very use of the term structures our narratives, stressing that Halaf-Ubaid transition (HUT) could be a fictional phenomenon resulting from our poor chronological knowledge of the centuries at the turn of the 6th millennium[8]. But it is not only a matter of dating. Apart from the difficulties raised by qualifying materials as transitional unless in presence of hybrids – like those collected at Tell Aqab (Davidson 1977) or other northern Mesopotamian sites (Breniquet 1996) –, it now seems that some typical Ubaid traits occurred in firmly dated Halaf contexts at sites like Domuztepe, namely at a considerably early time and well beyond the alleged southern Mesopotamian Ubaid core area. This suggests that the genesis of the Ubaid phenomenon was indeed polycentric and long-standing, which would make the use of the term transitional rather problematic. Furthermore, at a site like Kurdu, in the 'transitional' phase D, there seems to be a stronger continuity with the previous rather than the following phase, as evidenced by the persistence of the Dark Faced Burnished Ware and similar unburnished ceramics, as well as by the fact that unpainted pottery still constituted most of the assemblage of this phase (approximately three quarters of the total selected sherd bulk).

Phase D levels contained different types of painted wares, whose amount never exceeded 10% and generally accounted for much lower percentages. The so-called 'Transitional' painted pottery was characterized by a beautifully executed and often intricately painted decoration, either monochrome or bichrome. Some sherds seem to be distinguished based on their very fine brushwork ('Fine-line Ware'). Decorative motifs resemble Halaf ones, but the Braidwoods did not consider them to be specifically Halafian, and interpreted these kinds of wares as a sort of *"West Syrian experimentation with Halaf motifs"* (1960, 164). Indeed, even though these 'transitional' pottery groups could not be adequately classified due to their small numbers, according to the Braidwoods, they are mainly characterised by *"a sort of uniformity in the peculiar designs, which are neither proper Halaf, neither proper Ubaid"* (*ibid*., 166, note 5). Anyway, 'transitional' painted pottery differs markedly from the Ubaid-like ceramics of the succeeding phase E, and it clearly precedes stratigraphically the 'Ubaid-like' wares, whose first (intrusive?) specimens appear only in the uppermost levels of phase D[9]. (Fig. 1)

Another northern Levantine site where levels traditionally attributed to the HUT have been found is Ras Shamra[10]. Here, in phase IVB (de Contenson 1992, I, 164-172), the variety detected in the preceding phase IVC is considerably reduced: Red-Wash Ware made up the vast majority of the ceramic assemblage, amounting to around 80%, whereas Halaf matt-painted pottery constituted nearly all the remaining 20%, with the lustrous-painted variant being barely present. The Halaf matt-painted pottery is considerably diversified. Despite the close similarity in form and decoration, two different pastes can be clearly distinguished: a lighter one, white-to-creamy in colour, and a much rarer, buff one, accounting for the 3.5% of the pottery. Alongside shapes inherited from the previous phase, new types of bowls and jars made their appearance. Closed vessels seem to increase in number and size. Bichrome pottery features some cylindrical, very elongated spouts and a lid.

Painted decoration is usually said to be monochrome, but bichrome sherds appear to increase. In most cases, vessels are painted black and red, but black-and-brown decoration is known. One fragment, which is distinguished for its complex ornamentation, bears two bands of white paint, whose usage at Ras Shamra is quite rare. Light-coloured slips are sometimes mentioned in the description of the illustrated sherds. Based on drawings and photos, the decorative repertoire, more varied than in the previous phase, shows some similarity to that of the monochrome-painted pottery. Different combinations of finely executed linear or geometric motifs (lozenges) are usually arranged in horizontal bands, but sometimes form rather complex patterns. A few so-called naturalistic motifs, like rosettes or eyes, are present. Bichromy seems to characterize the most complex painted designs. When vessel shapes can be recognized, a certain correspondence between form and decoration becomes apparent. As in phase IVC, bichrome motifs can decorate 'Corrugated Pottery' vessels. (Fig. 2)

In phase IVA (de Contenson 1992, I, 173-175), the preponderance of Red-Washed Ware increases even more, attaining 90% of the assemblage. Halaf matt-painted pottery decreases to 8%, but it is still the second

8. The Halaf-Ubaid Transition probably dates to *ca* 5400-5200 cal. BC, although its actual duration could be as long as 5500-5000 cal. BC, at least in Northern Mesopotamia (Campbell/Fletcher 2010).
9. Actually, as pointed out by the Braidwoods, *"the question occurs as to Phase E, that is, the 'Ubaid period proper, should be considered to begin. The division is made more or less arbitrarily, at the 5.0 m in Kurdu trench I; above this 'Ubaid types assume substantial proportions, and the more characteristics phase D elements disappear"* (1960, 168).
10. The chronological status of phases IV B and IV A is uncertain, but they are generally equated to the Amuq D phase on typological grounds (*e.g.*, Schwarz/Weiss 1992), thus most probably falling within the 6th millennium BC.

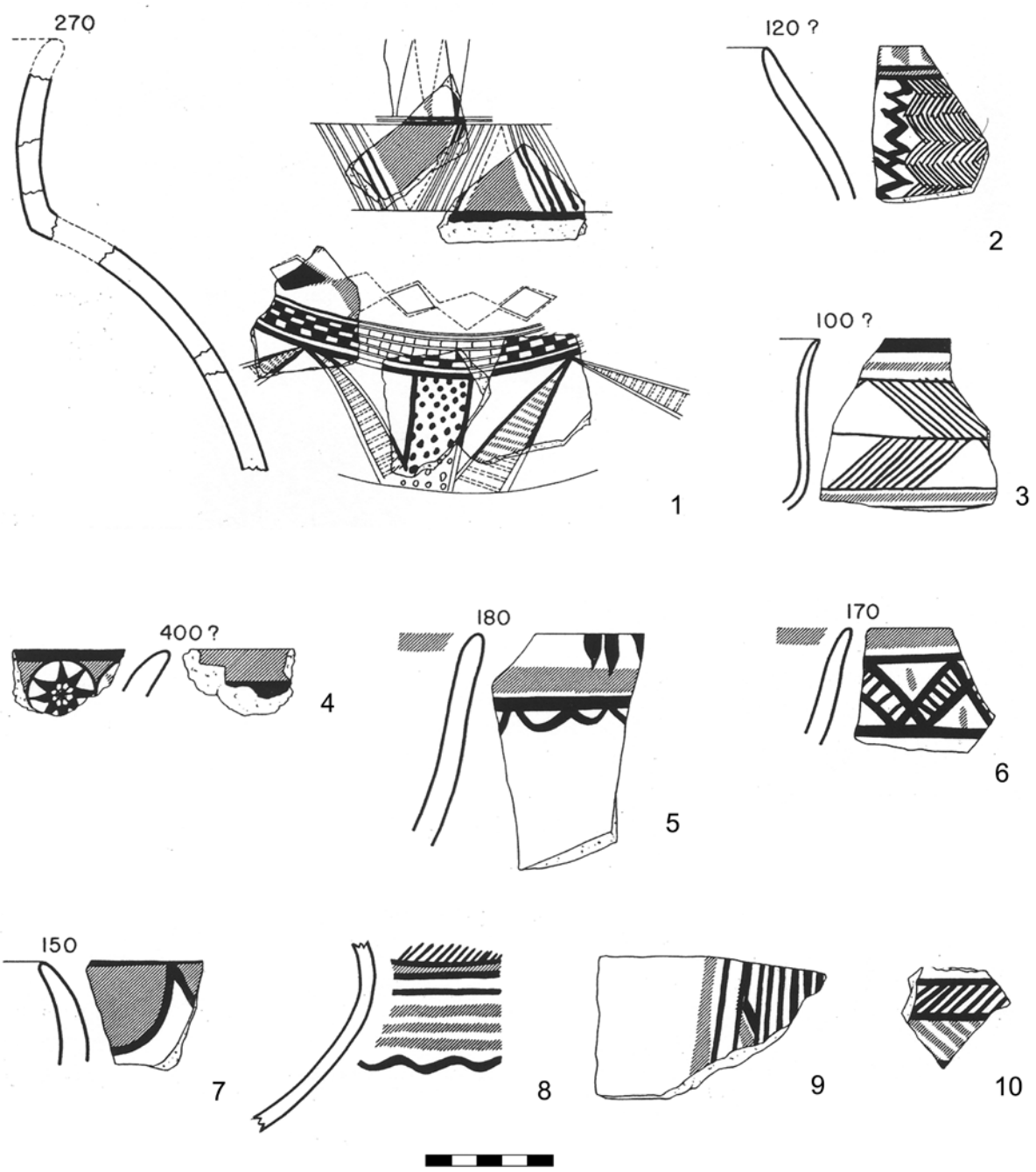

Figure 1. Tell Kurdu – Phase D: Transitional Bichrome Ware (left, above), Fine-Line Ware (left, below), Ubaid-like (right), Braidwood/ Braidwood 1960 (figs. 129.9-10, p. 165; 130, p. 166; 131.11-18, p. 167) (not to scale).

commonest category. According to de Contenson, there is little difference between this phase and the preceding one, but he believed that Halaf pottery underwent an impoverishment and a decline: decorative repertoire was less varied and motifs were often executed in a careless manner, sometimes without being bounded. He also reported that red-painted decoration and bichrome-painted decoration were abundant. Unfortunately, only a few painted sherds have been illustrated and none is bichrome.

UBAID BICHROME WARE

To the west, the diffusion of Ubaid/Ubaid-like pottery is considered to reach as far as the northern Levant: south of a line roughly stretching from Hama up to Ras Shamra, Ubaid pottery has indeed only been retrieved very sporadically, even though in the Homs region, where Chalcolithic evidence has generally proven to be elusive during reconnaissance survey, significant quantities of Ubaid pottery were observed at the SHR 094 site (Philip

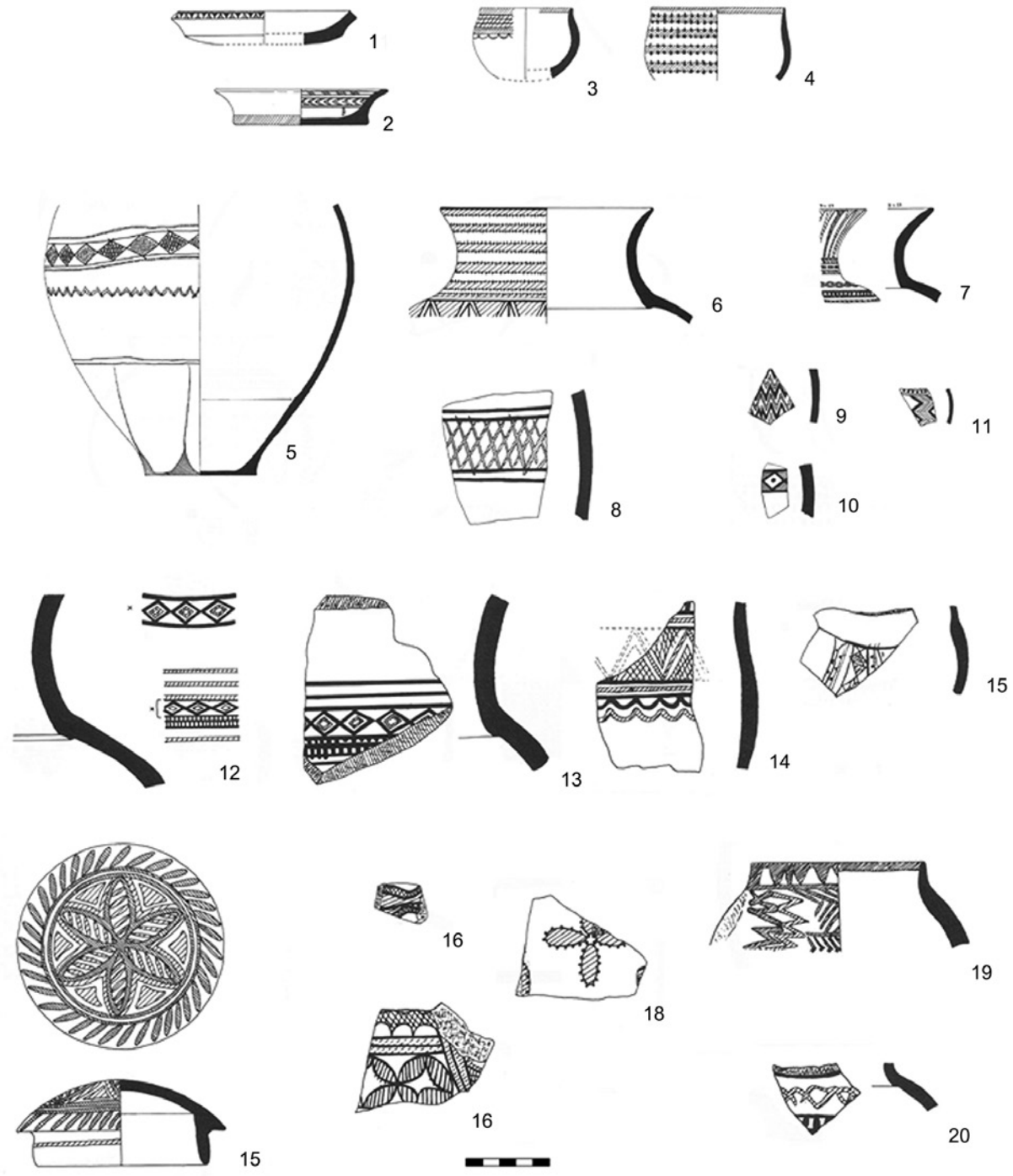

Figure 2. Ras Shamra – Phase IVB: De Contenson 1992 (figs. 207.1-2, 4, 6, p. 216; 208.3, 209.1, 3-4, p. 218; p. 217; 211.4-8, p. 220; 212.1, 5, p. 221).

et al. 2002). In the central Levant, however, the Chalcolithic period remains scarcely known.

At Tell Kurdu, phase E, whose latest levels are radiometrically dated to around 4800 cal. BC (Özbal 2010), is characterised by the appearance of substantial quantities of Ubaid pottery, alongside with a limited continuance of DFBW and related unburnished pottery (Braidwood/Braidwood 1960, 176-201). According to the Braidwoods, Ubaid monochrome-painted pottery made up three quarters of the assemblage, whereas the bichrome-painted version accounted for 1 to 5%. More recent excavations, however, although substantially confirming the validity of the typology worked out

previously, indicate that wares can occur at very different frequencies, also varying according to places (Diebold 2000). In trenches 11-15, for instance, the Ubaid monochrome pottery, accounts for 28% of the sherds, even though this percentage rises to 45% when only rim sherds are included in the sample. Quantitative data for bichrome-painted pottery are not still available, but this ware is relatively abundant in this area, being nearly all the bichrome recovered during the 1999 excavation season found here. This concentration seems to be related to the presence of a pottery workshop, which, with its four kilns, provides concrete evidence of specialized potting at the site.

In the Braidwoods' description (1960, 183, 186-201), bichrome-painted ceramics are characterized as having the same fabric as their monochrome counterpart. The paste, normally completely oxidized, has typically a buff colour turning either orange-buff or greenish buff. Surfaces, dull and smooth, have the same colour range as the paste but less intense, being normally light buff, slightly orange or greenish. The paint is dull, and there may be considerable colour variation in one brush stroke, due to the differences in the thickness of application and intensity of firing. Normally, the darker colour is a chocolate or greyish brown, while the red, mainly used as a filler, has a full red-orange tint. In about half of the specimens, red paint rubs off easily and was most probably applied after firing. As for the decorative repertoire, just like for the monochrome-painted pottery, the motifs are nearly always non-representational and can be called geometric only in a rather loose way. The main tendency is to stress the horizontal, by various types of banding and various means of emphasizing the bands. Decoration is generally confined to the upper part of vessels, which is further emphasized by the presence of a band of paint on or near the lip.

The Braidwoods found two different kinds of bichrome-painted pottery, concentrated respectively at the bottom and at the top of the deposit. About half of the sherds from the deeper range have the same chalky, white slip born by the (possibly intrusive) Ubaid-like fragments retrieved in phase D[11], while the most recent ones are unslipped with painted decoration covering a much wider area. The occurrence of different qualities of bichrome ware has been confirmed by the new excavations. The finest type, comprising sinuous-sided bowls and cups, is often white-slipped and decorated with motifs carefully outlined with thin, black lines; the lesser quality one, having generally orange fabrics and being often shaped into globular jars with ring bases, is decorated with broad strokes of paint on untreated surfaces, and with motifs barely constrained or not at all by rough black outlines. Benjamin Diebold observed that, unlike the Braidwoods suggested in their report, the first type would be later in date than the second, thus indicating the existence of either two distinct bichrome traditions or, alternatively, two modes in the popularity of a single bichrome ware (2000, 61). Yet, it can also be observed that, apart from the lack of slip, the bichrome sherds retrieved by the Braidwoods in the upper levels of phase E seem to have, as they wrote, a much larger decorated surface than the earliest ones, and that some bowls decorated with relatively elaborated, 'bold' patterns come from the uppermost levels, when multiple-brush and coarser monochrome-painted designs prevailed[12]. Even if at present it is not possible to satisfactorily match old and new finds, Kurdu's bichrome-painted pottery (or, at least, a part of its production) would seem to have become a finer and finer item compared to its monochrome counterpart. Such a diversification would seem to indicate that, even if Ubaid-like monochrome pottery was undergoing a process of 'simplification', bichrome ceramics kept their role of luxurious pottery or "good dishes". (Fig. 3).

Early Ubaid-related material comparable to that of Tell Kurdu has been found at Ras Shamra in phase III C, but, according to de Contenson, bichrome pottery was absent. In the following phase III B, whose abundant painted ceramics are considered to resemble more closely late northern Mesopotamian Ubaid types, bichrome-painted sherds are rare (amounting only to 1% of the material recovered in the sounding SH), and are decorated with rather simple combinations of linear and geometric motifs. A similar, simple ornamentation is found also at Hama, where bichrome-painted pottery was never characterized by complex patterns. (Fig. 4).

At Hama (Thuesen 1988), bichrome-painted sherds are found among both medium and coarse ware groups. Coarse bichrome pottery is closely related to the other coarse wares except for the two-colour decoration; its fabric, tempered with organic material, has a colour most commonly ranging from reddish to brownish shades, and normally a white slip or wash covers the exterior of vessels. Medium ware specimens have a mineral-tempered paste, reddish yellow or pale brown

11. See note 7.

12. The quality of the Ubaid-like monochrome-painted sherds recovered in trench 14 during the 1999 excavation season is 'noticeably higher', both in terms of the execution of decoration and fabric, than that of those collected in the later trench 11/15. Such a difference seems to be mirrored by the finds of the 1998 campaign. Although more work is needed to confirm its validity, the difference existing between the two assemblages would allow for the possibility of an internal subdivision of phase E (Diebold 2000, 62).

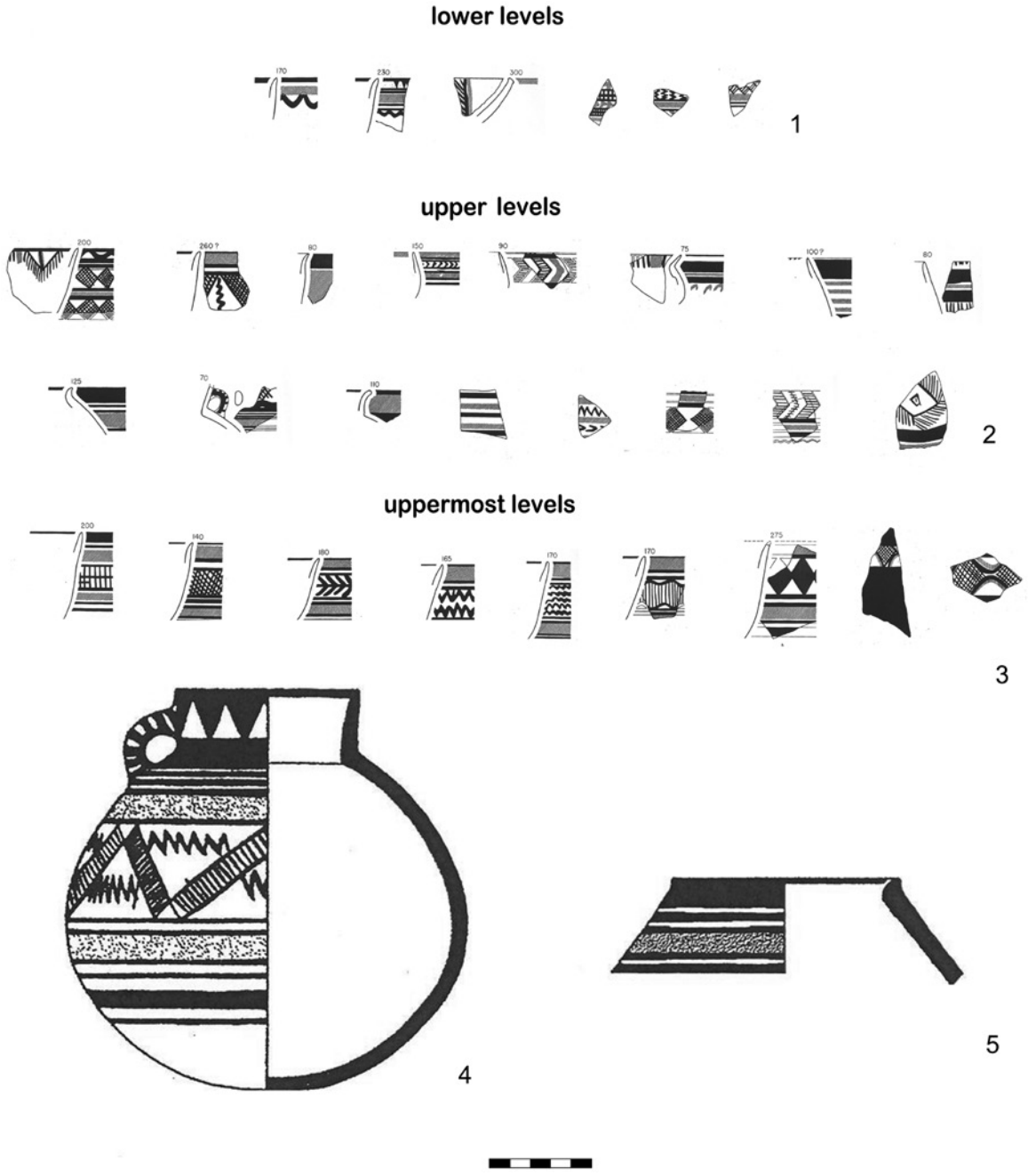

Figure 3. Tell Kurdu – Phase E: Ubaid-like Bichrome Ware, new excavation (left, Yener *et al.* 2000, fig. 14, p. 107), Braidwoods' excavation (right, Braidwood/Braidwood 1960, fig. 158, p. 202) (not to scale).

in colour, and are slipped on both the exterior and interior surface. Frequency data are not available, because about 90% of the sherds whose provenance was recorded can be referred to decorated vessels, but the medium type is reported to have a low representation throughout the period, while the coarse variety increased over time, given the progressive shift towards an inventory dominated by bigger shapes (a fact that seems to indicate that a change in the practices of commensality took place).

Bichrome decoration appears on bowls and jars; all the pottery is modelled with the help of a rotary device of some sort, most probably a slow wheel. Unlike monochrome-painted ware, paint is always matt. In the earliest strata of phase L, decoration is characterized by a combination of triangles, lozenges and cross-hatching; medium ware carinated bowls are considered to be a fossil type. Later, wavy lines (sometimes traced using a multiple brush) make their appearance and become increasingly common.

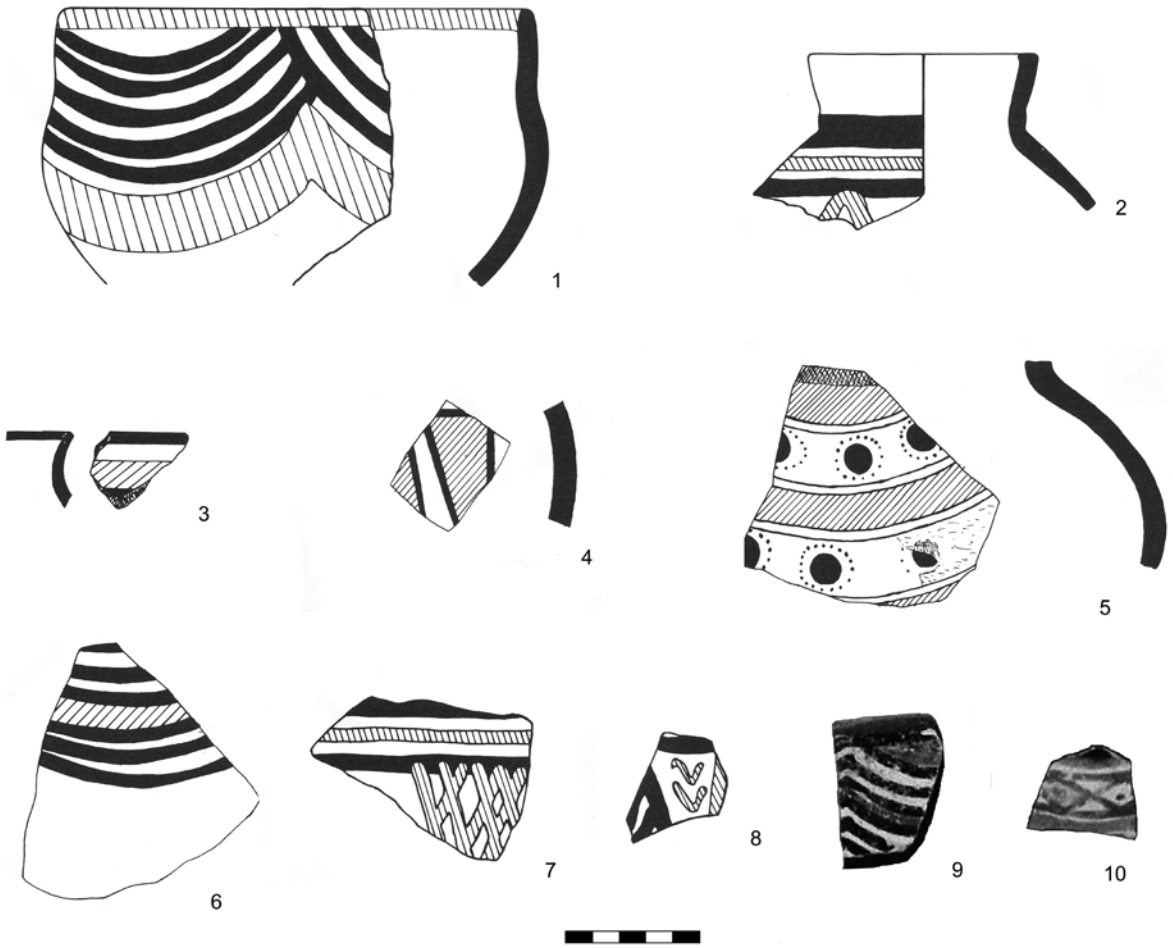

Figure 4. Ras Shamra – Phase IIIB: de Contenson 1992 (fig. 228, p. 237).

The earliest levels of phase L are traditionally attributed to the HUT based on typological grounds (*e.g.*, Schwarz and Weiss 1992). At Hama, however, unlike at other northern Levantine sites, painted pottery and Dark Faced Burnished Ware do seem never to have coexisted, which would lead to think of a somewhat later date. According to Ingolf Thuesen, Kurdu's phase E would offer the best parallels to phase L, and in particular bichrome-painted ceramics would show some affinity with the earliest bichrome pottery of phase E. Yet, as for other northern Levantine assemblages, the decorative repertoire of painted pottery has a background in original Halaf motifs (1988, 92), which is certainly more evident in the less recent specimens. (Fig. 5).

Ubaid-related painted pottery was recovered at other northern Levantine sites, like Tell Sukas (Oldenburg 1991), Tell Daruk (Oldenburg/Rohweder 1981) or Tell Afis (Giannessi 2004), but bichrome-painted sherds are extremely rare, and decoration is limited to bands of different colours or very simple patterns.

NORTHERN LEVANTINE BICHROME WARE, IN SUM

Despite a certain degree of variability, northern Levantine bichrome-painted ceramics are distinguished by the same basic traits (a red- and black-painted decoration usually confined to the upper part of vessels; a rather restricted set of mostly geometric or linear motifs arranged in horizontal bands; a whitish/light-coloured slip or untreated background; the nearly exclusive use of black paint for contour lines; small to medium shapes – mostly bowls and jars – suitable for displaying, serving and consuming food; mineral temper…), and, although a chronological discrepancy might be implied by the modes and tempo of the exchange/transmission, there seems to be a certain parallelism in their evolution.

Bichrome-painted vessels made their first appearance during the Halaf period, but they were much more numerous and widespread in the subsequent phases. Their numbers, however, seem to remain lower by

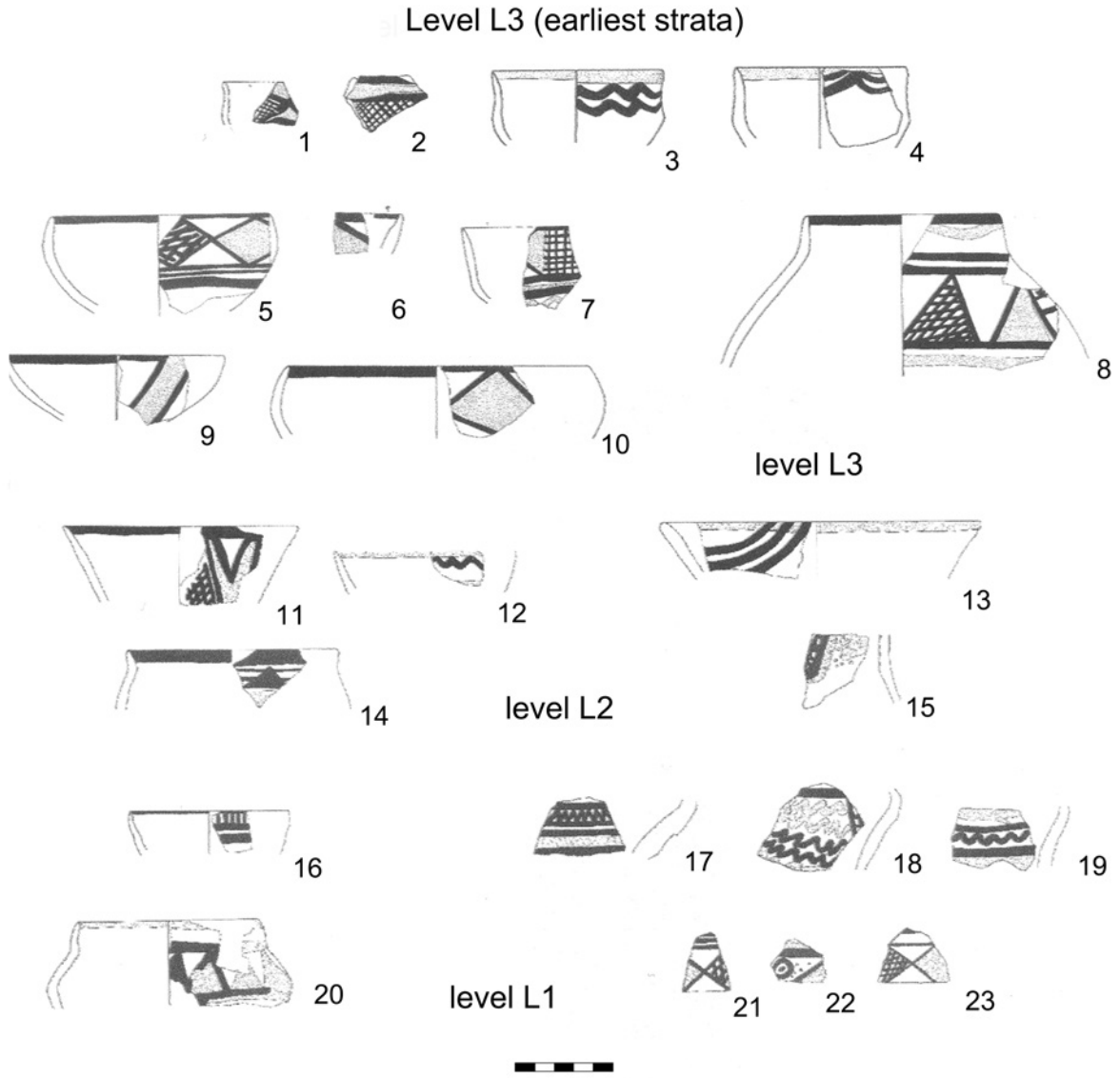

Figure 5. Hama – Phase L: Thuesen 1988 (pls. IV.9, p. 216; V.3, p. 217; VIII.8, 11, p. 220; XII.7, p. 224; XIII.8, p. 225; XV.4, 13, p. 227; XX.3-4, 7, p. 232; XXII.2, p. 234; XXIII.5, p. 235; XXIV.5, p. 236; XXV.9, p. 237; XXVI.4-5, 7, p. 238; XXVII.3, 6, 9, p. 239) (not to scale).

comparison with their monochrome counterparts, and are not at all comparable to the amounts reached at more eastern sites like Tell Masaïk during HUT times (around one third of the assemblage, Robert/Blanc/Masetti-Rouault 2008). Moreover, appreciable quantities of bichrome pottery have been found only at major sites, although this could partly be a matter of chronology and/or extent of the investigation.

The earliest examples are generally more finely executed; later, unslipped specimens become increasingly common, as well as a less elaborated and more careless decoration including new motifs like wavy lines. In general, decorative styles show a tendency to gradually evolve toward plainness, which, as already mentioned, might correspond to the inception of a more standardized vessel production, according to a process described in broader terms as the 'evolution of simplicity' by David Wengrow (2001) [13].

Bichromy characterizes nearly exclusively Halaf- and Ubaid-related pottery. Even though close parallels

13. According to Wengrow (2001, 181), after an unprecedented phase of elaboration and experimental design which took place in the (6th millenni-

Figure 6. Tsaf Ware (after Bar-Yosef and Garfinkel 2008, Fig. 224; photo D. Harris, courtesy of Tel Tsaf expedition).

cannot be found in most instances, forms and the decorative repertoire, just like for the monochrome-painted ceramics, are clearly drawn from the broader Halaf and Ubaid traditions of Upper Mesopotamia, and, as in the northern Ubaid, the weight of the Halafian heritage appears to be rather marked, being still discernible in the HUT and early Ubaid pottery. Certainly, from a decorative point of view, every community seems to "speak its own dialect", and, although variations are sometimes subtle, we cannot say if similarities in decorative patterns and motifs conveyed the same meanings for different communities. Most decoration is geometric and abstract (Campbell 2010), and some motifs could have spread just because they could be easily re-contextualized and re-conceptualized (Cohen 1985). The emphasis, however, seems to be placed on sharing a common identity.

THE SOUTHERN LEVANT: TSAF WARE

First identified in the late 1970s at the eponymous site located on the west bank of the Jordan river and radiometrically dated between ca 5200 and 4750 cal. BC (Streit/Garfinkel 2015), 'Tsaf Ware' is a rather peculiar kind of decorated pottery. It is characterised by horizontal bands of geometric motifs (net-filled rhombi or lozenges, net patterns, filled rhombi or triangles, fish-bone patterns) painted in black on a smoothed (usually) white-slipped surface[14], which appear on the upper part of vessels (mainly fine ware bowls and amphoriskoi). Below the design, the vessels are covered by a red slip/paint, and a red band is generally painted along the outer and inner rim (Gophna/Sadeh 1988-1989). (Fig. 6).

Tsaf Ware appears to be the earliest example of polychromatic pottery occurring in the southern Levant. Here, although painted pottery presents a very long tradition from the very first widespread use of ceramics, neither Halaf nor Ubaid black-on-buff decoration were ever adopted. The Wadi Raba assemblages, dating between 5800 and 5200 cal. BC and therefore roughly contemporary to the Halaf ones further north, only in-

um) Halaf period, *"the simplification of pottery designs began throughout Mesopotamia during the fifth millennium* […], *and reached its peak with the onset of urbanization during the fourth millennium. Throughout the vast network of Mesopotamian villages, the form of painted vessels became markedly less diverse and ornamental designs were reduced to concentric bands filled with simple rotary patterns"*.

14. One unique fragment bore the depiction of a flying bird (Streit/Garfinkel 2015, 866).

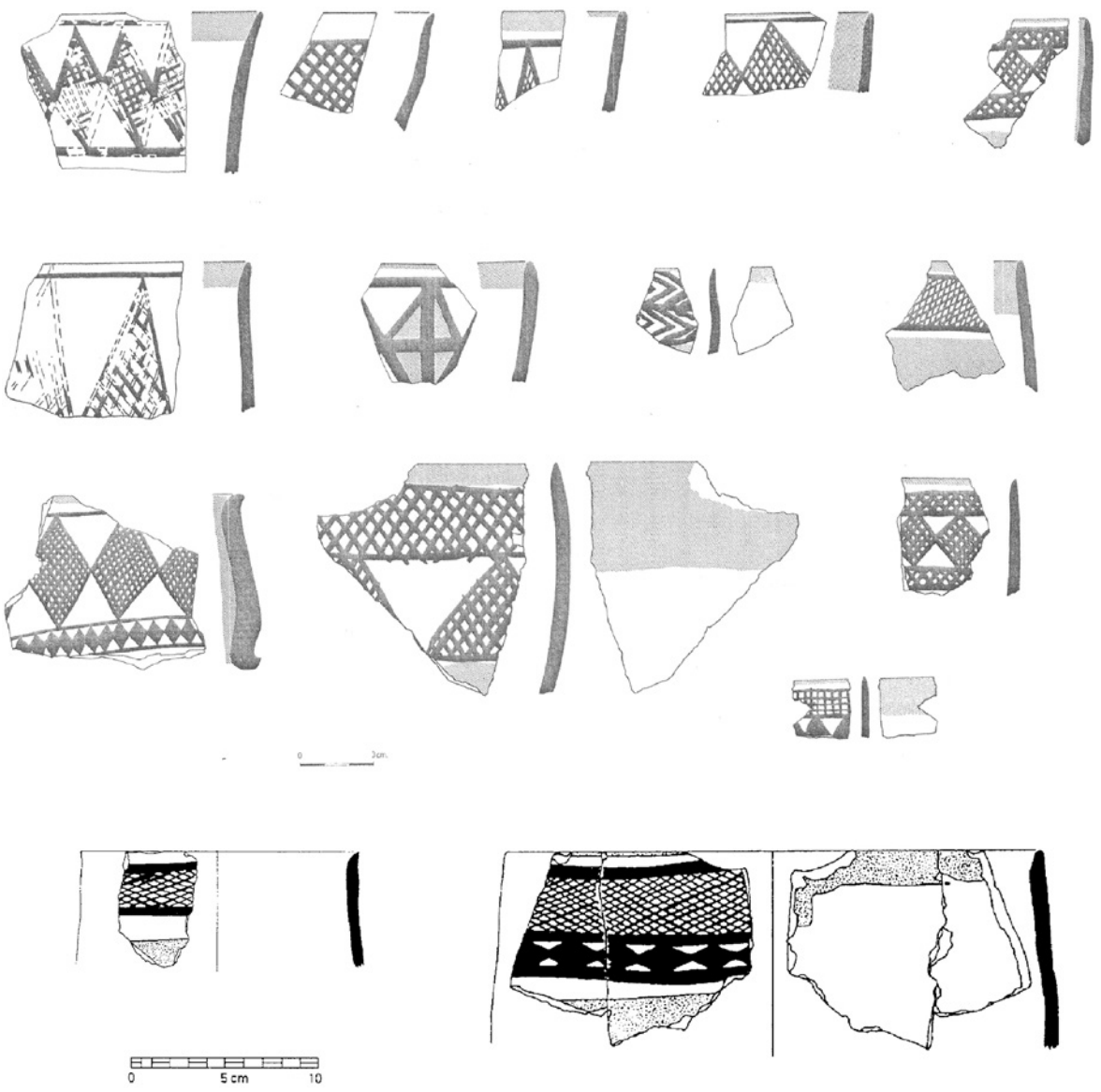

Figure 7. Tsaf Ware: Tel Tsaf (above, Gophna and Sadeh 1988-1989, fig. 6.1-4, 8-10, 13-14; 7.1, 4-5, 13; 8.2), Kataret es-Samra (below, Leonard 1989, Figs. 6.5, p. 8; 5.4, p. 7).

clude very few painted sherds. Only at the end of the 6th millennium painted pottery undergoes a resurgence in the southern Levant.

Tsaf Ware has a rather restricted distribution. So far, the only other site apart from Tel Tsaf to yield an appreciable quantity is Kataret es-Samra, which lies on the opposite bank of the Jordan. Other few finds, known from the excavations conducted at other southern Levantine sites (Tell esh-Shuna: Gustavson-Gaube 1986; Gibson 1994; Abu Hamid: Lovell/Kafafi/Dollfus 2007; Tubna: Banning/Blackham/Lasby 1998; Banning 2007; Abu Habil: de Contenson 1960; Leonard 1992; Tell el-Mafjar: Anfinset *et al.* 2011), all dating between the very end of the 6th and the half of the 5th millennia cal. BC, seem to attest certain variability, but their often inadequate characterisation and, above all, the paucity of data do not allow us to get a clearer picture.

Petrographic analyses have indicated that Tel Tsaf pottery was *"produced from raw material easily accessible to the inhabitants of the site"* (Gophna/Sadeh 1988-1989, 31, note 6). Even if at present it is not possible to identify any precise manufacturing centre or place, it seems quite reasonable to assume that Tsaf Ware was produced somewhere in the northern or central Jordan Valley, as its rather circumscribed diffusion and uneven distribution would confirm. But, though locally manufactured, Tsaf Ware is a foreign-inspired production, as was noted from the very early days of its discovery

when it was compared to Halafian wares, given that elaborately painted pottery is rarely found in the southern Levant (Gophna/Sadeh 1988/89; Leonard 1989). Radiometric evidence, however, has now shown that Tsaf Ware is in fact chronologically related to northern Levantine Ubaid assemblages or to those contained in the so-called Halaf-Ubaid transitional levels, as Albert Leonard (1989) already suggested on a stylistic basis, although very close parallels cannot be found[15]. (Fig. 7)

Tel Tsaf lies far beyond the southern limit of the Ubaid *oikoumene*, but here four Ubaid sherds were collected during the 2005 and 2006 excavation seasons. According to the excavators, they find comparisons with types of Ras Shamra's level III B and are imports from the northern Levant (Garfinkel *et al.* 2007). Even if phase III B is almost certainly to relate to a time later than the initial occupation at Tel Tsaf, their presence could hint to the existence of contacts linking the Jordan Valley and the northern Levant, as also indicated by the unusual occurrence of artefacts like obsidian tools, seals and tokens. This is surely a fact worthy of note since Tsaf Ware bears some similarities to the northern Levantine bichrome-painted pottery: the presence of the Ubaid fragments makes it rather likely that Jordan Valley people were aware of this kind of polychromatic decorations. However, the striking fact is that it was *this* kind of pottery that inspired a local production in the southern Levant instead of the less elaborated and commoner black-on-buff (Halaf/)Ubaid ceramics.

We do not know if the Jordan Valley communities looked at bichrome-painted ceramics as a rarer and/or more exotic (and therefore more valuable) item, but, evidently, they considered them as more suitable to their taste and needs. Thus, they chose to imitate a very distinctive type of pottery, working out their own version based on a very limited set of decorative patterns and motifs drawn from the Halafian/Ubaidian tradition. Such a simplification is not unknown among HUT/early Ubaid bichrome-painted pottery, as already evidenced for instance for Hama, and indeed it is in line with the general trend towards the plainness of decorative styles previously mentioned. Tsafian ceramics, however, most closely resemble some (HUT/)Ubaid monochrome-painted pottery recovered at the Syrian site of Tell al-'Abr in levels 7-6 (Hammade/Yamazaki 2006).

Levels 7 and 6 (Stage I), dated to the last centuries of the 6th millennium cal. BC, contain a large amount of painted pottery (90% of the diagnostic sherds), which is characterized by the presence of Halafian decorative motifs applied to the 'Ubaid' fabric. The excavators, however, believe that, even if *"such specimens fall into the 'Halaf-Ubaid transitional' category, […] Stage I material reveals more Ubaid-based features"* (Yamazaki 2010, 320). Bichrome-painted sherds are quite rare, but monochrome-painted bowls and jars are most frequently decorated with motifs based upon cross-hatching (single or multiple bands, lozenges…), placed close to the rim or in the upper part of vessels. More generally, painted ceramics are distinguished for the simplicity and repetitiveness of many of the decorative motifs, which are nonetheless very carefully executed[16]. (Fig. 8)

Tell al-'Abr is situated in the upper Euphrates Valley, at some 550 km of distance from Tel Tsaf as the crow flies, and further strict comparanda cannot be found at any sites lying in the area between the two (apart from a few occurrences, like at Tell Kurdu). Certainly, at present, it is difficult to say which decorative patterns and motifs were in use during a specific time in the vast HUT/Ubaidian *oikoumene*, and maybe some of them could have had a wider circulation than can be discerned based on the available finds. It is therefore impossible to ascertain whether the resemblance in question is due to more or less direct contacts between the two areas and/or chronological proximity rather than mere chance, and, actually, Tsafian ceramics are the unique instance so far known of Levantine bichrome pottery with the vessel's external lower part covered by slip/paint. Nevertheless, it must not be forgotten that in the southern Levant bichrome-painted decoration does not occur at all during the Pottery Neolithic and is still rare in the Chalcolithic, and it is exclusively associated with patterns and motifs belonging to the broader Halafian/Ubaidian decorative repertoire. The appearance of bichrome-painted decoration seems thus to represent a real novelty, which further witnesses the occurrence of relationships with the territories that are sited to the north.

CONCLUDING REMARKS

The eye-catching visual aspect of bichrome-painted pottery made it worth investing extra labour in its manufacture, though it was produced only in limited quantities. Just like for its Halaf and Ubaid monochrome counterparts, based on vessel forms and bold decorations, the use of bichrome pottery can be related to the display, serving and consumption of food. The lack of precise contextual data means it is not possible to

15. *"[This kind of] fine ware does not (nor probably should it be expected to) fit neatly with material from either Amuq phase C (Halaf) or Phase E ("Ubaid") horizon; yet it does seem to be part of the same cultural milieu (…), demonstrating an artistic tradition that seems more at home in Syria during Amuq Phase D"* (Leonard 1989, 11-12).

16. A similar decoration is also known from the coeval and nearby site of Tell Kosak Shamali (Nishiaki *et al*. 1999; Nishiaki 2016).

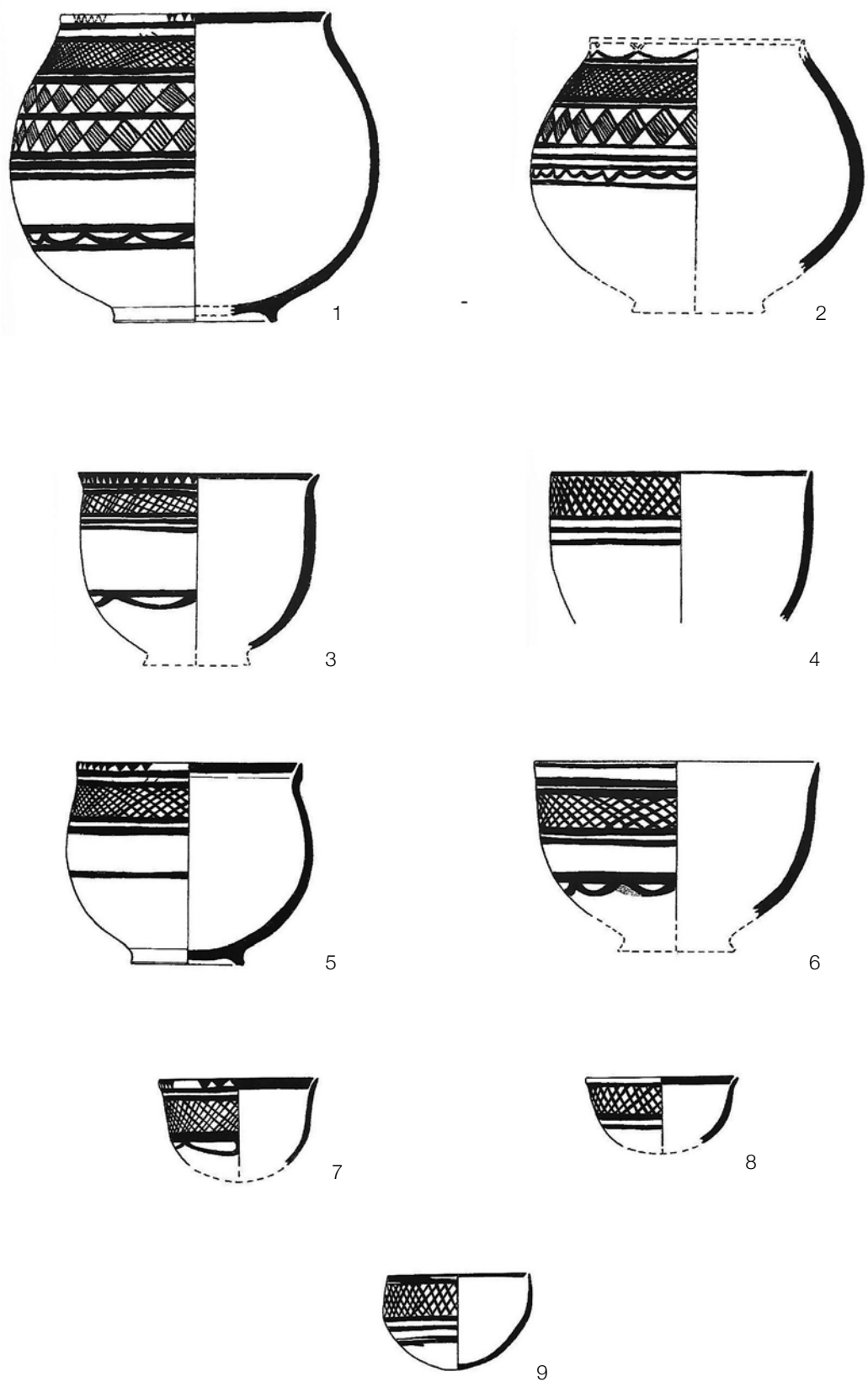

Figure 8. Tell ‘al-Abr – Ubaid Monochrome-Painted Ware, Stage I (Hammade/ Yamazaki 2006, pls. 6.1: 2, 3, 6; 6.3: 4; 6.5: 2, 4; 6.10: 7-8, 10) (not to scale).

more precisely denote the contexts of commensality, and to ascertain whether there was a difference in the use of bichrome and monochrome ceramics. In fact, we do not even know if such vessels could have made up some sort of standardized dinner set (possibly also comprising elements made up of perishable materials), which mirrored convivial and/or ritual habits.

Although we do not know whether the import or the production of Halaf- and Ubaid-related painted pottery entailed the adoption of specific habits, food-related practices, either daily food consumption or special feasts, certainly played a significant role in building and reproducing social relations (*e.g.*, Pollock 2010). The symbolic and ritual dimension, always so difficult to investigate, lies at the very core of these processes, and the appearance of painted pottery has certainly opened up a wide array of novel possibilities for *"the creation, negotiation, and contestation of identities, social norms, the construction of personhood and prestige, and the exercise of social and economic control"*. As remembered by Philip Karsgaard, painted ceramics, just like all 'meaningfully constituted' material culture, *"are meaningful in ways that are not reducible to their being epiphenomena of their particular technologies of manufacture"* (2010, 51).

Nevertheless, the role played by technology in the diffusion of painted pottery cannot be underestimated. As demonstrated by Michela Spataro and Alexandra Fletcher (2010), the spread of Halaf painted pottery entailed the use of a common formula or 'recipe' for the preparation of the clay paste: interregional contacts appear to have structured potting activities over a wide area, showing once more how technology can contribute to the establishment of extended communities of practice. A technological transfer of some sort must be presupposed also in the case of bichrome-painted pottery, a technically specialized product whose manufacture involves the use of technologies clearly differing from the Levantine autochthonous traditions.

The sharing of both technological knowledge and beliefs or, at least, of decorative patterns and motifs must have made the adoption of Halaf and Ubaid painted pottery highly desirable, as testified by its widespread diffusion. Available evidence rarely allows us to reconstruct the contexts of production of such pottery in detail, but we do not have evidence of mass pottery circulation, and local production is to be posited in most cases. Although the data indicating the provenance of Levantine bichrome ceramics are quite limited, the fact that they display peculiarities despite their small quantities and that they often appear to be related to local monochrome-painted wares, strongly suggests that most of them too were manufactured locally.

Local production, far from being a mechanical replication, implied a selective adoption and reworking of traits. This is a phenomenon very well known for both the Halaf and Ubaid interaction with regard to the appropriation of foreign/external traits, which is indicative of the complex and diverse mechanisms that such interactions entailed. The glocal character of Halaf and Ubaid pottery reflects the multiscalarity of interactions spheres or socio-material networks. Halaf and Ubaid *oikoumenai* can in fact be appropriately conceived in the first place as interaction spheres or socio-material networks identified by the diffusion of related pottery[17]. After all, as observed by Robert Carter and Graham Philip regarding Ubaid horizon, "*pottery is the single factor found in all assemblages that have historically been described as"* such (Carter/Philip 2010, 3).

Yet, although at least partially explained by the patchiness of evidence, the uneven distribution, both in spatial and quantitative terms, of the Halaf- and Ubaid-related pottery in the Levant raises the question of the mechanisms of their diffusion. It must be considered that their progressive rarefication takes place within an area characterized by a rather substantial degree of homogeneity from the point of view of ceramic production, as showed by the spread of Dark Faced Burnished Ware, Red-Wash Ware and related pottery. Furthermore, (Halaf/)Ubaid pottery appears to have inspired a local production of bichrome-painted ceramics in the southern Levant, namely at a considerable distance from sites where significant amounts of Halaf/Ubaid pottery have been found.

The uneven distribution and reworking of traits attest in the first place to the significance of the role played by local socio-economic conditions and cultural practices in determining their dissemination. Receptivity, however, can also be influenced by other elements. Relationships existing between communities and/or individuals are of course of great importance. Indeed, the very relational character of socio-material networks might help to explain a distribution of traits that eludes spatial proximity. As shown by the small-world theory, transmission over considerable distances does not necessarily entail a higher number of steps: small numbers of individuals with wider contacts may also be important functioning as links in a wider network. Individual potters, itiner-

17. Multiple ties can simultaneously bind individuals, groups of people and communities. Interaction spheres can intersect or merge, and vary to a more or less considerable degree over time, contributing to shape practices and therefore identities at both individual and collective level, even if they are not to be confused, given their very multi-scalar and fluctuating character, with 'cultural' or 'ethnic' markers of some sort (Asouti 2006).

ant or simply travelling over medium-to-long distances more or less regularly, could have spread pottery technology and styles even to an area like the southern Levant which is traditionally considered outside both the Halaf and Ubaid horizons. Similarly, in the southern Levant, the manufacture of Halaf/Ubaid-related pottery could have been promoted by aggrandizing individuals willing to exploit a prestige technology to acquire power (Hayden 1998), or by a part of a community, following preferential relationships or allegiances with other, distant communities. The nature of relationships, however, could also place constraints on the dispersal of innovation. Tsaf Ware, whose manufacture entailed a specialized know-how, was apparently produced in a very few centres, perhaps only one at its inception. This could also indicate that the diffusion of bichrome-painted pottery in the southern Levant was related to a restricted knowledge transmission network, as in the case of other specialized technologies like the use of 'rotary kinetic energy' and the lost-wax technique (Roux 2010).

Clearly, the mechanisms of diffusion of Halaf- and Ubaid-related pottery throughout the Levant are far from understood. Anyway, bichrome-painted ceramics contained in Late Neolithic and Early Chalcolithic Levantine assemblages are evidently distinguished for both their particularity and relatedness to the Halaf/Ubaid tradition. Their occurrence should therefore be primarily conceived as a peculiar expression of the vast Halaf and Ubaid supra-regional socio-material networks: their examination helps us assess the impact of the Halaf and Ubaid phenomena in an area like the Levant, in order to better understand how the "peripheries" of both *oikoumenai* were characterized.

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BIBLIOGRAPHY

AKKERMANS, P.M.M.G. 1988, An Updated Chronology for the Northern Ubaid and the Late Chalcolithic Periods in Syria: New Evidence from Tell Hammam et-Turkman, *Iraq 50*, 109-145.

ANFINSET, N. *et al.* 2011, Societies in Transition: Contextualizing Tell el-Mafjar, Jericho, in Lovell J.L., Rowan Y.M. (ed.), 97-113.

ASOUTI, E. 2006, Beyond the Pre-Pottery Neolithic B interaction sphere, *Journal of World Prehistory 20*, 87-126.

BANNING, E.B. 2007, Wadi Rabah and Related Assemblages in the Southern Levant: Interpreting the Radiocarbon Evidence, *Paléorient 33.1*, 77-101.

BANNING, E.B., BLACKHAM, M., LASBY D. 1998, Excavations at WZ 121, a Chalcolithic site at Tubna, in Wadi Ziqlab, *Annual of the Department of Antiquities of Jordan 42*, 141-159.

BRAIDWOOD, R.J., BRAIDWOOD, L.S. 1960, *Excavations in the Plain of Antioch, I. The Earlier Assemblages, Phases A-J*, Chicago, The University Press of Chicago, Oriental Institute Publications 61.

BRENIQUET, B. 1996, *La disparition de la culture de Halaf: les origines de la culture d'Obeid dans le nord de la Mésopotamie*, Paris, Éditions Recherche sur les Civilisations.

CAMPBELL, S. 2003, Part 1: The Pottery of Trenches V and VII, in Parr P.J. (ed.), *Excavations at Arjoune*, Syria, Oxford, Archaeopress, BAR Int. Ser. 1134, 31-70.

CAMPBELL, S. 2010, Understanding Symbols: Putting Meaning into the painted Pottery of Prehistoric northern Mesopotamia, in Bolger D., Maguire L.C. (ed.), *The Development of Pre-State Communities in the Ancient Near East,* 147–155.

CAMPBELL, S., FLETCHER, A. 2010, Questioning the Halaf-Ubaid Transition, in Carter R., Philip G. (ed.), *Beyond the Ubaid: Transformation and Integration in the Late Prehistoric Societies of the Middle East*, Chicago, The Oriental Institute of the University of Chicago, SAOC 63, 69-83.

CARTER, R.A., PHILIP G. 2010, Deconstructing the Ubaid, in Carter R., Philip G. (ed.), Beyond the Ubaid: Transformation and Integration in the Late Prehistoric Societies of the Middle East, Chicago, The Oriental Institute of the University of Chicago, SAOC 63, 1-22.

COHEN, A.P. 1985, *The Symbolic Construction of Community*, London, Routledge.

CRUELLS, W. 2013, La cerámica Halaf en Tell Halula (VII y VI milenios cal BC). Orígenes y desarrollo, in Molist M. (ed.), Tell Halula: un poblado de los primeros agricultores en el valle del Éufrates, Siria, Madrid, Ministerio de Educación, Cultura y Deporte, 59-211.

DAVIDSON, T. E. 1977, Regional Variation within the Halaf Culture, Unpublished Ph.D. Thesis, University of Edinburgh.

DE CONTENSON, H. 1960, Three Soundings in the Jordan Valley, Annual of the Department of Antiquities of Jordan 4-5, 19-28.

DE CONTENSON, H. 1992, *Préhistoire de Ras Shamra: les sondages stratigraphiques de 1955 à 1976* (*I. Texte, II. Figures et planches*), Paris, Éditions Recherche sur les Civilisations, Ras Shamra-Ougarit VIII.

DIEBOLD, B.H. 2000, Preliminary Report on the Ceramic assemblage at Tell Kurdu, in Yener K.A. *et al*., Tell Kurdu Excavations 1999, Anatolica 26, 58-65.

DIEBOLD, B.H., SPEAKMAN, R.J., GLASCOCK, M.D. 2005, Laser ablation-ICP-MS Analysis of Late Neolithic ceramic pigments form the Amuq Plain, Turkey, in Speakman R.J., Neff H. (ed.), Laser ablation-ICPMS in archaeological research, Albuquerque, University of New Mexico Press, 125-137.

DUNAND, M. 1973, *Fouilles de Byblos V. L'architecture, les tombes, le matériel domestique, des origines néolithiques à l'avènement urbain*, Paris, Adrien Maisonneuve, Études et documents d'archéologie 6.

GARFINKEL, Y. *et al*. 2007, Tel Tsaf: The 2004-2006 Excavation Seasons, Israel Exploration Journal 57: 1-33.

GIANNESSI, D. 2004, Tell Afis: the Late Chalcolithic Painted Ware, Levant 34, 83-97.

GIBSON, C. 1994, The Area D pottery from the 1993 season, in Baird D., Philip G., Preliminary Report on the Third (1993) Season of Excavations at Tell esh-Shuneh North, Levant 26, 121-124.

GILBERT, B. 2004, Analysis of the Painting on six Halaf period pottery samples from Tell Amarna (Syria), in Tunca Ö., Molist M. (ed.), Tell Amarna (Syrie) I. La période de Halaf, Louvain, Peeters, Publications de la Mission archéologique de l'Université de Liège en Syrie, 213-219.

GÓMEZ-BACH, A. *et al*. 2012, Black, red and white: characterizing Neolithic ceramic productions in middle Euphrates Valley, in Matthews R., Curtis J. (ed.), Proceedings of the 7th International Congress on the Archaeology of the Ancient Near East, Wiesbaden, Harrasowitz, 527-36.

GOPHNA, R., SADEH, S. 1988-1989, Excavations at Tel Tsaf: An Early Chalcolithic Site in the Jordan Valley, Tel Aviv 15-16, 3-36.

GUSTAVSON-GAUBE, C. 1986, Tell esh-Shuna North 1985: A Preliminary Report, Annual of the Department of Antiquities of Jordan 30, 65-114.

HAYDEN, B. 1998, Practical and Prestige Technologies: The Evolution of Material Systems, Journal of Archaeological Method and Theory 5.I.

HAMMADE, H., YAMAZAKI, Y. 2006, *Tell Al-'Abr (Syria). Ubaid and Uruk Periods*, Louvain, Peeters.

KARSGAARD P. 2010, The Halaf-Ubaid Transition: A Transformation without a Center, in Carter R.A., Philip G. (ed.), Beyond the Ubaid: Transformation and Integration in the Late Prehistoric Societies of the Middle East, Chicago, The Oriental Institute of the University of Chicago, SAOC 63, 51-68.

KAPLAN, J. 1960, The Relation of the Chalcolithic Pottery of Palestine to Halafian ware, Bulletin of the American Schools of Oriental Research 159, 32-36.

KIRKBRIDE, D. 1969, Early Byblos and the Beqa'a, Mélanges de l'Université Saint-Joseph 45.5, 45-60.

LEONARD, A. JR. 1989, A Chalcolithic "Fine Ware" from Kataret es-Samra in the Jordan Valley, Bulletin of the American Schools of Oriental Research 276, 3-14.

LEONARD, A. JR. 1992, *The Jordan Valley Survey, 1953. Some Unpublished Soundings Conducted by James Mellaart*, Winona Lake, Eisenbrauns, The Annual of the American Schools of Oriental Research 50.

LOVELL, J.L., KAFAFI, Z., DOLLFUS, G. 1997, A Preliminary Note on the Ceramics from the Basal Levels of Abu Hamid, in Gebel H.G.K., Kafafi Z., Rollefson G. (ed.), Prehistory of Jordan II. Perspectives from 1997, Berlin, ex Oriente, 361-369.

NIEUWENHUYSE, O.P. 2007, *Plain and Painted Pottery. The rise of Late Neolithic ceramic styles on the Syrian plains*, Brepols, Turnhout, PALMA Series 3.

NISHIAKI, Y. *et al*. 1999, Prehistoric occupations at Tell Kosak Shamali, the Upper Euphrates, Syria, Akkadica 113: 13-68.

NISHIAKI, Y. 2016, 18. Tell Kosak Shamali (Aleppo), in Kanjou Y., Tsuneki A. (ed.), A History of Syria in One Hundred Sites, Oxford, Archaeopress, 76-79.

NOLL, W., HOLM, R., BORN, L. 1975, Painting of Ancient Ceramics, Angewandte Chemie 14.9, 602-613.

OLDENBURG, E. 1991, *Sūkās 9: The Chalcolithic and Early Bronze Age Periods*, Copenhagen, The Royal Danish Academy of Sciences and Letters, Publications of the Carlsberg Expedition to Phoenicia 11.

OLDENBURG, E., ROHWEDER, J. 1981, *The Excavations at Tell Daruk (Usnu?) and 'Arab al-Mulk (Paltos)*, Copenhagen, The Royal Danish Academy of Sciences and Letters, Publications of the Carlsberg Expedition to Phoenicia 8.

ÖZBAL, R. 2010, The Emergence of Ubaid Styles at Tell Kurdu: A Local Perspective, in Carter R., Philip G. (ed.), Beyond the Ubaid: Transformation and Integration in the Late Prehistoric Societies of the Middle East, Chicago, The Oriental Institute of the University of Chicago,

SAOC 63, 293-309.

PHILIP, G., JABOUR, F., BECK, A., BSHESH, M., GROVE, J., KIRK, A., MILLARD, A. 2002, Settlement and Landscape Development in the Homs Region, Syria: Research Questions, Preliminary Results 1999-2000 and Future Potential, *Levant 34*, Iss.1, 1-23.

POLLOCK, S. 2010, Practices of Daily Life in Fifth-Millennium B.C. Iran and Mesopotamia, in Carter R., Philip G. (ed.), Beyond the Ubaid: Transformation and Integration in the Late Prehistoric Societies of the Middle East, Chicago, The Oriental Institute of the University of Chicago, SAOC 63, 93-112.

ROBERT, B. 2010, Développement et disparition de la production céramique halafienne: Implications techniques et sociales à partir d'études de cas, Ph.D. Thesis, Université Lumière Lyon 2, http://theses.univ-lyon2.fr/documents/lyon2/2010/robert_b#p=0&a=top.

ROBERT, B., BLANC, C., MASETTI-ROUAULT, M-G. 2008, Characterizing the Halaf-Ubaid Transitional Period by studying ceramic from Tell Masaikh, Syria. Archaeological data and archeometry investigations, in Kühne H., Czichon R.M., Kreppner F.J. (ed.), Proceedings of 4th International Congress of the Archaeology of the Ancient Near East, Wiesbaden, Harrassowitz, 225-234.

ROUX, V. 2010, Technological innovations and developmental trajectories: social factors as evolutionary forces, in O'Brien M.J., Shennan S.J. (ed.), Innovation in Cultural Systems. Contributions from Evolutionary Anthropology, Cambridge, MA and London, The MIT Press, 217-234.

SCHWARZ, G., WEISS, H. 1992, Syria, ca. 10000-2000 B.C., in Ehrich R.W. (ed.), Chronologies in Old World Archaeology (3rd ed.), Chicago, University of Chicago Press, 221-243.

SPATARO, M., FLETCHER, A. 2010, Centralisation or regional identity in the Halaf period? Examining interactions within fine painted ware production, Paléorient 3.2, 91-116.

STREIT, K. 2015, Exploring the Wadi Rabah Culture from the 6th millennium cal BC: Renewed Excavations at Ein el-Jarba in the Jezreel Valley, Israel (2013–2015), STRATA 33, 11-34.

STREIT, K., GARFINKEL, Y. 2015, Tel Tsaf and the Impact of the Ubaid Culture on the Southern Levant: Interpreting the Radiocarbon Evidence, Radiocarbon 57.5, 865-880.

SULAIMAN, G. 2012, Tell al-Baharia: an important site in the Damascus Basin, in Borrell, F. *et al*. (ed.), Broadening Horizons 3. Conference of Young Researchers Working in the Ancient Near East, Bellaterra (Barcelona), Universitat Autónoma de Barcelona, Congressos 8, 113-122.

THUESEN, I. 1988, *Hama. Fouilles et recherches de la Fondation Carlsberg 1931-1938. I. The Pre- and Protohistoric Periods*, Copenhagen, Nationalmuseet, Nationalmuseets Skrifter Storre Beretringer XI.

WENGROW, D. 2001, The evolution of simplicity: Aesthetic labour and social change in the Neolithic Near East, *World Archaeology,* 33.2, 168-188.

YAMAZAKI, Y. 2010, An Aspect of the Ubaid Intrusion in the Syrian Upper Euphrates Valley, in Carter R., Philip G. (ed.), *Beyond the Ubaid: Transformation and Integration in the Late Prehistoric Societies of the Middle East*, Chicago, The Oriental Institute of the University of Chicago, SAOC 63, 311-328.

YENER, K.A. *et al*. 2000, Tell Kurdu Excavations 1999, *Anatolica 26*, 31-117.

Anna Gómez-Bach, Jörg Becker and Miquel Molist (ed),
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LOCAL MATTERS: POTTERY PRODUCTION AT TELL HALAF AND TELL TAWILA

Jörg Becker*, Kirsten Drüppel, and Markus Helfert*****

Los fragmentos cerámicos de los periodos Halaf y Ubaid de Tell Halaf, Tell Tawilla y de la región de Tell Chuera han sido analizados utilizando métodos geoquímicos, mineralógicos y petrográficos. El intercambio y las importaciones ceràmicas seran discutidos y los fragmentos cerámicos Samarra de Tell Halaf se podran associar a producciones principamente locales.

Cerámica Halaf, Tell Halaf, Tell Tawila, Análisis petrográfico y mineralógico, Fluorescència de Rayos X.

Sherds of the Halaf and Ubaid periods from Tell Halaf, Tell Tawila and Chuera region were analysed through geochemical and mineralogical/petrographical methods. Pottery exchange and imports will be discussed and Samarra-like sherds from Tell Halaf, partly interpreted as imports, will be assigned as local products.

Halaf Pottery, Tell Halaf, Tell Tawila, Petrography and Mineralogy, X-Ray Analysis.

INTRODUCTION

Pottery sherds from Halaf and Ubaid periods were recently analysed within the framework of excavations at Tell Tawila and Tell Halaf in cooperation with colleagues from the University of Frankfurt/Main and the Karlsruhe Institute of Technology.

Both sites are located in Upper Mesopotamia in northeastern Syria (Fig. 1), situated about 60 km apart and separated by a watershed. Especially during the Late Neolithic Halaf culture in the early 6th millennium cal. B.C., both sites share a lot of common features in the material culture (tholoi, painted fine ware, figurines; *cf.* Akkermans 1993; Becker 2011), yet based on the geographical setting and ecological conditions, some significant differences are indeed noticeable.

Accordingly, the Tell Halaf settlement starts during the Pottery Neolithic from about 6500 cal BC onwards (*cf.* Hole 2001: 70) and continues through all stages of the Halaf period, followed by the Ubaid period, while the prehistoric sequence ends with the Late Chalcolithic era. During the new excavations, solely the developed Halaf phases (Halaf IIa/b and the Halaf-Ubaid-Transitional (HUT) could be uncovered on a larger scale (Becker 2009, 2012, 2013a/b, 2015, 277–326).

Differing from Tell Halaf in the well-watered Khabur triangle, Tell Tawila and the Tell Chuera region – as part of the halafian '*hinterland*' – were intensively settled only after

* Seminar for Oriental Archaeology and Art History, Martin-Luther-University, Halle – Wittenberg, Universitätsplatz 10, 06108 Halle (Saale), Alemanya. joerg.becker@orientarch.uni-halle.de
** Institute for Applied Geosciences, Dep. of Mineralogy and Petrography, Karlsruhe Institute of Technology (KIT), 76131 Karlsruhe, Alemanya. kristen.drueppel@kit.edu
*** Head of the Research Centre for Pottery at the Institute for Archaeological Sciences at the Goethe-University Frankfurt am Main, 60323 Frankfurt del Main, Alemanya. m.helfert@em.uni-frankfurt.de

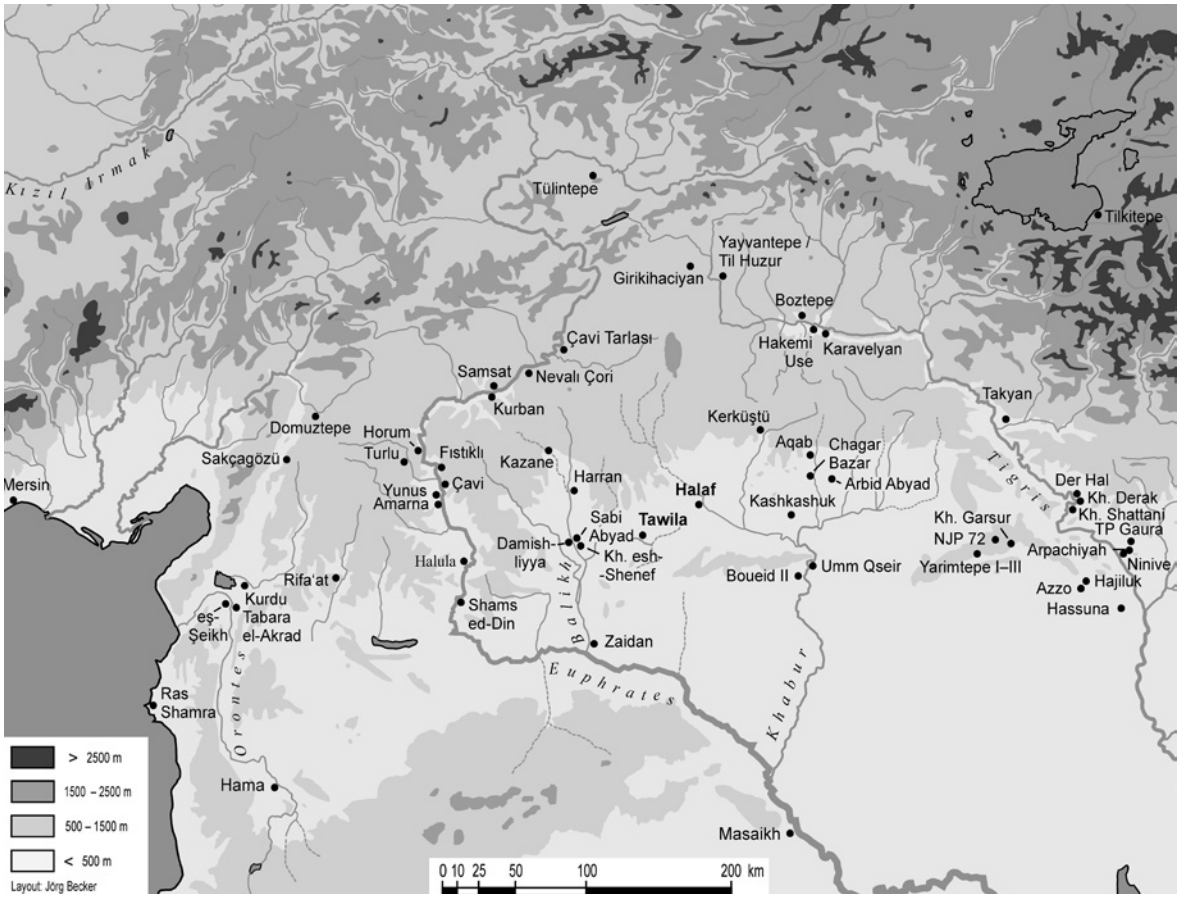

Figure 1. Map of Halafian sites.

the Halaf culture had become established along bigger rivers, emerging out of the older stages of Pottery Neolithic (henceforth, PN) with dates for Tell Tawila between ca. 5950–5650 cal BC. Further, in the subsistence of sites like Tell Tawila, the hunting of onager and gazelle played a more important role (Becker *et al.* 2007; Becker 2015).

Exchange between both regions can be suggested through recent X-ray analysis of obsidian from both sites, most of it coming from Bingöl A and B. The high percentage of obsidian in the lithic assemblage from Tell Tawila (ca. 40%) is very close to that of sites in the Khabur or the Sinjar region (Tell Umm Qseir with ca. 42%, Tell Aqab – 80%, Yarimtepe II – ca. 34%; *cf.* Campbell 1992, 152 with Tab. 8.8). Although the way via the Balikh valley cannot be excluded, the route via Tell Halaf as a possible transfer site seems most likely, whereas obsidian came into the Tell Chuera region as prepared cores (*cf.* Helms in Becker *et al.* 2007, 246 ff.; Becker 2015, 200).

QUESTIONS AND ANALYTICAL METHODS

Archaeological work on pottery is mainly based on the arrangement of wares, the typology of forms and decorative motifs, as well as their classification in chronological and spatial terms. Alongside this usual work, different kinds of archaeometric methods for the analysis of pottery have entered the scientific discussion during the last decades (*cf.* Moorey 1999, 149–153). In contrast to the traditional macroscopic descriptions of pottery and their fabrication, these archaeometric methods offer new insights concerning the raw materials and technologies employed, as well as aspects of communication and exchange, social organisation or specialisation (*cf.* Spataro 2002, 36; Spataro/Fletcher 2010, 95).

The examinations discussed in this article focused mainly on the following questions:

- questions about the sources of clay used, their possible preparation, especially in the case of the dominating painted fine wares.
- questions about similarities or dissimilarities in pottery fabrication on a local (intra-site level) and a regional level (inter-site level).

Sites	Total Samples	Periods			
		Pre-Halaf	Halaf	Ubaid	LC (and others)
Tell Halaf	32	1	25	6	–
Tell Tawila	40	–	26	4	10
WHS 5	12	–	10	1	1
WHS 15	11	–	5	4	2
WHS 19	4	–	3	–	1
WHS 21	5	–	5	–	–
WHS 23	5	–	5	–	–
WHS 28	7	–	1	2	4
WHS 42	7	–	4	–	3
Total	**123**	**1**	**84**	**17**	**21**

Figure 2. Distribution of analysed samples per site and period.

- questions about pottery exchange and specific production centres.
- questions about the pigments used for the painting and the required technologies (in progress).

To answer these questions, a combination of different archaeometric analyses was used. The aim of portable energy dispersive X-ray fluorescence analysis (pXRF) was the destruction-free analysis of a larger group of pottery samples from different sites and mainly from the Halaf and Ubaid periods, thus gaining a chemical fingerprint of these samples and an initial grouping.

Through the subsequent mineralogical and petrographic analyses, thin sections, scanning electro microscopy, and X-ray diffraction, of selected sherds, the composition of the samples, their similarities and differences were further studied (*cf.* for similar methods see also Spataro/Fletcher 2010, 95 f.). In several meetings, the results of these analyses were finally discussed with reference to their cultural and historical background.

ARCHAEOLOGICAL CONTEXT AND SAMPLING METHOD

The distribution of the samples is shown in Figure 2. In general, the samples focus on Halaf pottery with 84 samples, while only 17 pieces date to the Ubaid period. They were augmented by 21 sherds of the local Late Chalcolithic period and one sample of the *altmonochrom* stage from Tell Halaf (Fig. 2).

No samples from the recent excavations were available for Tell Halaf. Therefore, samples were taken from the old excavations undertaken by Max von Oppenheim before and after the First World War, now stored in different depots in the Vorderasiatisches Museum in Berlin. Based on earlier classifications of this pottery with its chronological external comparisons (*cf.* Becker 2013a, 47–53 fig. 2; Becker 2013b, 456–460 fig. 41.2 and 41.3), 32 samples were chosen for analysis. Thereby, the sample selection refers to potsherds first published by H. Schmidt (1943 in von Oppenheim), whose provenience from Tell Halaf can be regarded as secure. These samples should be more or less representative

Sample-No.	Reference after Schmidt 1943: Taf. ...	Ware	Dating	Comments
TH 1	XLII, 15	Ba	Halaf II	monochrome painted
TH 2	XLII, 6	Ba	Halaf II	*ibid.*
TH 3	LIX, 3	Ba	Halaf Ib-II	*ibid.*
TH 4	XC, 1	Ba	(Proto-Halaf /) Halaf Ia	*ibid.*
TH 5	XLIV, 13	Ba	Halaf	*ibid.*
TH 6	XLIV, 4	Ba	Halaf	*ibid.*
TH 7	LI, 3	Ba	Halaf II	*ibid.*
TH 8	XLV, 4	Ba	Halaf II	*ibid.*
TH 9	XLII, 12	Ba	Halaf II	*ibid.*
TH 10	L, 8	Ba	Halaf II	*ibid.*
TH 11	XLIII, 11	Ba	Halaf II	*ibid.*
TH 12	XLIII, 7	Ba	Halaf II	*ibid.*
TH 13	XLVIII, 12	Ba	Halaf II	*ibid.*
TH 14	LXXVII, 3 = XVI, 5	Ba	Halaf II	*ibid.*
TH 15	XLIV, 5	Ba	Halaf Ib-II	*ibid.*
TH 16	XLIV, 2	Ba	Halaf II	*ibid.*
TH 17	XC, 16	Ba	Halaf Ia	*ibid.*, Samarra influence
TH 18	XC, 7 = Abb. 57	Ba	Proto-Halaf / Halaf Ia	*ibid.*, Samarra influence
TH 19	XC, 13 = Abb. 54	Ba	Proto-Halaf / Halaf Ia	*ibid.*, Samarra import
TH 20	LXXXIX, 1	Ba	Halaf IIb ?	white painting on black varnish
TH 21	XCI, 2	Bb	Halaf IIb	polychrome painted
TH 22	LXXXIX, 7	Ba	Halaf IIb	monochrome painted
TH 23	XCI, 3	Bb	Halaf IIb	polychrome painted
TH 24	XLV, 12	Bb	Halaf IIb	polychrome painted
TH 25	LXXXVIII, 3	Ba	Halaf	plastic decorated fragment of a *'Korbgefäß'*
TH 26	XCVIII, 5 = XXX, 8	Ca	Halaf IIb / HUT	monochrome painted
TH 27	XCVII, 1 = Abb. 74	Aa	Pre-Halaf	*'altmonochrom'* with monochrome painting
TH 28	XCIX, 6 = XXXII, 13	Cb	Ubaid	polychrome painted
TH 29	CII, 8	Cb	Ubaid	monochrome painted
TH 30	CII, 3	Cb	Ubaid	*ibid.*
TH 31	CII, 5	Cb	Ubaid	*ibid.*
TH 32	CII, 7	Cb	Ubaid	*ibid.*

Figure 3. List of the analysed fine ware sherds from Tell Halaf.

for the spectrum of the fine ware pottery at Tell Halaf, including its time range. At the time of its selection, this museum collection focused on predominant and special fragments of the fine ware groups, whereas samples of coarse wares – at least in their present-day state – seem to be less represented, and therefore are not included in the analysed samples (Fig. 3, Fig. 4).

Figure 4 shows some of the selected sherds from Tell Halaf, starting with a painted *altmonochrom* example, viewed by H. Schmidt as an imitation of Halaf pottery, but it belongs to the oldest, local stage of the earlier Pottery Neolithic. Schmidt considered other samples as imitations or imports of the Samarra culture. Nevertheless, the majority of the selected sherds belong the to monochrome and polychrome painted Halaf ware groups. At the end of this selection one sample of red ware with black painting, often assigned to the Halaf IIb or Halaf-Ubaid-Transitional stage (henceforth, HUT), and some fragments representing the following Ubaid stages with monochrome and polychrome samples are presented (see also Fig. 3 for reference of the selected samples to the publication of H. Schmidt 1943 in von Oppenheim, and *cf.* Becker 2013b for actual comparisons).

The Halaf samples from Tell Tawila derive mainly from excavations. The Ubaid sherds from Tawila as well as the Halaf and Ubaid sherds are from all other Wadi Hamar sites found during the survey. Here as well, the selected samples mainly concentrate on the Halaf and Ubaid

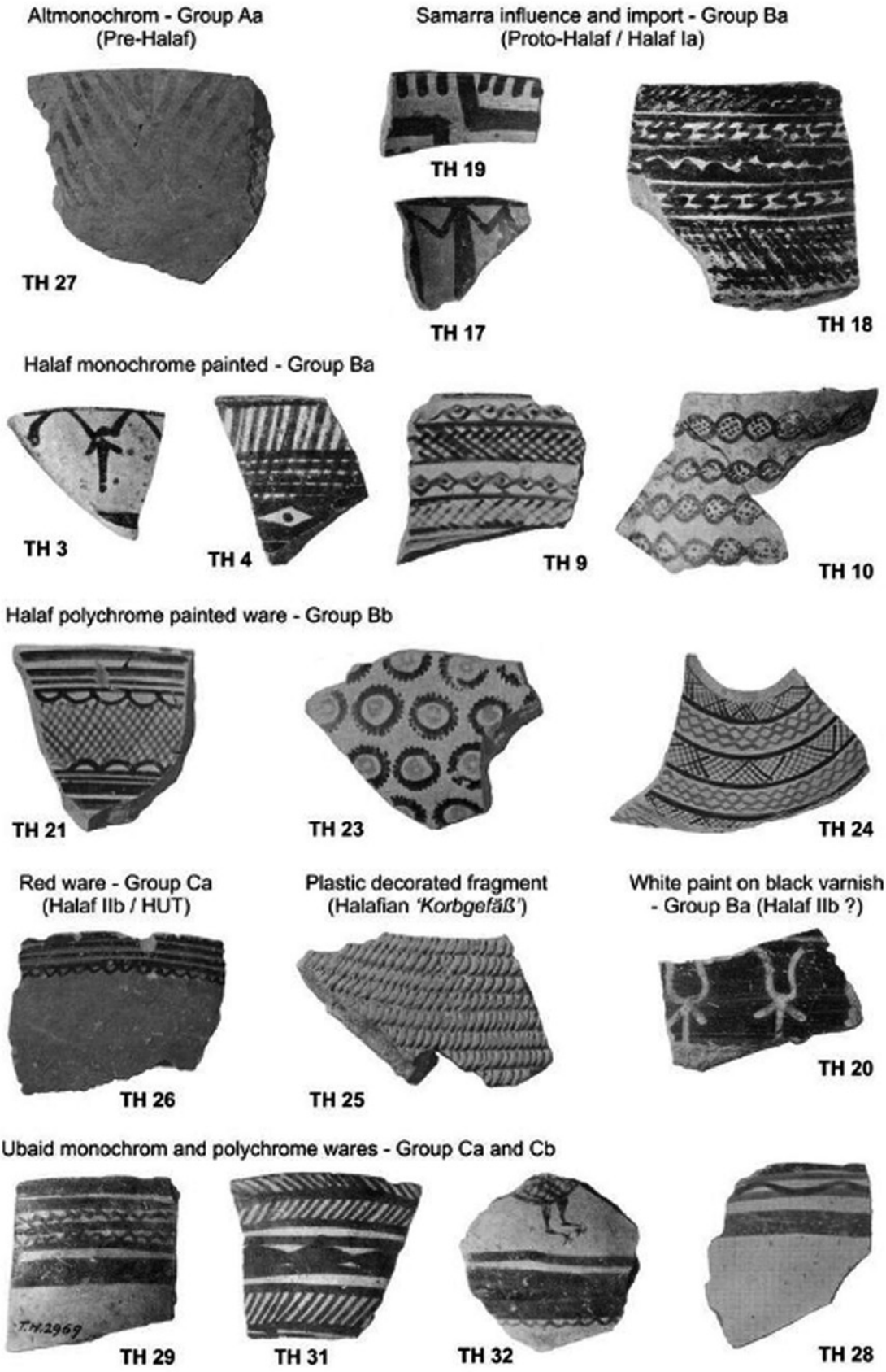

Figure 4. Selected fine ware samples from Tell Halaf illustrating their assumed time range (all photos after Schmidt 1943; *cf*. Tab. 3).

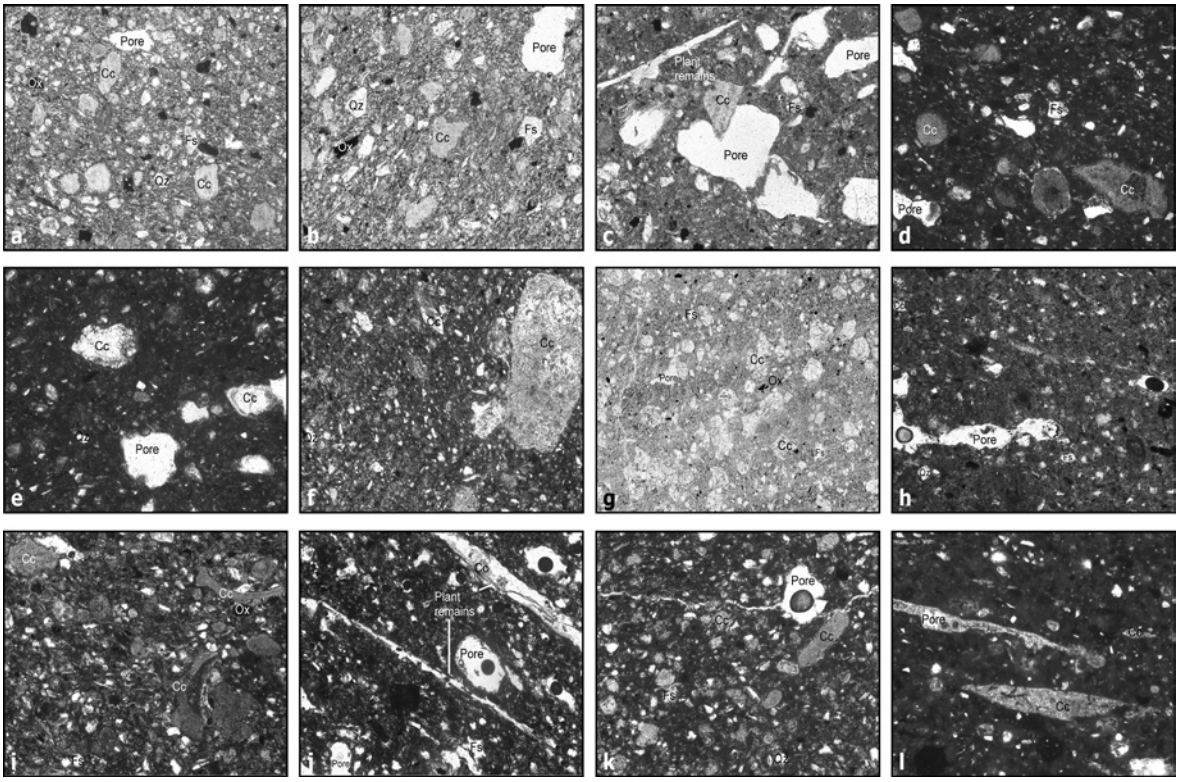

Figure 5. Microphotographs of fine ware samples from Tell Halaf (a–d), Tell Harubi (e), Mishrife (f), Agila-South (g–h), Khirbet Hagg Badran (i–j) and Tell Tawila (k–l): a, d, h, j, l = Ubaid pottery, b–c, e–g, i and k = Halaf pottery; plane polarised light, 1.2 mm field of view (abbrevations: *Cc* Calcite, Fs Feldspar, *Ox* Fe-Ti-Oxide, *Qz* Quartz).

monochrome fine wares. However, for the Halaf (n = 7) and the Ubaid (n = 5) periods some samples of kitchen wares are represented, i.e. the mineral-tempered kitchen ware of the Halaf and the chaff-tempered kitchen ware of the Ubaid period from Tell Tawila and other survey sites, which seem to be local products, and could be included in the sample list. No special fragments of bichrome or plastic decorated Halafian fine ware, which occur at Tell Tawila only in minimal quantities, could be incorporated in the analysed samples (*cf*. Helfert 2015 with addendum 4).

MINERALOGICAL AND PETROGRAPHICAL ANALYSIS

Thirty sherds from different sites (Tell Halaf, Tell Harubi, Mishrife, Khirbet Hagg Badran, Agila-South and Tell Tawila) were selected for mineralogical and petrographical analysis using thin sections, polarisation microscopy, X-ray diffraction, scanning electron microscopy, and electron microprobe analysis (*cf.* Drüppel 2015).

Macroscopically, the sherds of these sites display different colours and gradients in their core and marginal areas. Halaf sherds from Tell Halaf are characterised mainly by reddish-brown surfaces and pale green to pale red core areas. In contrast, Ubaid fragments from Tell Halaf and Tell Tawila have instead a homogenous red-brown colour, indicating oxidising conditions during firing. Samples from Tell Harubi, Mishrife, Khirbet Hagg Badran and Agila-South show heterogeneous colours; frequently uniform green or green to black coloured potsherds are indicative of reducing firing conditions.

Under the polarized light microscope, sherds from all sites display a similar and quite homogenous distribution of their components (Fig. 5). Numerous samples display a bimodal grain size distribution with larger fragments of quartz, carbonate, feldspar or iron-titan-oxide of 0.1 to 0.5 mm in size. These relicts of raw materials are set in a very fine-grained to vitric matrix that is formed by quartz, feldspar, clinopyroxene, iron-titanium-oxide, and glass phase. This is mainly the case for Ubaid samples (Fig. 5d). In contrast, most of the Halaf sherds show a predominance of polymodal or serial grain-sized distributions without significant maxima, which leads to the impression that less care was given in the selection and preparation of the clay sources. Porosity is represented by sub-millimetre-sized voids, channels, and, especially in the case of potsherds of the Ubaid period, elongated pores of up to 3 mm in length, suggesting additions of organic chaff (Fig. 5h, j an l). Such relicts of organic materials are found only sporadically in older samples,

for example, in one fragment from the *altmonochrome* stage at Tell Halaf (Fig. 5c) or in one sample from Khirbet Hagg Badran (Fig. 5i). However, their pore size is much smaller (max. 1 mm in length).

The spatial arrangement of mineral fragments, pores and relicts of organic substances is mostly irregular (Fig. 5a, c, d): the subparallel orientation of the mineral fragments (Fig 5c) or elongated cavities observed (Fig. 5j and l) is rare. The analysed sherds from the different sites show a variable porosity mostly < 10 vol.%, but in the case of the organic tempered Ubaid pottery as much as 28 vol.% was reached.

High resolution examinations with scanning electron microscopy and electron microprobe analysis document that during the firing process Al-Ca-Mg-rich clinopyroxene (fassaite) and gehlenite are generated in the fine grained matrix of the burnt sherds. Coarse feldspar relicts of the raw materials are often rich in potassium (K-feldspar), whereas in the new matrix, newly formed microcrystalline feldspar has a more calcium-rich composition (anorthite). Relicts of calcite grains are fine grained and re-crystallised, showing numerous fractures, pointing to the transformation of calcite into CaO during firing. Locally, calcite is surrounded by a narrow rim of a Ca-Si-phase, presumably wollastonite. These newly formed microcrystallites are surrounded by a porous Si-Al-Fe-Mg-Ca-rich glass phase, *i.e.* crystallised melt.

Quantitative phase analyses (*i.e.* Rietveld analysis) revealed a strongly heterogeneous composition of the sherds on an inter-site as well as on an intra-site level (*cf.* Drüppel 2015, 452 fig. 199). With the exception of one carbonate-rich Halaf sample from Agila-South (WHS 5-154), quartz (5–41%) and feldspar (11–39%) are the main constituents of all sherds. Alongside clinopyroxene (up to 53%), calcite (up to 37%) and gehlenite (up to 13%) are minor constituents. Accessory minerals are iron-titanium-oxides, and analcime, amphibole, or sanidine are rare. Eight of the 30 samples contain smaller portions of the original clay minerals (up to 8% illite) and iron-hydroxide (up to 1% goethite). These phases indicate that marl-clay was used as the main clay source.

In light of the existing phases, this heterogeneity can be mainly explained as due to differences in the composition of the clay sources. The simplified ternary diagram (Fig. 6) shows that the quartz-rich samples from Tell Halaf and Mishrife (WHS 21) range mainly in one field, bordered by tie-lines of quartz-diopside-anorthite. Sherds from Tell Tawila and other sites in the Tell Chuera region, with their higher calcium-magnesium contents, mainly fall into the stability field of diopside-anorthite-gehlenite. The latter samples indeed contain higher amounts of clinopyroxene and/or feldspar (anorthite) and, at the same time, lower contents of quartz. In contrast, modal amounts of gehlenite in different samples cannot be correlated with their chemical composition. For example, no gehlenite could be determined in sherds from Agila-South, despite their calcium-magnesium-rich composition, but they contain higher amounts of newly formed clinopyroxene. The same holds true for one sample from Khirbet Hagg Badran (sample WHS 15-156 – an Ubaid sample). This observation suggests that the firing conditions also played an important role for the resulting phase assemblage and should not be neglected.

The firing temperature can be mainly deduced from the minerals formed during the burning of the sherds. Larger fragments of calcite are heavily decomposed, re-crystallised and transected by microfractures, indicating that calcite was decomposed at temperatures of ca. 830–870°C into calcium oxide (lime = CaO) (*cf.* Boynton 1980). This transformation is interlinked with a decrease in volume and may lead to the formation of fractures or porosity in the pottery. During cooling, calcite can be newly formed out of calcium-oxide through re-hydration and re-carbonisation. The new formation of anorthite, gehlenite and clinopyroxene during the firing process, which can be found in the fine-grained to vitric matrix of most of the samples from different sites (the only exception is Agila-South), is remarkable. These phases are known from other ceramic products of lime-rich clays, in which gehlenite and anorthite are formed by calcite, quartz and the clay minerals (illite/muscovite) of the raw materials during firing. The newly formed clinopyroxene is presumably a result of the transformation of Mg-rich carbonates (f.e. dolomite) and/or reaction of Mg-silicates with quartz during the firing process, whereas wollastonite originates from the reaction of calcite and quartz.

Examinations of comparable ceramics (Cultrone *et al.* 2001) have demonstrated that wollastonite and gehlenite crystallise at temperatures roughly higher than 800°C, while the crytallisation of clinopyroxene and anorthite starts at only slightly higher temperatures around 900°C. The highest firing temperature, about 1000°C, is indicated in one early sample from Tell Halaf (TH 18) by the occurrence of sanidine, which was presumably transformed out of clay minerals or muscovite. Interestingly, this sample (TH 18, see Fig.3 and Fig. 4) is one example from the old excavations that was correctly described by H. Schmidt as a local imitation at Tell Halaf with Samarra influence (*cf.* Schmidt 1943 in von Oppenheim, 67 Taf. XC, 7 = Abb. 57).

The preservation of non-decomposed feldspar and illite as well as the absence of crystallised melted mass (glass) in some of the samples indicate that the firing temperature could not have been higher than 1000°C.

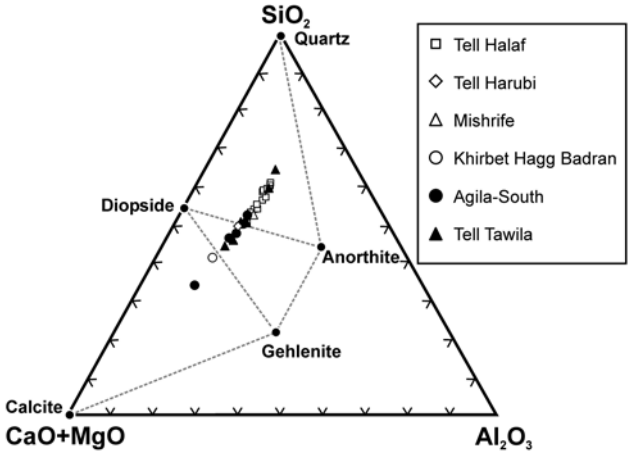

Figure 6. Chemical composition of Halaf and Ubaid sherds from different sites in northeastern Syria with their main phases, shown in a ternary SiO_2-CaO+MgO-Al_2O_3-diagram.

Generally it must be noted that the above mentioned transforming temperatures according to Cultrone *et al.* (2001) were calculated under oxidising conditions. Experiments in reducing systems document that, under such conditions, the respective reactions start at higher absolute temperatures (ca. 50–100°C higher; Peters/Jenni 1973).

The existing phases for the majority of the samples from different sites, fired under oxidising conditions, suggest that relatively consistent and homogenous firing temperatures of about 900°C were maintained; presumably higher temperatures up to ca. 1000° C were reached for a short time.

Clinopyroxene- and glass-rich and at the same time gehlenite-free samples from Agila-South and Khirbet Hagg Badran presumably document firing temperatures of more than 900°C: under these conditions, more clinopyroxene crystallises while the amount of gehlenite decreases (Cultrone *et al.* 2001).

In the case of the oxidised fired samples from Tell Halaf (TH 23 = Halaf IIb, TH 26 = Halaf IIb/HUT and TH 27 = *altmonochrom*; *cf.* Fig. 3) slightly lower firing temperatures below 800°C were reached. Under such conditions the sedimentary source minerals like for example the clay minerals remain partly preserved.

In general, the variations in the phases and firing temperatures of the analysed sherds from different sites and within the local groups lead to the conclusion that there was a local production of these ceramics, but with strong variations concerning the care in preparing the clay sources and the firing conditions. (Fig. 6).

GEOCHEMICAL X-RAY FLUORESCENCE ANALYSIS

All 123 samples were firstly analysed with a portable energy-dispersive X-ray-analyser (Type Xl3t 900S GOLDD = Geometrical Optimized Large Area Drift Detector; for a detailed report see Helfert 2015 with addendum 4). As different case studies have shown, the new generation of such instruments are suitable for their enhanced detector to make examinations of pottery (*cf.* Böhme/Helfert 2010, 13 ff.; Helfert 2011, 325 f. or Helfert *et al.* 2011). Unlike older models, proof of the light elements magnesium (Mg), aluminium (Al), silicium (Si), phosphor (P) and sulphur (S) are an important factor for the use of this method in archaeology, given that silicon and aluminium are especially essential for the characterisation of pottery. As a precondition for the use of portable energy-dispersive X-ray fluorescence analysis (pXRFA), the instrument needs to be finely calibrated and the parameters must be harmonised with the pottery matrix (Böhme/Helfert 2010, 18; Helfert *et al.* 2011, 6 f.). Through measurements of reference samples with known chemical composition, systematic errors can be detected and corrected. A selection of 140 pottery samples from a Roman context in Groß-Gerau (Germany), whose chemical composition had been analysed beforehand using another X-ray analysis series (WD-RFA; for the method see Helfert 2010, 247 ff.), was used for the fine calibration in the present analysis.

With the high agreement between both measurement procedures, the above mentioned X-ray analyser was able to measure nine main elements and thirteen trace elements. In general, the spectrum was broadened into 25 measured elements. For the main elements, the data are given in percentage by weight of their oxide, and for

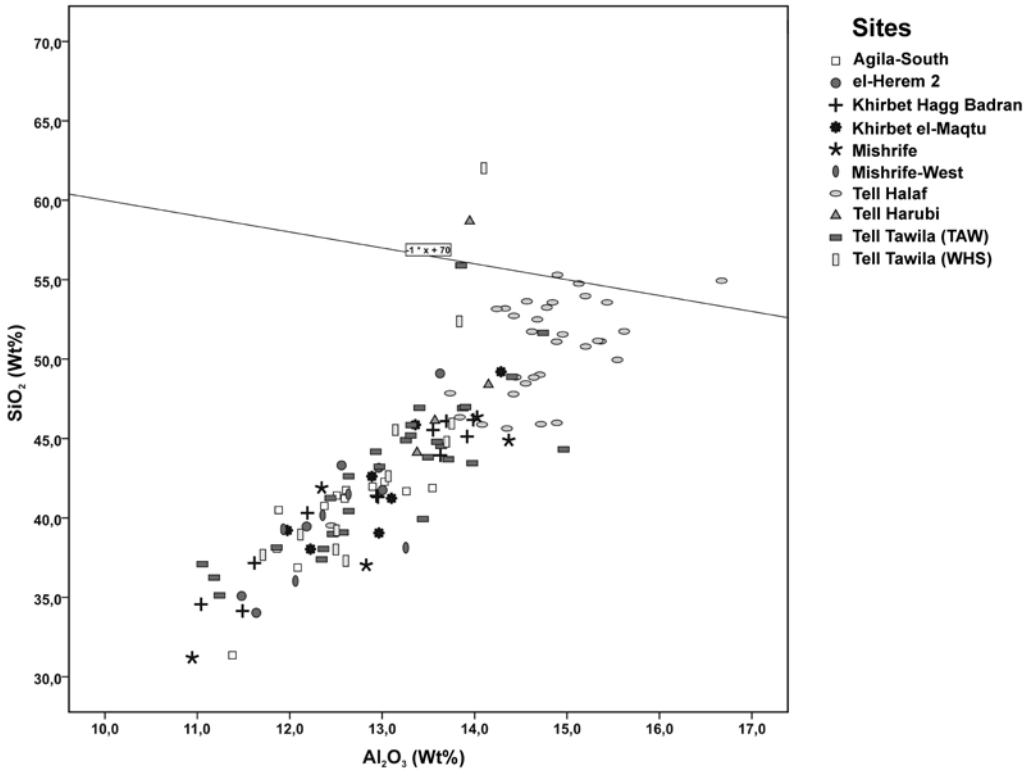

Figure 7. Scatter diagram of all samples showing SiO_2 (wt%) against Al_2O_3 (wt%), designated according to sites.

the trace elements in parts per million (*cf.* Helfert 2015 with addendum 4).

Concerning the question of clay preparation, several pottery studies could show that, through the levigation of the clay – whether this took place in pits or basins – the resulting clay mass, if we look for the content of silicon against aluminium, will be ordered on a correlation line (*cf.* Schneider 1988, 305 f.; Helfert 2010, 149 ff.), resulting in the reduction of sand (geochemical represented through SiO_2) and leading to an increase of clay (geochemically represented by Al_2O_3). Through this effect, bivariate element plots show characteristic curves with very small variance among single measurements ordered along a line. After a standardisation of the main elements to 100 percent, this line is (in an ideal case) an ascending slope with a gradient of -1. In the case that such correlation lines exist in the measurements, a statement can be made as to whether and how intensive levigation (or under dry conditions preparation through sieving) took place, and – based on the variance of the measurements – also a statement on how carefully such a levigation process was executed.

Similar to the mineralogical results of 30 selected sherds (see above), Figure. 7 also show that all 123 samples from all nine sites give no clear indication for the levigation of the clay. It can be further assumed, in view of the great variance in measurements, that in all sites no special care took place regarding the preparation of the clay. At the same time, it is recognisable that over the long time scale of the sites, mainly spanning the Halaf and Ubaid periods, but also reaching at maximum from Pre-Halaf to the Late Chalcolithic periods, similar clay sources were used in the nine sites. By trend, the low percentages by weight of SiO_2 can be seen as indicative of no tempering at all or at most only sporadic tempering, here excluding chaff temper in late Ubaid samples. Higher quartz (SiO_2) concentrations in the samples from Tell Halaf may be seen as a means of light mineral temper (Fig. 7).

Bivariate scatter diagrams and principle component analysis (PCA) were used concerning the question of local production and exchange between the analysed sites (*cf.* Ramminger/Helfert/Mecking 2010, 59 ff. for the description of the procedure) (Fig. 8). The three-dimensional diagram with the first three calculated parameters of the main component analysis (Fig. 8a) shows at first slight differences in the geochemical composition of the individual sites. Individual samples from Tell Tawila and Tell Harubi (WHS 19) are slightly separated from the dense scatter plot. Also, the main samples from Tell Halaf are distinguished in that scatter plot. This feature can be interpreted in geographic terms, according to which Tell Halaf is located 60 km northeast of the Tell Chuera region and is also separated by a watershed.

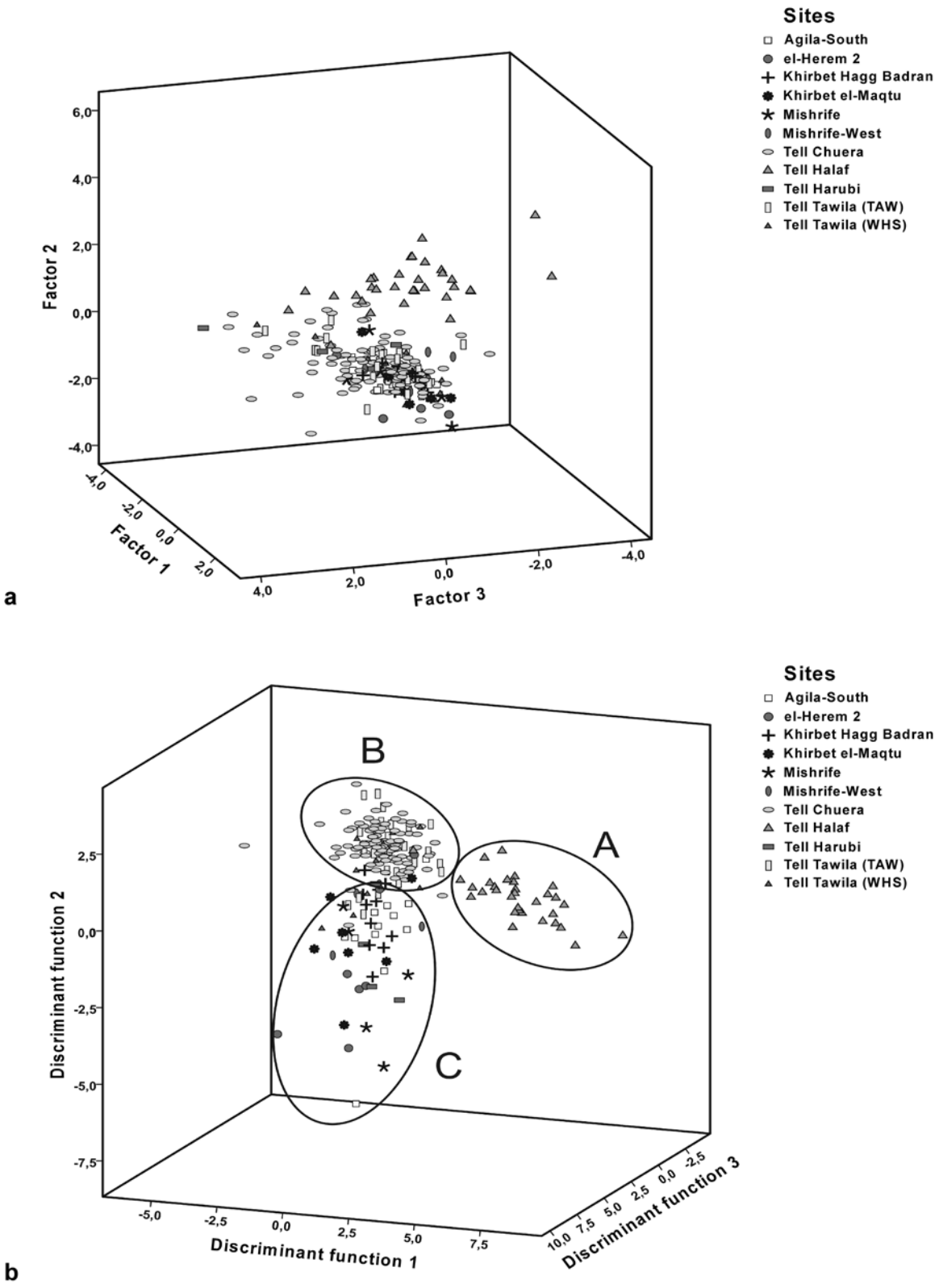

Figure 8. a) Position of all samples in a three-dimensional drawing after the three first factors of a principal component analysis (PCA), designated according to sites.

b) Position of all samples in a three-dimensional drawing after the first three functions of a canonical discriminant analysis (CDA), designated according to sites.

Therefore, different conditions of sedimentation and decomposition of the used clay sources seem to be responsible for these slight differences, under the premise that clay was not transported over greater distances.

Assuming that the analysed Halaf and Ubaid sherds were produced in a subsistence economy, mainly at each site, as is also indicated by wasters from Tell Halaf and Tell Tawila (*cf.* Becker 2015, 97 and 199), it is possible to undertake a canonical discriminant analysis (CDA) with the data on an inter-site level. In doing so, the homogeneity in the individual groups is checked and also the question as to whether the sites can be distinguished from each other (Fig. 8b). The analysis shows at first that each group is very consistent in itself, with some runaway values. Three clusters can be recognised in the three-dimensional diagram of the first three discriminant functions. These clusters comprise (A) samples from Tell Halaf, (B) pottery from Tell Tawila and – as a reference – Tell Chuera, and (C) other sites on the eastern part of the Wadi Hamar survey, *i.e.* the Tell Chuera region. A reason for this phenomenon could be slight differences in the sedimentation of the clay in the different wadi systems. Tell Tawila and Tell Chuera, for example, lie along the same Wadi Chuera, so that in this case it can be assumed that the quite similar chemical composition is based mainly on similar sedimentation processes along that wadi. Solely sites in the eastern part of the Tell Chuera region, group C, show a greater variance, but perhaps this is the result of their location on other wadis.

DISCUSSION

Halaf painted fine ware dominates the spectrum of Late Neolithic fabrics at Tell Halaf and Tell Tawila with ca. 80 % (Becker *et al.* 2007, 236 f. Fig. 18; Becker 2012, 33; 2015, 96 and 293), and is macroscopically characterised at first glance by quite a homogeneous appearance. The Halaf painted fine ware is often described as having been made of well levigated clay, mostly free of rough components from the original clay source, containing some only in minor quantities in small fractions (for example quartz, often > 0.5 mm), and having been fired consistently in an oxidising atmosphere (Rye 1981, 36 f.; Noll 1991, 235 and 237 f.; see also for example Becker 2007, 29). The fine clay matrix is quite visible along the break of such sherds. However, some rough pieces of lime together with other minerals were found in the core as well as on the surface, which had the negative capacity of cracking the surface during firing (*cf.* Rye 1981, 36 f.; Le Mière 1989; Noll 1991, 235 and 237 f.; Clop/Alvarez/Hatert 2004; Nieuwenhuyse 2007, 92).

Thus, it may be questioned whether the clay was really levigated, or whether the fine matrix of the Halaf painted fine ware should be seen rather as a clear selection of finer clay sources during the Halaf period (*cf.* the discussion by Nieuwenhuyse 2007, 92). T. E. Davidson (Davidson 1977, 28) already described mineral inclusions in the case of Halaf fine ware, which occurred naturally in the clay source used at that time by the Arpachiyah potters.

Our mineralogical/petrographical and geochemical analyses for Tell Halaf and Tell Tawila as well as other sites in the Tell Chuera region indicate through their variances in grain-size distribution and different inclusions that varying care was given in preparing the clay, depending more or less on the persons involved in the clay preparation and, thus, negates an intentional levigation process (*cf.* in contrast Spataro/Fletcher 2010, 108, who argue that levigation probably took place).

Similarly, examinations in Tell Amarna (Clop/Alvarez/Hatert 2004), for example, suggest that an intentional selection of finer clay sources was performed, without any necessary further treatment of the clay, to produce the often predominant fine ware fabrics.

Regarding Halafian coarse wares, different and coarser clay sources could have simply been selected. However, in these cases it is clear that such clay sources were tempered with rough sand minerals and/or partly with chaff. Specifically, the mineral temper had the positive feature of thermal conductivity and resistance to temperature changes, and thus functionally lent itself well as kitchen ware (*cf.* Rye 1981, 27; Rice 1987, 229; Le Mière/Picon 1994, 67). Similar tempering of coarse kitchen wares – including local and regional variations – can also be observed at several other Halaf sites, for example at Shams ed-Din or Cavi Tarlası (Gustavson-Gaube 1981, 73–76; von Wickede/Herbordt 1988, 20 f.).

The exchange of ceramic products is ultimately an important aspect, since it significantly determines discussions about areas with regard to regional and inter-regional networks, communication, forms of social organization and specialization.

As already in the 7th millennium cal. B.C. with the Proto Hassuna and Archaic Hassuna stages, and also in the earlier stages of the Ceramic Neolithic there was an intensive exchange of ceramic products, the traces of which could be determined through X-ray and cluster analyses. At least, some fine ceramic products in particular were transported over long distances (*cf.* Le Mière/Picon 1987; Bader *et al.* 1994).

With regard to the Late Neolithic Halaf culture of the 6th millennium cal. B.C, it was primarily the results of Neutron Activation Analyses (NAA) presented by T. E. Davidson / H. McKerrell some 40 years ago, which significantly determined the image of pottery production

and exchanging ceramic products (Davidson/McKerrell 1976 and 1980; Davidson 1977, 349–395; Davidson 1981): The long series of analyses tried to geographically cover all areas of the Halaf pottery distribution, with a selection of sites from the northern Tigris region, the Khabur headwaters, sites along the Euphrates valley and finally sites from the Cilician-Levantine regions along the Mediterranean Sea: Arpachiyah, Tepe Gawra, Gird Banahilk, Tell Hassuna, Tell Brak, Chagar Bazar, Tell Aqab, Tell Halaf, Tell Mureybit, Shams ed-Din, Tell Kurdu, Sakaçagözü, Mersin and Ard Tlaili. Through their own field project, the excavations at Tell Aqab (Khabur triangle), as well as museum and university collections in Great Britain and the United States of America (for Arpachiyah and Tepe Tepe Gawra in the northern Tigris region), the detailed examination focused mainly on both aforementioned distribution areas in the eastern part of the Halaf culture. More survey locations particular to the Khabur triangle were included in the study, especially those in the vicinity of Tell Aqab and Chagar Bazar.

Methodically, specific sherds for each site were selected and compared with local clay sources (if available), and each sample was characterised by the measurements of eight trace elements.

Thereby, at first, samples that seemed to represent the typical type of fabrication for each site were collected; then, samples that did not fit into this pattern and were considered possible imports were chosen.

Comparison of pottery samples and soil samples using Neutron Activation Analysis produced a picture through which soil samples from the Wadi Dara, close to the east of Chagar Bazar, or along the Khabur close to Tell Halaf, could be correlated with the analysed pottery samples. It also further revealed that the wadi systems could be separated, and that the pottery was produced locally at both sites or at least in their immediate vicinity.

A different picture came to view through the comparison of the pottery samples from the six survey sites and local soil samples. Differences in the chemical composition led to the conclusion that a considerable amount of these Halaf samples were non-local in origin, but could be correlated with data from Chagar Bazar. During the late Halaf stage (Halaf IIb) Chagar Bazar seems to have exported mainly polychrome plates and saucers to at least five of the six survey sites. Hence, it was interpreted as a regional centre of the Halaf culture in the eastern part of the Khabur region, as assumed earlier by M. Mallowan (1936).

Further examinations by Davidson (1981) led to the conclusion that about 5–10% of the pottery from Tell Aqab was produced at Chagar Bazar. The exchange of polychrome painted plates and saucers during the late Halaf phase (Halaf IIb) also indicates that not the vessel contents, but the vessels themselves were exchange goods. In the case of Tell Aqab, this kind of exchange can be traced back to the Halaf Ib stage, during which a monochrome painted pot was transported from Chagar Bazar to Tell Aqab.

Similarly, according to these analyses, Tell Halaf and Tell Brak are interpreted as two further production centres of Halaf painted pottery in the Khabur triangle. These centres transferred painted vessels as special products to some smaller sites in their immediate vicinity and also exchange relations existed between these centres.

The comparison between analysed pottery from Arpachiyah and Tepe Gawra, 25 km to the northwest, allows to conclude, for the northern Tigris region, that about 30–40% of the painted vessels found in the deep sounding at Tepe Gawra were imported from Arpachiyah. These imports incorporate not only elaborate platters and saucers, well known from the *'burnt house'* in Arpachiyah (Mallowan/Rose 1935), but also simple painted examples. The fact that it was not the possible contents of the vessel that were was traded, but the vessel itself, is indicated by the formal restriction to flat, open vessel types and the absence of closed vessel types (pots or jars), which were transported from Arpachiyah to Tepe Gawra.

In summary, an extensive pottery exchange is implied, which essentially stimulated the homogenous appearance of the painted Halaf pottery, yet which did not show a great deal of regional stylistic variation, even though it covered a wide geographical distribution.

New evaluations of the original data with updated statistical methods have led in recent years to great doubt about such interpretations, the role and the intensity of pottery exchange in the Late Neolithic Halaf period. In sum, this re-evaluation does not contradict the theory that ceramics were exchanged, but instead concludes that the earlier NAA data do not support the specific model proposed by Davidson and McKerrell (Galbraith/Roaf 2001; *cf.* also Akkermans/Schwartz 2003, 138; Nieuwenhuyse 2010, 98; Spataro/Fletcher 2010, 93 f.).

New data from sites like Domuztepe, Tell Halaf, Chagar Bazar and Arpachiyah were recently published and studied in thin sections, and some of them were also analysed with energy dispersive X-ray analysis (SEM-EDX) similar to our own analysis methods. Through the thin sections, several different fabrics were identified at each site, showing the use of different clay sources and a similar formula for producing the fine ware. Chemical analyses show that the potters at Domuztepe and Tell Halaf used distinct clay sources for their pottery production. In contrast, chemical and mineralogical similarities were identified in the fine ware painted ceramics from

Chagar Bazar and Arpachiyah, indicating possible exchange networks of fine ware (Spataro/Fletcher 2010).

Concerning the role and intensity of pottery exchange, our results are in contrast to the above discussed studies. At least it must be stated in the case of the analysed samples from Tell Halaf and Tell Tawila that there is no clear indication of ceramic exchange. Solely one Halaf sherd sample, interestingly from Tell Halaf (TH 2), can be better assigned through its chemical signature to samples from the Tell Tawila/Wadi Hamar region; however, further examinations are necessary in this case to exclude an error value.

Concerning the homogenous group of samples from Tell Halaf, including some pieces made in the Samarra style, it is noteworthy that also at Tell Sabi Abyad no distinction was observed between the painted Halaf and Samarra-like pottery; both seem to have been locally manufactured at Tell Sabi Abyad (Le Mière 1989, 234). One might argue that the lack of evidence for exchange in the samples from Tell Halaf and Tell Tawila can be ascribed to the absence of special samples from Tell Tawila and the Tell Chuera region, *i.e.* the absence of sporadic pieces decorated with polychrome painting and/or plastic decoration among the selected samples, which might have been possible imports.

However, the intensity of pottery exchange during the Late Neolithic should also be questioned as stated according to Davidson/McKerrell in the case of Arpachiyah and Tepe Gawra, when they calculated that such an exchange could reach a range of 30–40 %. If correct, such an extensive exchange would mean that besides polychrome vessels, whose amount never rises above 5 % (Davidson 1977, 148 for Tell Aqab [< 5 %], or Becker 2012, 33 for Tell Halaf [< 3 %]; *cf.* Nieuwenhuyse 2000, 167), also monochrome painted vessels were transported to a considerable extent. Following this assumption, it would be quite expectable that the one or the other monochrome painted sample from Tell Chuera region was a proven product from Tell Halaf. However, as mentioned above, this was not the case.

CONCLUSION

With regard to the possible preparation of the clay, our mineralogical-petrographic and X-ray analysis brought forth similar results, according to which no special care was taken in conditioning the clay. This is indicated by the absence of indicators for the levigation of the original clay and the predominant lack of intentionally added mineral temper (excluded here are the mineral-tempered cooking pots of the Halaf period and the characteristic chaff-tempered, late Ubaid pottery). We interpret the variances in the clay matrix and the grain-size distribution as follows: during the Late Neolithic, finer clay sources were intentionally selected in earlier times and this specific clay was part of a widely shared formula used in the production of pottery vessels. Thereby, an additional conditioning of the clay by means of temper, as used for fine ware ceramics, could often be omitted.

The variances among samples on an intra-site and an inter-site level are further indicative of a primarily household-based pottery production, in which different groups of families participated. However, the analysed data clearly demonstrates that it is possible, especially on the basis of chemical signatures, to differentiate between various regional groups and some local groups, a differentiation that can presumably be correlated with the geological formation of the different wadi systems.

Such a homogeneous group is represented in the analysed samples of fine ware pottery from Tell Halaf, which is in itself very consistent for the Halaf as well as for the Ubaid period samples. The fact that it also comprises one singular example displaying Samarran influence does not necessarily contradict the thesis of Davidson about the exchange of ceramic products, especially since no comparative samples from adjacent sites in the area around Tell Halaf could be included in the study. Analysis of the singular Samarra sherd just indicates that this fragment, like others designated by H. Schmidt as local imitations, should also be interpreted as a further example of a local imitation in Samarra style, executed at Tell Halaf.

Concerning a possible exchange of pottery between Tell Halaf and Tell Tawila, that is, between two neighbouring regions, the results based on analysed samples are, nonetheless, clearly negative, and simply show that at least the selected samples are not evidence for such exchange relationships. However, it should be taken into account that for Tell Tawila and the Wadi Hamar region, no special potsherds could be incorporated in the sample selection.

Nevertheless, it may be assumed that in the late stage of the Halaf culture (Halaf IIb), the production of polychrome painted pottery, which is just a very small part of the pottery assemblages, was a special production, carried out by specialists who possessed the knowledge about controlling the firing atmosphere.

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BIBLIOGRAPHY

AKKERMANS, P.M.M.G. 1993, Villages in the Steppe. Late Neolithic Settlement in the Balikh Valley, Northern Syria. Ann Arbor: International Monographs in Prehistory (Archaeological Series 5).

AKKERMANS, P.M.M.G., SCHWARTZ, G.M. 2003, The Archaeology of Syria: From Complex Hunter-Gatherers to Early Urban Societies (c. 16,0000–300 BC), Cambridge Cambridge University Press, Cambridge World Archaeology.

BADER, N.O., BASHILOV, V.A., LE MIERE, M., PICON, M., 1994, Productions locales et importations de céramique dans le Djebel Sinjar au VIe millénaire, Paléorient 20, 1, 61–68.

BECKER, J. 2007, Nevali Çori: Keramik und Kleinfunde der Halaf- und Frühbronzezeit (with a contribution by L. Herling), Mainz: Zabern Verlag, Archaeologica Euphratica; 4.

BECKER, J. 2009, Untersuchung der prähistorischen Siedlung, in: Bagdo, A.M.H., Martin, L. Novák, M., Orthmann, W. (eds.) Ausgrabungen auf dem Tell Halaf in Nordost-Syrien. Vorbericht über die erste und zweite syrisch-deutsche Grabungskampagne auf dem Tell Halaf (Teil I), Wiesbaden, Harrassowitz Verlag, Vorderasiatische Forschungen der Max Freiherr von Oppenheim-Stiftung 3, I.

BECKER, J. 2011: Frühe Siedler am Tell Halaf – Zur Bedeutung der Halaf-Kultur, in: N. Cholidis, N. / Martin, L. (eds.) Die geretteten Götter aus dem Palast vom Tell Halaf. Begleitbuch zur Sonderausstellung des Vorderasiatischen Museums “Die geretteten Götter aus dem Palast vom Tell Halaf”, vom 28.1–14.8.2011 im Pergamonmuseum, Regensburg: Schnell & Steiner, 345–351.

BECKER, J. 2012, Die Ausgrabungen in den prähistorischen Schichten, in: Bagdo, A.M.H., Martin, L., Novák, M., Orthmann, W. (eds.) Ausgrabungen auf dem Tell Halaf 2008 bis 2010. Vorbericht über die dritte bis fünfte syrisch-deutsche Grabungskampagne auf dem Tell Halaf (Teil II), Wiesbaden, Harrassowitz Verlag, Vorderasiatische Forschungen der Max Freiherr von Oppenheim-Stiftung 3, II.

BECKER, J. 2013a, Tell Halaf – Die prähistorischen Schichten, in: Bonatz, D., Martin, L. (ed.) 100 Jahre archäologische Feldforschungen in Nordost-Syrien – eine Bilanz. Internationales Symposium des Instituts für Vorderasiatische Archäologie der Freien Universität Berlin und des Vorderasiatischen Museums der Staatlichen Museen zu Berlin vom 21. Juli bis 23. Juli 2011 im Pergamonmuseum, Wiesbaden, Harrossowitz Verlag, 45–64.

BECKER, J. 2013b, Tell Halaf: New Results on the Late Neolithic Period in Northeastern Syria in Nieuwenhuyse, O.P. et al. (eds.), Interpreting the Late Neolithic of Upper Mesopotamia, Turnhout, Brepols, Papers on Archaeology of the Leiden Museum of Antiquities (= Palma); 9, 455–466.

BECKER, J. 2015, Tell Tawīla, Tell Ḥalaf und Wādī Ḥamar: Ḥalaf- und ‘Obēd-Zeit in Nordost-Syrien. Regionale Entwicklungen, Gemeinsamkeiten und Unterschiede, Berlin, ex oriente, bibliotheca neolithica Asiae meridionalis et occidentalis.

BECKER, J., HELMS, T., POSSELT, M., VILA, E. 2007, Ausgrabungen in Tell Tawila, Nordost-Syrien (unter Mitarbeit von P. Aytaç, J. Eckhardt, J. Malo), Mitteilungen der Deutschen Orient-Gesellschaft 139, 213–268.

BÖHME, D., HELFERT, M. 2010 Herkunftsbestimmung von römischer Keramik mittels portabler energiedispersiver Röntgenfluoreszenzanalyse (P-ED-RFA) – Erste Ergebnisse einer anwendungsbezogenen Teststudie, in: B. Ramminger / O. Stilborg (eds.), Naturwissenschaftliche Analysen vor- und frühgeschichtlicher Keramik I: Methoden, Anwendungsbereiche, Auswertungsmöglichkeiten. Erster und zweiter internationaler Workshop für junge Wissenschaftlerinnen und Wissenschaftler in Hamburg am 9. Februar 2008 und 7. Februar 2009, Bonn: Habelt, Universitätforschungen Prähistorischer Archäologie; 176, 11–30.

BOYNTON, R.S. 1980, Chemistry and Technology of Lime and Limestone, New York: Wiley-Interscience, 2nd ed..

CAMPBELL, S. 1992, Culture, Chronology and Change in the Later Neolithic of North Mesopotamia, unpublished PhD thesis, Edinburgh.

CLOP, X., ALVAREZ, A., HATERT, FR. 2004, Characterization Study of Halaf Ceramic Production at Tell Amarna (Euphrates Valley, Syria), in Tunca, Ö. / Molist, M. (eds.) 2004, Tell Amarna (Syrie) I, La période de Halaf, (avec la colloboration de W. Cruells), Louvain, APHAO, 201–212.

CULTRONE, G., RODRIGUEZ-NAVARRO, C., SEBASTIAN, E., CAZALLA, O., DE LA TORRE, M.J., 2001 Carbonate and Silicate Phase Reactions during Ceramic Firing, European Journal of Mineralogy 13, 621–634.

DAVIDSON, T.E. 1977, Regional Variation in the Halaf Ceramic Tradition, unpublished PhD, Edinburgh: University of Edinburgh.

DAVIDSON, T.E. 1981, Pottery Manufacture and Trade at the Prehistoric Site of Tell Aqab, Syria, Journal of Field Archaeology, 8/1, 65–77.

DAVIDSON, T.E., MCKERRELL, H. 1976, Pottery Analysis and Halaf Period Trade in the Khabur Headwaters Region, Iraq 38/1, 45–56.

DAVIDSON, T.E., MCKERRELL, H. 1980, The Neutron Activation Analysis of Halaf and Ubaid Pottery from Tell Arpachiyah and Tepe Gawra, Iraq 42/2, 155–167.

DRÜPPEL, K. 2015, Mineralogische und petrographische Untersuchungen an Keramik-scherben der Ḥalaf- und ʻObēd-Zeit aus verschiedenen Fundorten Nordost-Syriens, in Becker, J., Tell Tawīla, Tell Ḥalaf und Wādī Ḥamar: Ḥalaf- und ʻObēd-Zeit in Nordost-Syrien, Regionale Entwicklungen, Gemeinsamkeiten und Unterschiede, Berlin, ex oriente, bibliotheca neolithica Asiae meridionalis et occidentalis, 452–458.

GALBRAITH, J., ROAF, M. 2001, Does the Neutron Activation Analysis of Halaf Pottery Provide Evidence of Trade? A Re-examination of Davidson and McKerrel's Investigation of Halaf Pottery from the Khabur Basin in Eastern Syria, LSE Department of Statistics Research Report, London, London School of Economics.

GUSTAVSON-GAUBE, C. 1981, Shams ed-din Tannira: The Halafian Pottery of Area A, Berytus 29, 9–182.

HELFERT, M. 2010, Groß-Gerau II: Die römischen Töpfereien von Groß-Gerau, „Auf Esch". Archäologische und archäometrische Untersuchungen zur Keramikproduktion im Kastellvicus, Bonn: Habelt, Frankfurter Archäologische Schriften 11.

HELFERT, M. 2011, Geochemische Untersuchungen von Terra Sigillata mit mutmaßlichem Produktionsort Trier, in: C. Moneta, Eine Trierer Sigillata-Reliefschüssel mit zwei Modelgraffiti des Perpetuus. Eine Studie zur Perpetuus-Primanus-Dignus-Gruppe, Jahrbuch des Römisch-Germansichen Zentralmuseums, Mainz (= JbRGZM), 55, 2 (2008), 325–330.

HELFERT, M. 2015, Bericht über die geochemischen Untersuchungen zu spätneolithischer/ chalkolithischer und bronzezeitlicher Keramik aus Nordost-Syrien, in J. Becker, J., Tell Tawīla, Tell Ḥalaf und Wādī Ḥamar: Ḥalaf- und ʻObēd-Zeit in Nordost-Syrien. Regionale Entwicklungen, Gemeinsamkeiten und Unterschiede, Berlin, ex oriente bibliotheca neolithica Asiae meridionalis et occidentalis, 443–451.

HELFERT, M., MECKING, O., LANG, F., VON KAENEL, H.-M. 2011, Neue Perspektiven für die Keramikanalytik. Zur Evaluation der portablen energiedispersiven Röntgenfluoreszenzanalyse (P-ED-RFA) als neues Verfahren für die geochemische Analyse von Keramik in der Archäologie. Frankfurter elektr. Rundschau Altkde. 14 (Frankfurt 2011) 1–30. http://www. fera-journal.eu.

HOLE, F. 2001, A Radiocarbon Chronolgy for the Middle Khabur, Syria, Iraq 63, 67–98.

LE MIÈRE, M. 1989, Clay Analysis of the Prehistoric Pottery: First Results, in Akkermans, P.M.M.G. (ed.) 1989, Excavations at Tell Sabi Abyad, Prehistoric Investigations in the Balikh Valley, Northern Syria, Oxford, BAR International Series, 468, 233–235.

LE MIÈRE, M., PICON, M. 1987, Productions locales et circulation des céramiques au VIe milléniere au Proche-Orient, Paléorient 13/2, 133–147.

LE MIÈRE, M., PICON, M. 1994, Early Neolithic Pots and Cooking, in Wartke, R.-B. (ed.), Handwerk und Technologie im Alten Orient. Ein Beitrag zur Geschichte der Technik im Altertum, Internationale Tagung Berlin 12.-15. März 1991, Mainz, 67–70.

MALLOWAN, M.E.L. 1936, The Excavations at Tell Chagar Bazar and an Archaeological Survey of the Habur Region 1934–1935, Iraq 3, 1–87.

MALLOWAN, M.E.L., ROSE, J.C. 1935, Excavations at Tall Arpachiyah, 1933, Iraq 2, 1–178.

MOOREY, P.R.S. 1999, Ancient Mesopotamian Materials and Industries. The Archaeo-logical Evidence, Winona Lake, Indiana: Eisenbrauns.

NIEUWENHUYSE, O.P. 2000, Halaf Settlement in the Khabur Headwaters, in Lyonnet, B. (ed.), Prospection archéologique du Haut-Khabur occidental (Syria dur N.E.), vol. I, Beirut, Bibliothèque Archéologique et Historique, 155, 151–260.

NIEUWENHUYSE, O.P. 2007, Plain and Painted Pottery, The Rise of Neolithic Ceramic Styles on the Syrian and Northern Mesopotamian Plain, Turnhout, Brepols, Papers on Archaeology of the Leiden Museum of Antiquities (= Palma); 3.

NIEUWENHUYSE, O.P. 2010, A Household affair? Pottery Production in the Burnt Village at Late Neolithic Tell Sabi Abyad, in Bolger, D, Maguire, L.C. (eds.) The Development of Pre-State-Communities in the ancient Near East, Studies in Honour of Edgar Peltenburg, Themes for the Ancient Near East, Oxford and Oakville, BANEA Publication Series; 2, 97–105.

NOLL, W. 1991, Alte Keramiken und ihre Pigmente. Studien zu Material und Technologie. Stuttgart, E. Schweizerbart'sche Verlagsbuchhandlung.

PETERS, T., JENNI, J.-P. 1973, Mineralogische Untersuchungen über das Brennverhalten von Ziegeltonen, Beiträge zur Geologie der Schweiz 50, 1–59.

RAMMINGER, B., HELFERT, M., MECKING, O. 2010, Zur Herkunftsbestimmung Bandkeramischer Gefäße: Das Beispiel Herxheim, in: B. Ramminger / O. Stilborg (eds.), Naturwissenschaftliche Analysen vor- und frühgeschichtlicher Keramik I: Methoden, Anwendungsbereiche, Auswertungsmöglichkeiten. Erster und zweiter internationaler Workshop für junge Wissenschaftlerinnen und Wissenschaftler in Hamburg am 9. Februar 2008 und 7. Februar 2009, Bonn: Habelt, Universitätsforschungen zur Prähistorischen Archäologie; 176, 51–74.

RICE, P.M. 1987, Pottery Analysis, A Sourcebook, Chicago: The University of Chicago Press.

RYE, O.S. 1981, Pottery Technology: Principles and Reconstruction, Washington: Taraxanum, Manuals in Archaeology; 4.

SCHNEIDER, G. 1988 Chemische Zusammensetzung römischer Keramik im Rhein-Main-Gebiet, in: V. Rupp, Wetterauer Ware – Eine römische Keramik im Rhein-Main-Gebiet, Regensburg, Schnell & Steiner, Schriften des Frankfurter Museums für Vor- und Frühgeschichte; 10, 303–327.

SPATARO, M. 2002, The First Farming Communities of the Adriatic: Pottery Production and Circulation in the Early and Middle Neolithic, Trieste, Edizioni Svevo, Società per la Preistoria e Protostoria della Regione Friuli-Venezia Giulia, Quaderno; 9.

SPATARO, M., FLETCHER, A. 2010: Centralisation or Regional Identity in the Halaf Period? Examining Interactions within Fine Painted Ware Production, Paléorient 36/2, 91–116.

VON OPPENHEIM, M. 1943, Tell Halaf I, Die prähistorischen Funde bearbeitet von Hubert Schmidt, Berlin, Walter de Gruyter.

VON WICKEDE, A., HERBORDT, S. 1988, Çavi Tarlası. Bericht über die Ausgrabungs-kampagnen 1983–1984, Istanbuler Mitteilungen 38, 5–35.

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RED WARE: CHARACTERIZING A POTTERY PRODUCTION AT TELL HALULA AT MID SIXTH MILLENNIUM CAL BC.

Anna Gómez-Bach*, Xavier Clop*, Miquel Molist*

Una de las producciones cerámicas más reconocidas de Oriente Próximo es la cerámica Halaf, si bien esta aparece acompañada de otras producciones como es la denominada red ware*. Este tipo de producción se caracteriza por tener una pasta anaranjada y un acabado pulido en gris claro y rojo oscuro asociado a cuencos y platos abiertos, algunos de ellos pintados de color oscuro con motivos geométricos básicos.*

Neolítico cerámico, Halaf final, Alta Mesopotamia, *Red ware*.

One of the most easily recognized ceramic productions in Near East is the Halaf pottery among other productions such as red ware*. This kind of ware is well defined because of its characteristic clay with a light gray and dark red slip associated to closed bowls and open dishes, some of them painted with dark geometric motifs.*

Pottery Neolithic, Late Halaf, Upper Mesopotamia, Red Ware*.*

INTRODUCTION

Red ware pottery has been defined as a foreign production and it has been related to Late Halaf horizon in a chronologic and cultural period between 5600-5300 cal BC. Also, their presence is well recognized in several archaeological sites as Yarim Tepe II, Tell Halaf or Tell Halula, among others, and it has also been attested in surveys developed in the Jezirah or the upper Tigris regions.

The set recovered from Tell Halula, belonging to a well-known stratigraphic sequence and dated by radiocarbon dates, allows the characterization of the red ware pottery production from an archaeometric point of view (Gómez Bach 2011, 2013; Gómez Bach *et al.* 2014). The analysis of 86 potsherds from a comprehensive perspective by using archaeometric techniques such as chemical analysis, petrographic, and PIXE as well as morphometric and basic techno functional characterization analysis set new guidelines to identify their spread and production.

The Neolithic settlement of Tell Halula is located in the middle Euphrates valley, in a zone of contact between several natural ecosystems. The known site covers nearly 2500 m^2 with an uninterrupted chronological sequence ranging from 7800 to 5300 cal BC. Excavations have been ongoing since 1992, under the direction of Miquel Molist, Autonomous University of Barcelona, Spain (Molist ed. 1996, 2013).

HALAF POTTERY PRODUCTION IN THE EUPHRATES VALLEY

The characterization of pottery production in the mid-sixth millennium cal BC context at Tell Halula arises from the need to understand how structured and organized consolidated agricultural and pastoral communities of the Fertile Crescent were. (Fig. 1).

* Grup de Recerca en Arqueologia del Mediterrani i el Proper Orient (GRAMPO), Department of Prehistory, Autonomous University of Barcelona, Edifici Mòdul de Recerca A, Pl. del Coneixement, Campus de la UAB 08193 Bellaterra, Barcelona annagomezbach@gmail.com xavier.clop@uab.es mimolist@gmail.com

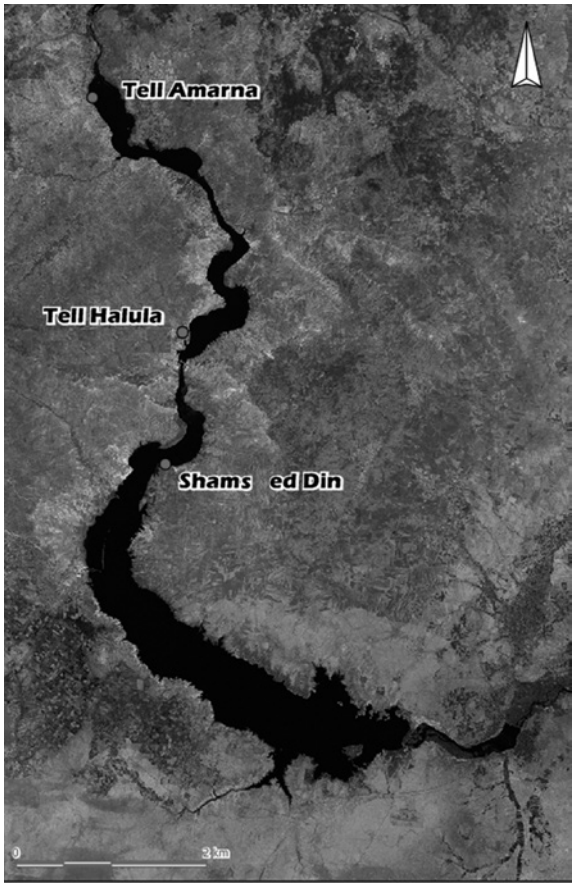

Figure 1. Map of Euphrates valley and the location of the Tell Halula site. SAPPO, UAB.

The opportunity to study the pottery assemblages from Tell Halula (with 16,668 sherds) allowed us to study, from a comprehensive perspective, well stratigraphic sets dated between 5600 to 5300 cal BC. (Fig. 2) by using archaeometric techniques (chemical and petrographic) as well as morphometric and basic techno-functional adscription (Gómez Bach 2011). Halula Late Halaf ceramic assemblages include a large variety of wares. There are fine wares, plain or decorated, simple and burnished coarse wares, either with mineral or plant inclusions.

Overall it is a finely made pottery with monochrome and scarce polychrome decoration. This decoration has good adhesion and the pigment is highlighted in matte and glossy combinations, although the latter is less abundant. Most documented colors comprise brown, black and red; some productions are orange (Fig. 3). Related to this ware, a small group that can be attributed to *red ware* (0,04%) has been identified.

Red ware was identified by Oppenheim and Schmidt at Tell Halaf as a very late pottery production (Oppenheim 1943). These sets were attributed to the sequence called Late Halaf and later to Halaf transitional Obeid

Figure 2. Image of the Halaf levels from sector 49. SAPPO, UAB.

(Davidson 1977, Leenders 1989) when these were identified at Tell Aqab (Davidson 1977; Campbell 1992). While attribution is doubtful, red slipped productions are also available in Late Halaf sets from Yarim Tepe (Merpert; Munchaev 1993) or Shams ed-Din (Gustavson-Gaube 1981). 26 fragments were recovered in the course of prospecting at the Khabur from 4 specific sites: Aïn el Qerd, Khaneké Tell, Tell Baqar, all in the Wadi Dara (Nieuwenhuyse 2000: 169). Some authors speak of a much more heterogeneous production of what might have been thought (Breniquet 1996). Through archaeometric analysis (Davidson 1981; Davidson, KcKerrell 1976, 1980), *red ware* will be definitely characterized and bounded in space and time within the Halaf horizon (Campbell 2007; Campbell/ Fletcher 2010).

ARCHAEOMETRIC RESULTS

Pottery known as *red ware* is present at Tell Halula with 7 potsherds. Broadly, these pieces are characterized by the presence of a red slip, often with a polished finish, and a black painted decoration in some of their simple geometric patterns (horizontal and vertical lines or triangles). These series have been attributed to Late Halaf and are also well documented at Tell Halula deposits-external floors and pits- in sector 30, 31 and 49. (Fig. 4).

This set has been sampled and numbered as: THL-412, THL-416, THL-417, THL-502, THL-505, THL-506, THL-508, THL-509, THL-512, THL-514, THL-515, THL-517, THL-523, THL-530, THL-541, THL-549, THL-601, THL-604 and THL-608. This production corresponds to 18,8% of the petrographic group identified as THL3, and the chemical group SI-1; and it is mainly represented by small and medium sized open bowls (G.III) and closed bowls (G.IV). (Fig.5)

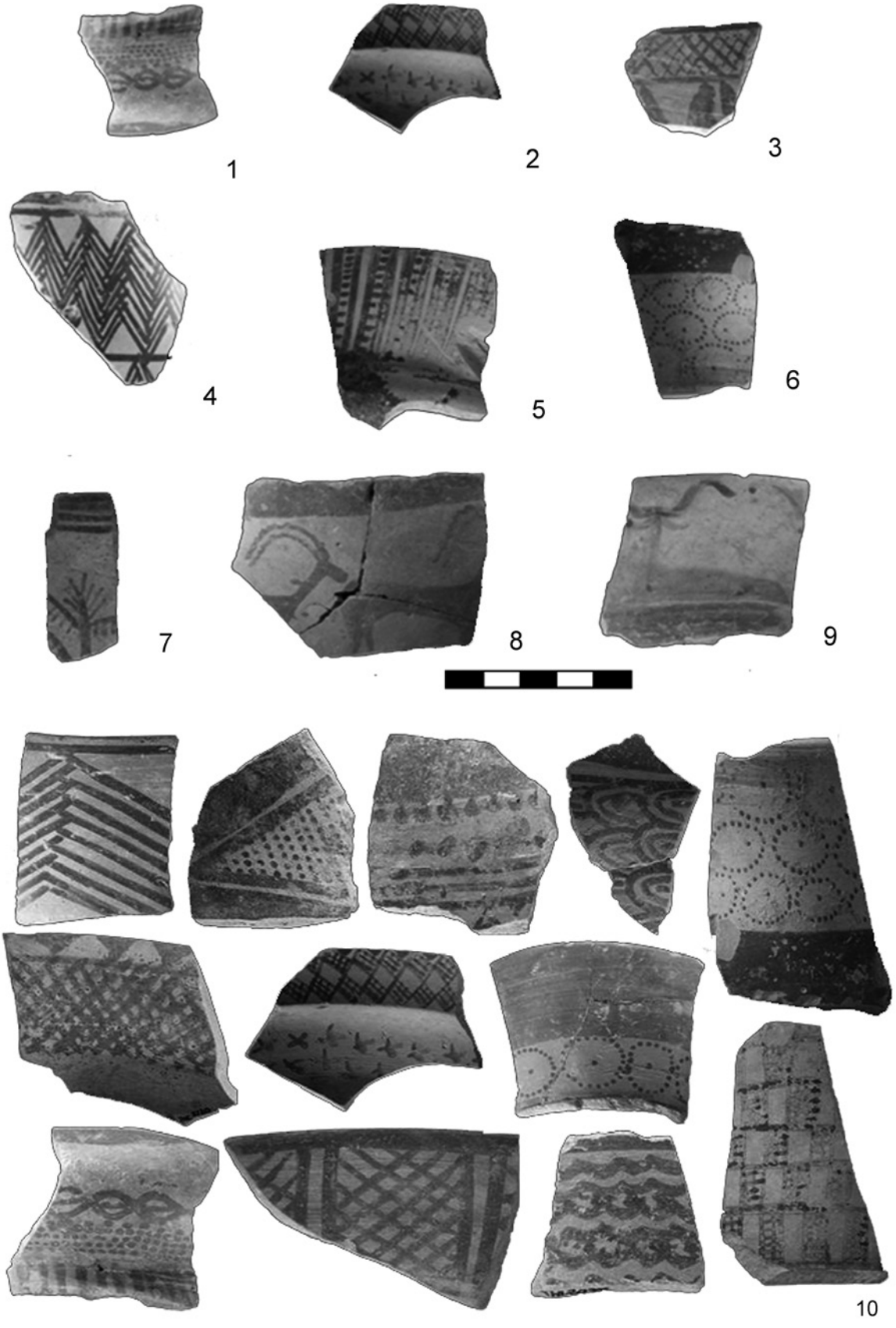

Figure 3. Main Late Halaf sets. Cream bowl (fig.3. 2,3.5,3.9); Jars (fig.3.1,3.6) Bowl with flat bottom and straigth side (fig.3.3, 3.4, 3.7, 3.8)., a complete decorated assemblage from ue.49.5 (fig.3.10), SAPPO, UAB.

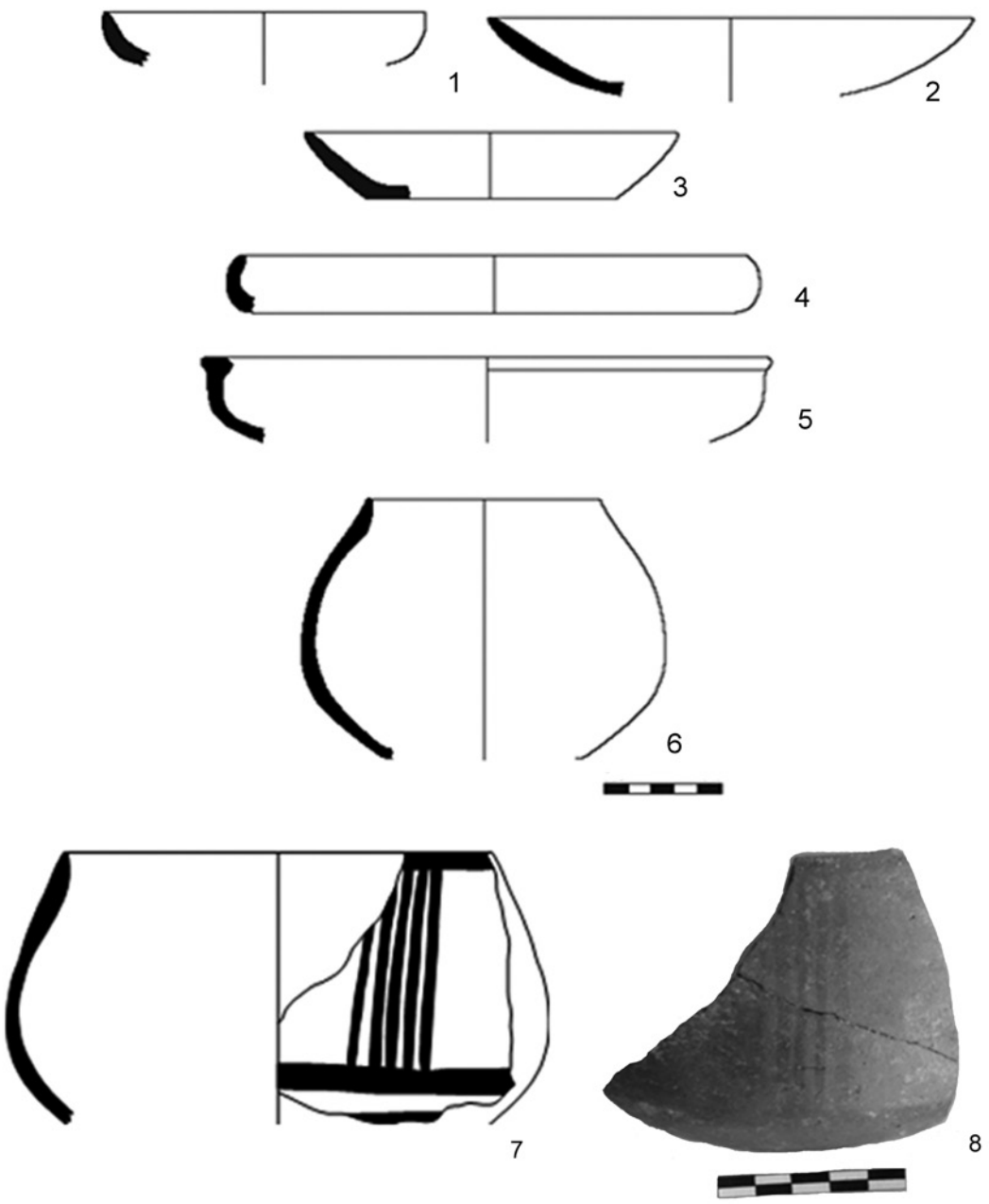

Figure 4. *Red ware* shapes from Tell Halula. SAPPO, UAB.

REMARKS

The archaeometric analysis done at Tell Halula's Late Halaf pottery has documented an association between the chemical group SI-1, the petrographic group HL3 and *red ware*. From a petrographic point of view, the HL3 group presents abundant mineral inclusions, small to medium in size with acicular clay. (Fig. 6). The appearance is heterogeneous when polarized light is used, while the polarized light with the analyzer is more anisotropic. The structure of the dough is fluidal. Pores are abundant, not too large and elongated and arranged parallel to the vessel wall forms. The temper consists on: quartz (wavy extinction), biotite, plagioclase, a few fragments of basalt and pyroxene. The presence of carbonates, due to contamination on the outer surfaces of the sample, is observed. From a chemical point of view, the group SI-1 has relatively low values of CaO and a larger relative presence of SiO_2. Also, in relation to the other defined Tell Halula groups, SI-1 shows lower values of MgO, P_2O_5, Fe_2O_3, and MnO. This group was preliminary attributed to Tell Halula local productions and opens a new perspective about *red ware* provenance (Fig. 7).

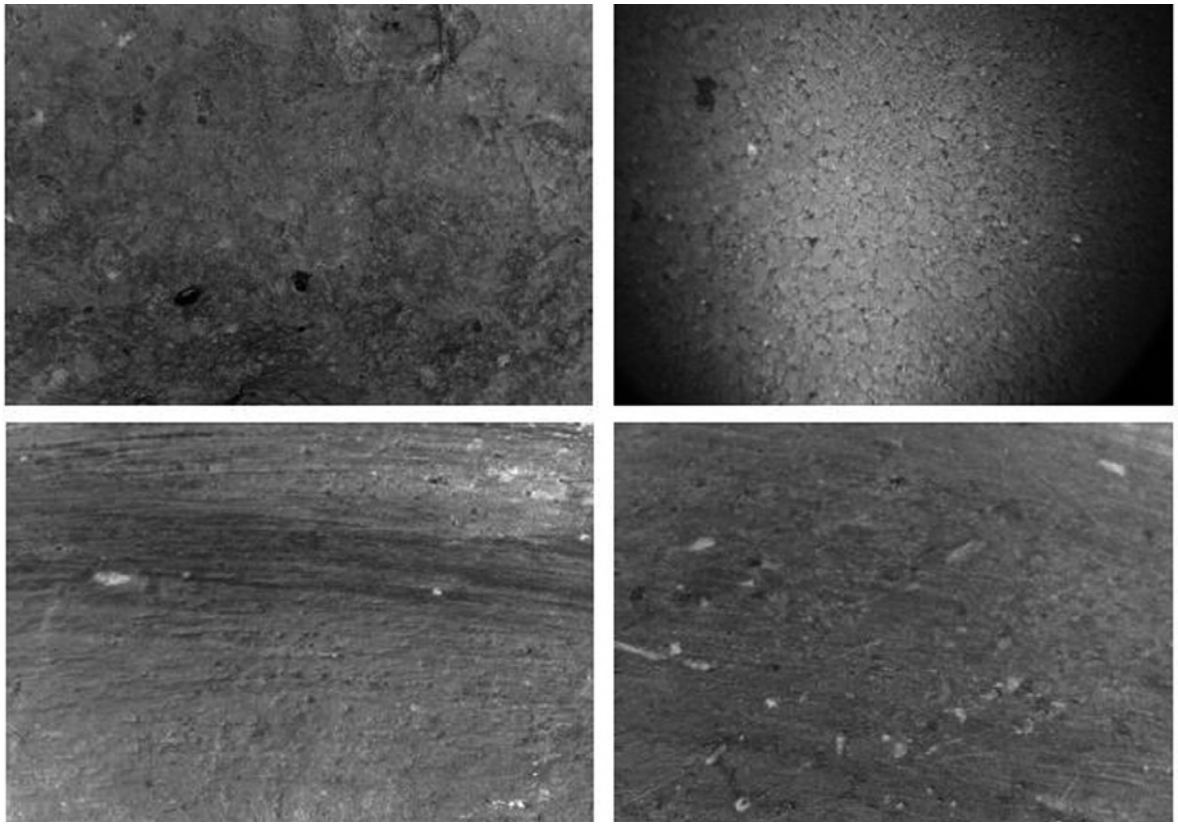

Figure 5. The mineralogical composition of *Red ware* and finishing techniques (polish and burnish). SAPPO, UAB. Microscope WF10 x 18 mm.

SECTOR	UE.	PETRO IDENT.	PETRO GROUP	CHEMICAL ID. NUM.	CHEMICAL-GROUP	WARE	SHAPE
THL 2007-49	E10 (A1j).4	HL512	THL-3	SI-78	SI-1	Plain ware (reddish yellow 7 / 8)	VIII- pot
THL 2007-49	E42 (A6b).1	HL514	THL-3	SI-80	SI-1	Paint ware (red 4 / 6) (brown 5 / 2, 5)	IV-Closed bowl
THL 2007-49	E32(A7c).8	HL508	THL-3	SI-76	SI-1	Plain ware (reddish yellow 7 / 8)	II-Bowl with flat bottom and straight side.
THL 2007-49	E8 (A1i).4	HL505	THL-3	SI-74	SI-1	Paint ware (red 4 / 8) (brown 5 / 8)	III-Hemispherical bowl with flat base
THL 2007-49	E24(A7d).16	HL515	THL-3	SI-81	SI-1	Coarse ware (reddish yellow 8 / 6)	III- Hemispherical bowl with flat base
THL 2007-49	E24(A7d).17	HL530	THL-3	SI-93	SI-1	Paint ware (red 4 / 6) (brown 5 / 3)	VII-Hole-mouth bowl
THL1999-32	A4	HL604 red ware	THL-3	SI-65	SI-1	Paint ware (red 4 / 6) (brown 5 / 2)	IV- Closed bowl
THL 1996-30-Ag	A3b	HL608	THL-3	SI-69	SI-1	Plain (brown 5 / 8)	III- Hemispherical bowl with flat base
THL 1996-30-Ag	A3b	HL608	THL-3	SI-69	SI-1	Plain (brown 5 / 8)	III- Hemispherical bowl with flat base

Figure 6. Table with main sherds that belong to S1 chemical group. SAPPO, UAB.

	SI-1 (n=8)	
	m	**ds**
Fe_2O_3 (%)	6.31	0.27
Al_2O_3 (%)	12.91	0.42
TiO_2 (%)	0.76	0.03
MgO (%)	5.00	0.22
CaO (%)	21.75	1.81
SiO_2 (%)	53.18	1.59
Rb (ppm)	72	9
Th (ppm)	10	1
Nb (ppm)	19	1
Zr (ppm)	191	11
Y (ppm)	27	2
Ce (ppm)	55	4
Ga (ppm)	15	1
V (ppm)	109	9
Zn (ppm)	108	11
Ni (ppm)	163	9
Cr (ppm)	187	14

Figure 7. Table with S1 petrographic group composition. SAPPO, UAB.

Like other archaeological sets, *red ware* has been associated to open forms, mainly open and closed bowls, and to a lesser extent, to plates and medium jug types; with red slip surfaces applied to a smoothed or burnished surface and may have a geometric decoration in black color. Numerous authors have identified *red ware* as a foreign and late product. Usually, the movement of these vases has been related with the existence of social networks, to exchange ideas, materials or persons equated between groups. In these contexts, variables such as human group mobility and the assignment to specific morphometric or functional groups were considered.

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BIBLIOGRAPHY

BRENIQUET, C. 1996, *La disparition de la culture de Halaf. Les origines de la culture Obeid dans le nord de la Mésopotamie.* Ed. Recherche sur les Civilisations. Paris.

CAMPBELL, S. 1992, *Culture, Chronology and Change in the Later Neolithic of North Mesopotamia,* PhD, University of Edinburgh.

CAMPBELL, S. 2007, Rethinking Halaf Chronologies, *Páleorient, 33 n.1, 103-136.*

CAMPBELL, S., FLETCHER, A. 2010, Questioning the Halaf-Ubaid Transition. In: R.A. Carter, G. Philip (ed.), *Beyond the Ubaid: Transformation and integration in the late prehistoric societies of the Middle East,* SAOC: Studies in Ancient Oriental Civilization 63, The Oriental Institute of the University of Chicago, 69-83.

DAVIDSON, T.E. 1977, *Regional Variation within the Halaf Ceramic Tradition*, PhD. University of Edinburgh.

DAVIDSON, T.E. 1981, Pottery Manufacture and Trade at the Prehistoric Site of Tell Aqab, Syria, *Journal of Field Archaeology 8*, 65-77.

DAVIDSON, T.E., MCKERRELL, H. 1976, Pottery Analysis and Halaf Period Trade in the Khabur headwaters region, *Iraq, XXXVIII*, 45-56.

DAVIDSON, T.E., MCKERRELL, H. 1980, The Neutron Activation Analysis of Halaf and Ubaid Pottery from Tell Arpachiyah and Tepe Gawra, *Iraq, XLII*, 155-167.

GÓMEZ-BACH, A. 2011, *Caracterización del producto cerámico en las comunidades neolíticas de mediados del VI milenio cal BC: el valle del* Éufrates *y el valle del Khabur en el Halaf Final.* PhD Universitat Autònoma de Barcelona.

GÓMEZ-BACH, A. 2013, Caracterización de las producciones cerámicas del Neolítico Final, Horizonte mediados del VI milenio Cal BC de Tell Halula. In: M. Molist (ed.) *Tell Halula: un poblado de los primeros agricultores en el valle del Éufrates, Siria. Tomo I y II*. Ministerio de Educación y Ciència, 212-231.

GÓMEZ-BACH, A., CRUELLS, W., MOLIST, M. 2014, Late Neolithic pottery productions in Syria. Evidence from Tell Halula (Euphrates valley): a technologica approach. In: Martinón-Torres, M.(ed.) *Craft and Science: International perspectives on archaeological ceramics.* Doha, Qatar: bloomsbury Qatar Foundation http://dx.doi.org/10.5339/uclq.2014.cas.ch14

GUSTAVSON-GAUBE, C. 1981, Shams ed-Din Tannira. The Halafian Pottery of Area A, *Berytus, 29*, 9-182.

LEENDERS, R. 1989, The red wash ware ceramic assamblage in Syria: a review. In: O.M.C. Haex, H.H. Curvers, P.M.M.G. Akkermans (eds.), *To the Euphrates and Beyond,* A.A. Balkema, Rotterdam, 89-101.

MERPERT, N.Y., MUNCHAEV, R.M. 1993, Yarim Tepe II: The Halaf levels. In: N. Yoffee, J.J. Clark (eds.) *Early Stages in the Evolution of Mesopotamian Civilization: Soviet Excavations in Northern Iraq,* University of Arizona Press, Tucson, 128-162.

MOLIST, M. (ed.) 1996, *Tell Halula (Siria). Un yacimiento neolítico del valle medio del Éufrates. Campañas de 1991 y 1992*, Ediciones del Ministerio de Educación y Ciencia. Madrid.

MOLIST, M. (ed.) 2013, *Tell Halula: un poblado de los primeros agricultores en el valle del Éufrates, Siria. Tomo I y II*. Ministerio de Educación y Ciencia.

NIEUWENHUYSE, O. 2000, Halaf settlement in the Khabur Headwaters, Lyonnet, B. (ed.), *Prospection archéologique du Haut-Khabur Occidental (Syrie du Nord- Est),* Bibliothèque archéologique et historique CLV. Beirut, 151-260.

OPPENHEIM, M. F. 1943, *Tell Halaf I. Die prähistorischen Funde*. Berlin, bearbeitet von Hubert Schmidt, Berlin.

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TECHNOLOGICAL APPROACH TO CERAMIC MANUFACTURE IN THE PRE HALAF IN TELL HALULA (SYRIA)

Sílvia Calvo*, Josep Miquel Faura, Miquel Molist***

El objetivo principal de este artículo es el de realizar una primera aproximación a las soluciones tecnológicas asociadas a las primeras producciones cerámicas del período Pre-Halaf (VII milenio cal BC) en el yacimiento de Tell Halula (Siria). Se analiza el conjunto desde una nueva perspectiva metodológica, priorizando los aspectos vinculados al proceso de modelaje de los recipientes cerámicos.

Tell Halula, Primeras producciones cerámicas, Cadena operativa, Caracterización tecnológica, Modelaje.

The main objective of this paper is to approach for the first time the technological solutions associated with the first ceramic production from the Pre-Halaf culture (VII millennium cal BC) in the Tell Halula settlement (Syria). The set is analysed from a new methodological perspective, prioritizing the aspects related with the manufacturing processes of the pottery vessels.

Tell Halula, first ceramic production, operational chain, technological characterization, manufacture.

INTRODUCTION

It is well known that the tradition of pottery studies as a principal element for the determination of the chronological or cultural groups has been, and it is still now, very important. However, it is also true that the need for a global analysis of pottery products is increasingly being recognized.

In this investigation, we observe the existing information gaps in the chronological time for the Pre-Halaf site of Tell Halula. It is well known that, for this period, there is an important gap regarding pottery analysis addressing the issues of manufacturing techniques from perspectives that go beyond the typological, morphological and raw material analysis.

Therefore, with the will to address this problem and the opportunity to work with unpublished data, a documental and analytic work essential for the knowledge of pottery material has been started. These collections and data transformations are completed with establishing and analysing a number of variables, which allow us to make different contributions to the set.

TELL HALULA, MIDDLE EUPHRATES VALLEY (SYRIA)

The transition from the pre-pottery to the pottery Neolithic has been documented in several sectors of the site (Sector 1 and Sector 7) (Fig. 1). New layers from this horizon in the Sector 2/4 have been recently identified. All the stratigraphically sequence and the radiocarbon dates associated indicate continuous occupations both in the spatial and the chronological level (Molist ed. 1996; Molist *et al.* 2008, Molist ed. 2013).

*Grup de Recerca en Arqueologia del Mediterrani i el Proper Orient (GRAMPO), Department of Prehistory, Autonomous University of Barcelona, Edifici Mòdul de Recerca A, Pl. del Coneixement, Campus de la UAB 08193 Bellaterra, Barcelona scalvope@gmail.com miquel.molist@uab.cat
**MNAC, Palau Nacional, Parc de Montjuïc, s/n, 08038 Barcelona – SAPPO, Department of Prehistory, Autonomous University of Barcelona, Edifici Mòdul de Recerca A, Pl. del Coneixement, Campus de la UAB 08193 Bellaterra, Barcelona, jfauravendrell@gmail.com

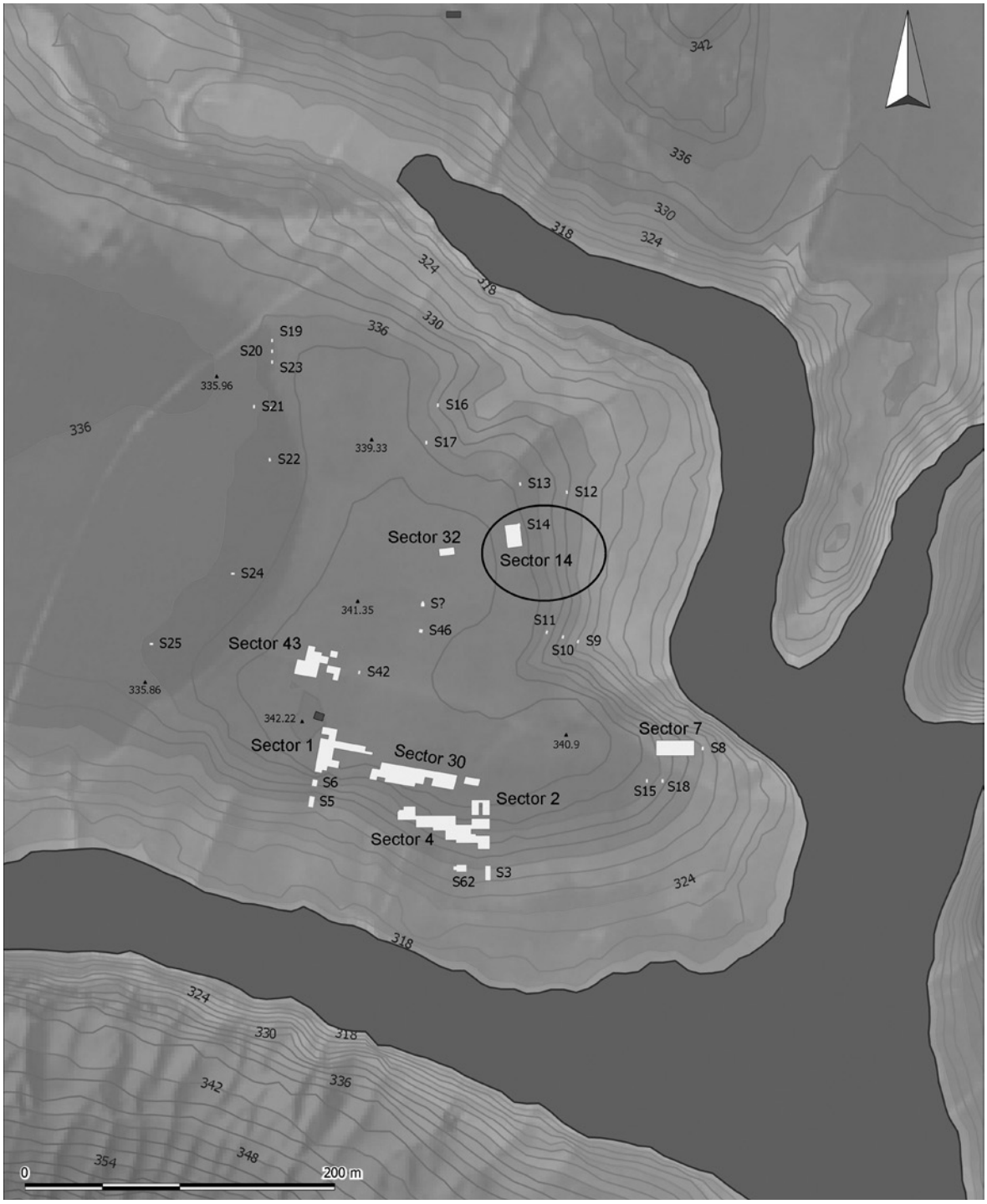

Figure 1. Distribution of sectors from Tell Halula (SAPPO, UAB)

New data recovered in Sector 34 and Sector 2/4 (squares 2E/F and 2G-2I) allow us to characterize these elder occupations from the Pre-Halaf period, relating to the first pottery productions.

We have established in square 2G a sequence of five successive levels from the pre-pottery Neolithic (four levels) to the pottery Neolithic (the upper level). This ceramic occupation was characterized by an open area with excavated structures interpreted as pit-fires. This space has provided a very rich material assemblage, with archaeozoologic and chipped stone remains, and also some fragments of pottery (Black Series and White Ware). Similar open areas had been previously documented in the squares 2E and 2F through the levels associated with the first pottery productions.

The analysis of the ceramic assemblages has allowed stablishing the succession of the sets in three differentiated phases that begun towards the 7000 cal BC:

Phase I (old Pre-Halaf), the earliest one, is characterised by a specific group of ceramics defined as the black series, with black or brown fabrics and polished surfaces with calcite inclusions. This group represents 44% of the total amount of potsherds. Other categories are vegetal tempered wares as well as polished fine wares.

In Phase II (middle Pre-Halaf), which is dated around 6600 – 6300 cal BC., simple chaff tempered wares are dominant, but appliques, early painted wares and fine series are also found. Husking tray pottery, grey-black wares, pattern burnished-wares and incisions/impressions are also presented along with a survival of the early black series.

In Phase III (recent Pre-Halaf), 6300 – 6050 cal BC. aprox., a quite different ceramic assemblage is found: simple chaff tempered wares make up about 75% of the total amount with burnished red slip wares, as well as new series of incised/impressed wares. Some Dark-Faced Burnish wares sherds can also be found in small quantities and black series sherds, grey-black wares, red slips and early painted sherds in minor amounts. (Faura 1996; Cruells 1996; Cruells 2001; Cruells 2005; Molist ed. 1996, 2013; Faura 2016; Cruells *et al.* 2017).

SECTOR S14

We only studied Sector 14. Its location is in the eastern part of the Tell. In that area, gentle slopes allow an excavation in extension which facilitates the discovery of remains of complementary structures located in other parts of the Tell's (SS7) domestic habitat. The operation was performed in an area of 150m^2, and only the upper level (1.20 meters deep) was excavated.

The excavation and posterior study allowed distinguishing three juxtaposed levels. The oldest (SS14-III), with an extension of 75m^2, is characterized by a big exterior area with earthen floors (E6) and an occupation layer with a combustion structure. One part of the adobe construction was in the North-eastern angle of excavated zone. The recognized surface indicated two rooms with earthen floors. The next level (SS14 – II) was located above. In this one, an occupation with 100m^2 of extension was documented. It was configured by a big exterior area with two constructed structures. The first was a big adobe wall with a north- south orientation, and the second had a circular plant construction that despite the poor state of preservation could be interpreted as a *tholoi.*

The most recent occupation (SS14 – I), had 150m^2 of extension and provided a more complete view of the structure of the space. It contained three domestic structures with rectangular multicellular plans irregularly arranged and separated by wide outdoor spaces associated with a large outdoor clay soil. The interior floors, despite its poor preservation, were also made with clay and with higher quality.

In summary, the three levels present a homogeneity both in its constitutions and stratigraphic settings. Stratigraphically, it should be highlighted that the large external surfaces allowed the reconstruction of the real layers of occupation, which are often difficult to locate in the interior areas of structures (Molist/ Vicente 2013).

METHODOLOGY AND VARIABLES FOR THE POTTERY STUDY

To perform the study of the pottery products from Sector 14, we decided to choose a type of method formulated to solve the need for identifying the different steps of the operative chain (Échallier 1984). This proposal's aim is to focus on the manufacture process of pottery vessels, giving priority to those aspects that are linked to the modelling processes of the vessels. Therefore, manufacture traces, which can contribute to an approximation of technological solutions and technological gestures adopted by artisans (Semenov 1982), will be identified.

The identification of the manufacture processes is highly complex and an undeveloped field of study. Our criteria focuses in the determination of these procedures with different variables. With this goal, this work has, as a documentary source, a complex database in which we have considered the following variables (to define these variables, quantitative and qualitative parameters were used following Bernabeu *et al.* 2011; Skibo 1992; Schiffer 1976, 1987; Schiffer/Skibo 1997; Dedet/Py 1975):

Identification: sector number, level and inventory number.

Raw materials: texture, petrographic groups (Faura 1996, 2016), size and quantity.

Vessel manufacture, divided in:

Morphology: indicates the forms of the vessels grouped in big categories (Balfet *et al.* 1989): open vessels, closed vessels, simple forms, and complex forms.

Part of the vessel: indicates the identifiable forms of the vessel and wherein the pottery sherd is located: lips,

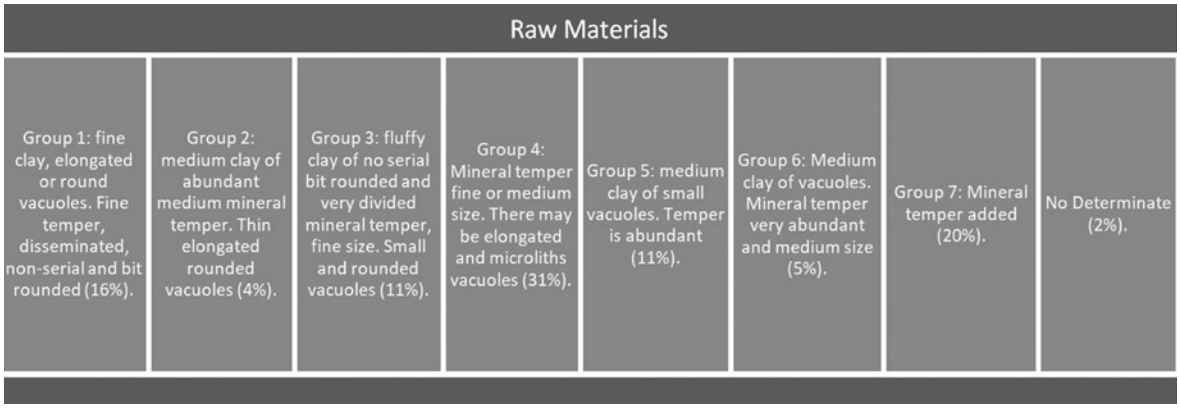

Figure 2. Petrographic composition of different groups.

non-form, inflection point, base, handle, ½ profile[1], complete profile[2] and complete vessel[3].

Volume, thickness, and diameter: indicated in millimetres, taking into account both the diameters of the lip, the base, and the wall thickness, wherever possible.

Manufacture technique: in the cases where it is identifiable, we note the modelling technique that could have been used to elaborate the vessel. We use, as reference, the different techniques documented by other authors in archaeology and ethnography. These techniques are: coils, moulding, pinch, plaques, paddle and anvil technique and mixed techniques. For the lips and the handles, we indicate the typology and manufacture technique. Furthermore, for lips we use a typological table by Dedet and Py (Dedet/Py1975); and for the handle elements we describe the type and the form.

Type of traces: indicate where the traces are located. The different possibilities are: visible, in the surface of the vessel, variations on the wall thickness, fractures and fissures, traces that affect the management of inclusions, or in the form of the vessel.

Observable traces: describes the traces that can be observed to indicate if they consist of fractures, fissures, surface marks, etc.

Surface treatment: considered as a treatment that both exterior and interior surfaces receive to eliminate the manufacture process traces. We register the exterior and interior treatments and the traces left during the treatment: burnished, polished, smoothing etc. In this characterisation, we include the decoration, in which the motif, technique and traces will be documented.

Firing: Indicates the type of atmosphere in which the vessel has been made depending on whether it is: an oxidising atmosphere, a reducing atmosphere, or a mixed atmosphere.

From the pottery material recovered in its stratigraphically context we proceeded to its classification applying the aforementioned technological, morphological and typological criteria (Rice 1987; Orton et al 1988; Py 1999; Calvo et al 2004; García/Calvo 2013).

RESULTS OF THE SET

Sector 14 consists of a total of five squares, from which the pottery set from four squares from thirteen levels has been studied. These are: Square T levels A3 and A3a; Square V levels A2, A2a, A2b, A3, A3a; Square Y levels A2a, A3a, A3b, A3c, A6a; and Square Z level A6(y). The total set is formed by 348 sherds which form a total number of 315 individuals.

RAW MATERIALS

In this part, we observe both aspects of its texture, size and quantity as well as the petrographic group belonging to every sherd. This refers to its aspect, touch and structure, which can be observed both in the cross section of the fracture and the surface.

The first element we observe is porous clay. Many vacuoles are present which may have originated in the use of either vegetable inclusions or by bad modelling processes. Other samples might present compact clays, indicating a high firing temperature or a good clay preparation. For sector 14 in Tell Halula, the analysis

1. The cases in we found with a one identifiable part to form with two parts describe previously: lip + handle, inflection point + base, etc.
2. When presents the complete form (from the lip to base).
3. When the storage is equal to or greater tan 50% of the vessel.

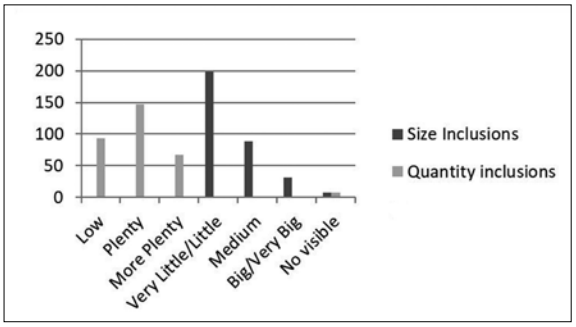

Figure 3. Presence of size and quantity inclusions.

detected a homogeneous presence of porous clays and compact clays. (Fig. 2)

If we observe the different petrographic groups documented by Faura (1996), seven were the groups documented by them.

The abundance of the different groups is very homogeneous in the set. The presence of group 4 (31%) as the most frequent group in this sector, and group 7 with a 20%, should be highlighted. In similar proportion, we documented group 1 with a frequency of 16% and group 3 and group 5 both with 11%. The group 2 has a minor presence, with 4%, and group 6 with 5%. The remaining 2% refers to sherds in which we could not determinate the petrographic groups or the size and quantity are smaller and, therefore, not definable by a macroscopic analysis (Fig. 3).

Finally, we have considered the size of inclusions with the following categories: very little (≤1mm), little (≥1mm a ≤3mm), middle (≥4mm a ≤6mm), big (≥7mm a ≤9mm), very big (≥10mm), and indeterminate. We can observe that the majority of sherds from the set have little inclusions (57%) or medium inclusions (28%), while other documented sizes were more homogeneous.

Moreover, we observed the quantity with these criteria: low (1-10%), plenty (10 – 25%) and more plenty (≥25%). Results documented that many of the sherds had plenty of inclusions, but with very homogeneous percentages .

MODELLING THE VESSEL

MORPHOLOGY AND TYPOLOGY

For this set, we have tryied to define the principal characteristics by locating each sherd in its part of the vessel. From them we define the morphology and the typology.

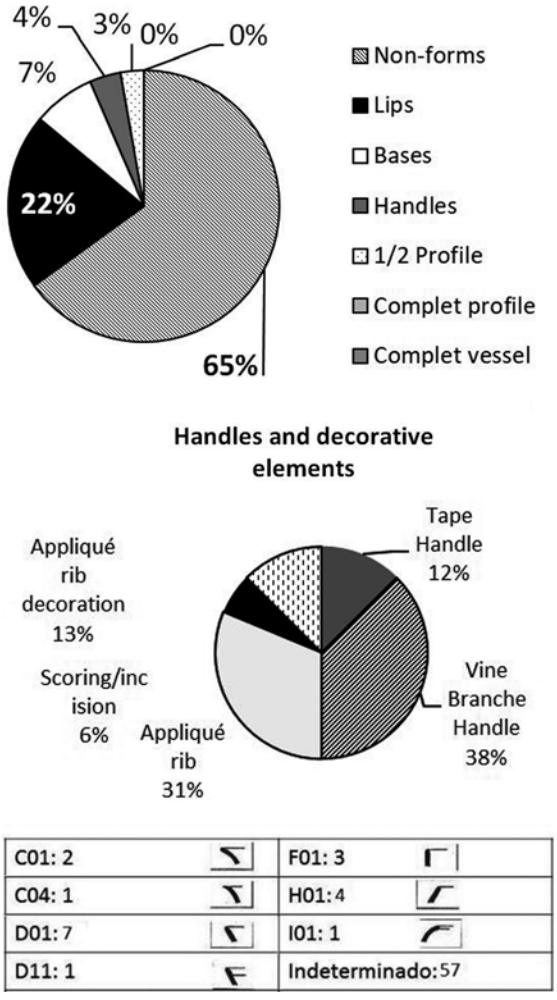

Figure 4. Percentages of morphology and typology sherds.

In this case, we observe that 65% of individuals are non-forms while 22% are lips, 7% are bases, also 7% are handles and the ½ profiles are 3%. Other categories haven't been documented. When morphologies are studied, we try to documented the typology of each element. The ½ profiles are definited as: simple forms, complex forms, open forms or closed forms (Fig. 4) (Balfet et al 1989)[4].

About the bases, two types were documented: bases on high (Faura 1996) or discontinuous bases (Balfet et al 1989); and flat bases (Faura 1996) or continuous bases (Balfet et al 1989). A first typological analysis has documented seventeen individuals and, in the second, ten individuals. Moreover, in sixty individuals preservation was not sufficient to allow a typological and morphological study.

4. Simple form: when the principal form can be describing in reference with a geometrical volume; Complex form: when the form cannot be described in reference with a geometrical volume.

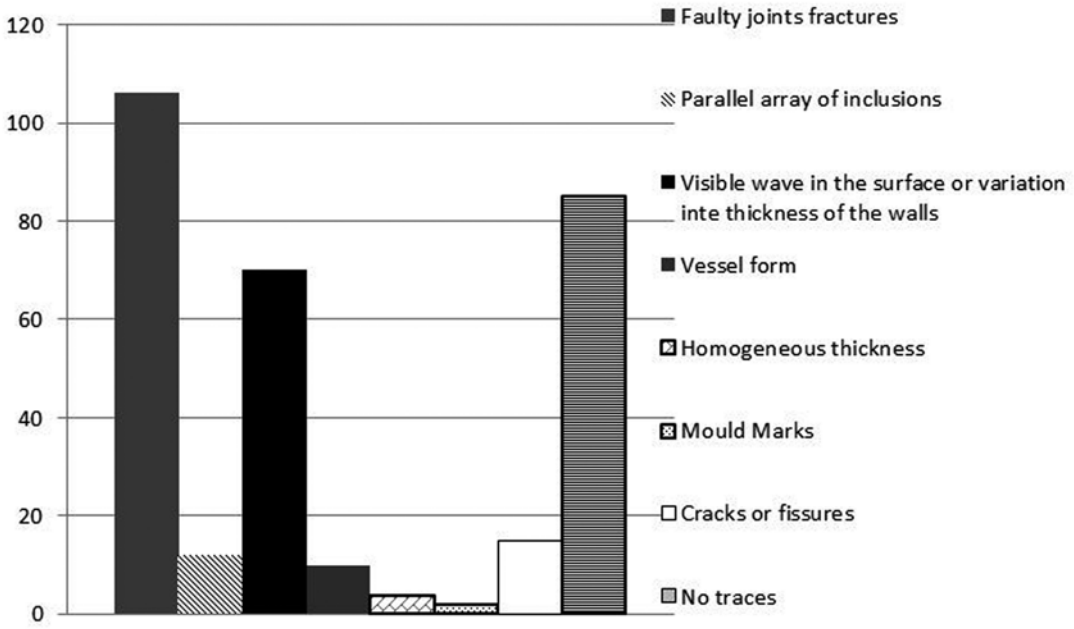

Figure 5. Proportions of macro traces.

If we speak typologically, the lips are defined with the typological table published by Dedet and Py in 1975. Therefore, out of the sixty-eight documented lips, with the lips from ½ profiles, we observe nine different types.

In handles, we observe three different typologies: tape handles, vine branched handles and appliqué ribs. This last type, the appliqué rib, is variable and it can appear as a decorative element too. Moreover, we can observe the quantity of preserved handles and their typology (2 tape handles, 6 vine branches handles and 5 appliqué ribs).

About decorative elements, only three e individuals presented them: two are appliqué ribs and one is a simple scoring/incision. This last appears with an appliqué rib (Fig. 4).

MANUFACTURE TECHNIQUES

The identification of manufacture techniques has been attempted on all sherds. Nevertheless, not all sherds presented sufficient surface to evidence macro traces left by the modelling process.

For this set, three different techniques were documented. The principal method used is coils. This technique is characterized by assembling strips of clay which overlap and create the main shape of the vessel. Sometimes, they can be risen in spiral or by different strips of clay with variable thicknesses. The second method is the use of a mold. The clay is introduced in it and, by digital pressures, adhered to the surface of the mold, thus acquiring its shape. The third method is the use of mixed techniques. It is chracaterizedby the use of two different methods in one vessel and, probably, in two different times. In the cases where the technique was not documented we considerated the variable to be indeterminate (Fig. 5).

We observe a middle proportion of the inviduals was produced with coils; in 41% of the individuals the technique could not be documented. The use of molds has a frequency of 8% and the mixed techniques are present only in 1% of the proportion.

When focusing the attention to the sherds with the best surface preservaton and an approximation to vessels morphology is attempted, three different typologies have been detected: bowls (12 MNI), pots (4 MNI), and plates (3 MNI). For the bowls, the majority have been manufactured by coils, although three individuals present a different technique: two have been manufactured by mould and one has been manufactured by a mixed technique. For the pots, we only documented the technique in two individuals and both had been manufactured by coils. Finally, for the plates, two different techniques were documented. Two individuals had been manufactured by coils, and one individual had been manufactured by mould.

Regarding the orientation of the modelling we have focused on two types of bases. In general, all vessels have been manufactured from the base to the lip, as shown in the arrangement of the coils. Furthermore, these coils' joints have been performed in the internal part of the vessel. This is the easiest technique from the artisan point of view to elaborate both continuous and discontinuous bases.

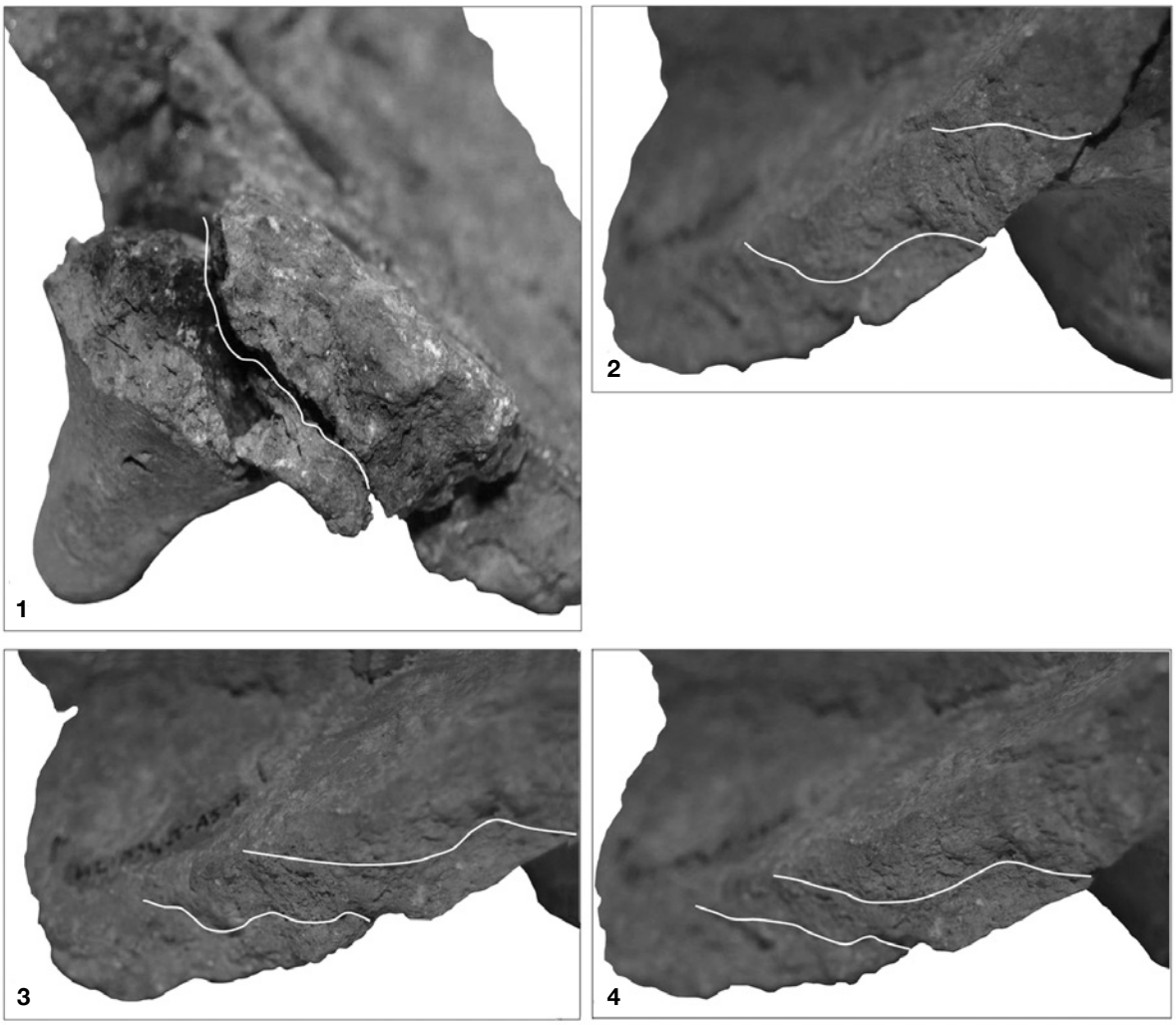

Figure 6. 1-Apply handle; 2-3-4-Parallel array of inclusions.

Continuous bases could be modelled in spiral by working with a long enough coil through the inflection and leading into to the vessel wall. In batch bases, we observe that they are made using a clay disk which rises until the inception of the wall, and therefore, adhere to the vessel body, where the coils start.

Regarding the lips, two types of modelling were documented. The first method is the application of a final coil. The second method is to perform a small pinch in the clay to achieve the desired form. If we observe the open or closed forms, we will see that there is no relation or preference according to the typologies.

In terms of handles, we have located 13 MNI. The major technique used to manufacture them is a previously shaped coil. It is common to find these elements dislocated from the vessel. We talk about seven individuals manufactured with this technique, especially tape handles and appliqué ribs. For the documented vine branched handles, the manufacturing technique would have been the use of clay balls (6 individuals) (Fig. 6-1).

In this part, it is important to talk about decorative elements. The appliqué rib has been manufactured by coils. With this technique, we can detect the inner flange grooves located at the junction of the body with the decorative element. This shows a compacted bond, probably because they would have used some kind of tool when the clay was in a plastic or leather state (García 2007: 52 – 56).

DOCUMENTED MACRO TRACES

For the studied vessels, five different traces had been documented; but in general, we observed a homogeneous tendency. The vessels manufactured by coils presented one type of traces in relation with the fracture of the sherds: faulty joint fractures (Fig.7-2 and 3). But these traces are not unique for this technique. For the coils, we documented the following traces: visible

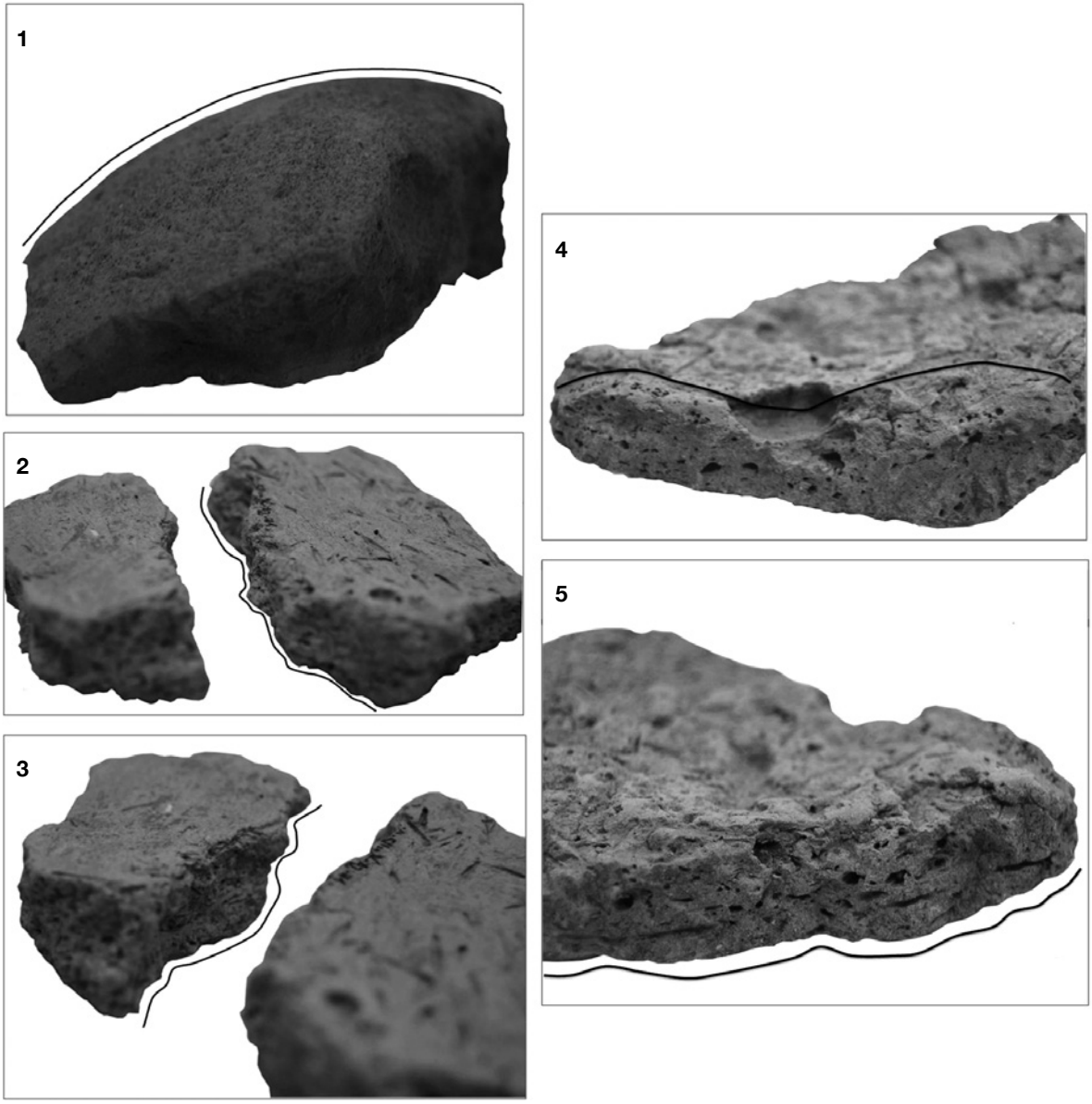

Figure 7. Vessel form; 2-3-Faulty joins fractures; 4-5-Visible wave in the surface.

waves in the surface of the vessel or variations in the thickness of the walls by the thinning and placement of coils (Livingstone 2007: 118 – 119; Rye 1981: 67; Gelbert 2000: 144) (Fig. 7-4 and 5). On the other hand, the less documented trace is the parallel array of inclusions (Fig. 6-2, 3 and 4); we can only observe this trace thanks to the presence of organic o vegetal inclusions (Balfet et al 1989: 53 – 54).

The vessels which have been manufactured by moulding show three different types of traces. The first is a perfect and regular curvature in the bottom of the base (Huysecom 1994: 39; Gelbert 2000: 137) (Fig. 7-1). The second is a uniform thickness of the walls of the vessel, which can be added to regulate the clay to the desired thickness (Gelbert 2000: 140 – 144; Rye 1982: 81 – 82) and the third trace is marks from support used as mould (Gelbert 2000: 140-143).

It is important to highlight those cases without traces or traces with no related techniques, where the approximation to the manufacture technique was not possible. These types of traces can be associated with use-wear phenomena.

SURFACE TREATMENTS

In this reconstruction of the operative chain is important talk about surface treatments and the different traces left from the tools used.

For this set, five different treatments were documented.

If we considered the surfaces lost in post depositional processes, six treatments have to be considered. These are: Smoothing, Burnishing, Polishing, surface evening, slip and lost.

For every type of treatment, different types of traces were found. For the smoothing, three types of traces were documented: aggregation of splines, grooves in the surface and a crumbly surface state.

For the polished surfaces, only one type of trace was identified: little bright ridged surface waves.

Finally, in the burnished surfaces we documented three types of traces: the state of the surface forming small plates, a roughened surface and edge chipping, glowing trails or bands as lines with no uniform lustre and shallow and roughed grooves.

But, if we observe the traces together, we will talk about a majority individual not presenting any, and a surface treatment with more traces is associated to smoothing (30%). The burnishing (21%) and polishing (10%) have a few traces.

FIRING

We can observe the different changes in the firing atmosphere in the exterior, centre and interior of the wall. These changes are described using a colour scale: 1. Black; 2. Grey; 3. Beige; 4. Red; 5. Light Brown; 6. Dark Brown; 7. White; 8. Orange; and 9. Green[5].

In the external parts, the colours from oxidising atmospheres predominate; in the central parts, the black and grey colours predominate; and in the internal parts, the colours are the more homogeneous and no colour prevails over the rest. Most of the atmospheres are mixed and oxidising and that reducing atmospheres are very homogenous.

CONCLUSIONS

The study of the pottery materials allow us to better understand the manufacture strategies, especially the main manufacture techniques, which are very important to approximate in technological and social process in the first pottery production in Tell Halula.

In these final conclusions, we observe the results obtained about the raw materials, the manufacturing techniques, the morphometry, typology and the surface treatments used in this pottery set.

The first aspect that the raw materials show is the texture of the clay. Half of individuals have a porous texture, and 50% have a compact texture. This indicates that the kneaded clay is very homogeneous. Therefore, the presence of porous clays is not due to kneading, but, thanks to the petrographic analysis observed, it has an origin in the use of vegetable inclusions.

If we cross the variables: texture, petrographic groups, size and quantity; we can observe that the set is characterized by compact and fine clays with mineral inclusions, which, in occasions, can be a combination of the two types of small sized inclusions.

Techno–morphological features show that the election of one type of manufacture method or another for bowls depends on the diameter. These vessels have the larger diameters of the set. For the pots, if we use the measures from the thickness of the walls, we can interpret that technique used for manufacture would have been coils. Finally, the criteria to choose one method or other in plates depend on the desired thickness of the wall. Vessels modelled by moulds are thinner than those manufactured by coils.

In bases, the technique election depends on the morphology of the base. Discontinuous or raised bases are modelled using clay disks; and continuous or plane bases are modelled using overlapping spiral coils. For the lips, the manufacture type has no relation with the morphology of the lips or the morphology of the vessel. It is possible that this choice is related to the preference the artisan would have had for easier techniques. Finally, for handle elements it is important to consider its appearance apart from the vessels. This is an indicator about the existence of time a lapse in the manufacture between the drying of the vessel and the application of the handle (García 2007: 52 – 54).

The macro traces are indicators of different steps in the manufacture process. For example, the faulty joint fractures show a weak cohesion of clays and a sharp separation is due to the existence of a drying process between coils or the inexistence of a preparation of the surface (Livingstone 2007: 119; Rye 1981: 67 – 68; Balfet et al 1989: 53 – 55; Martineau 2001: 178; Calvo/García 2013).

For the surface treatments and its documented traces, the different treatments respond to different degrees of application and a bigger variability of tools. The different stretches and marks respond to different types of materials in which the tools were used for the application of the surface treatment (García 2007: 52 – 56; Marti-

5. This scale was defined by Josep Miquel Faura (Faura1996) in his MA thesis. In it, he stablished these atmosphere colours from the Munselltable.

neau 2001: 180 – 182; Gelbert 2000: 148). In the polished surfaces, the traces normally indicate the use of boulders (García 2007: 52 – 56) and in the traces from burnished surfaces, the traces respond to the treatment intensity or the timing applied to the piece during the drying process.

In general, thanks to the analysis, this set would respond to a collective manufacturing work present in all of the operative chain processes with no traces of specialization.

BIBLIOGRAPHY

BALFET, H., FAUVET-VERTHELOT, M.F., MONZÓN, S. 1989, *Lexique et typologie des poteries: pour la normalization de la description des poteries*. CNRS Plus. Paris: Presses du CNRS.

BERNABEU, J. ; GARCÍA, P., GUITART, P., MOLINA, LL. 2011, *La cerámicaprehistorica* : *metodologiade análisis e inventario de materiales.* Valencia. Apendice 4.

CALVO, M., FORNES, J; GARCÍA, J.; JUNCOSA, E. 2004, Propuesta de cadena operativa de la producción cerámica prehistórica a mano, *Pyrenae, 35*, 1, 75-92.

CALVO, M., GARCIA, J. 2013, *Making pots: el modelaje de la cerámica y su potencial interpretativo*, BAR International Series 2540.

CRUELLS, W. 1996, La cerámica pintada Halaf, Molist, M. (ed), *Tell Halula (Siria). Un yacimiento Neolítico del Valle Medio del Éufrates. Campañas de 1991 y 1992*, Ministerio de Educación y Cultura, Madrid, 99 – 114.

CRUELLS, W. 2001, Nuevas aportaciones a la cultura Halaf en Siria, in J.L. Montero, J. Vidal and F. Maso, (eds), *Actas del I congreso de Arqueología e Historia Antigua del Oriente Próximo., vol. MonografiesEridu 1*, Barcelona, 135 – 157.

CRUELLS, W. 2005, Orígens, emergencia i desenvolupament de la cerámica Halaf a Síria. Tesis Doctoral. Departamentd'Arqueologia i Prehistòria. Universitat Autònoma de Barcelona.

CRUELLS, W., FAURA, J.M., MOLIST, M. 2017, AkarçayTepe and Tell Halula in the Context of the Earliest Productions of Ceramics in West Asia, Tsukeni, A. Nieuwenhuyse, O., Campbell, S., The emergence of pottery in West Asia, Oxbow Books, 43-54.

DEDET, B., PY, M., 1975, *Classification de la céramique non tournée protohistorique du Languedoc Méditerranéen*. Paris.

ECHALLIER, J.C. 1984, Eléments de technologie céramique et d'analyse des terres cuites archéologiques. *Documents d'Archéologie méridionale. SérieMéthodes et Techniques*, 3, 23.

FAURA, J. M. 1996, *Un conjuntceràmic del VIII mil·lenni B.P. a la Vall de l'Èufrates: Les produccions de Tell Halula Síria,* Trabajo de Tercer Ciclo, Universitat Autònoma de Barcelona, 2 vol. 348 p.

FAURA, J.M. 2016, *El conjuntceramic del VII mil·leni cal Bc de Tell Halula (Siria). Una evidencia delsprocessos de canvisocioeconomic.*PhD. Universitat Autònoma de Barcelona.

GARCÍA ROSSELLÓ, J. 2007, La etnoarqueología como experimentación: Identificación de marcas de manufactura en cerámicas modeladas a mano. En: M. Ramos Sáinz, J. González Urquijo, J. BaeinaPreysler (Ed): Arqueología Experimental en la Península Ibérica: investigación, didáctica y patrimonio: 45 – 57.

GELBERT, A. 2000, *Etudeethnoarchéologique des phénomènesd'empruntscéramiques,* UMR 7055, Préhistoire et technologie, Université de Paris X, Paris.

HUYSECOM, E. 1994, Identification technique des céramiques africaines. In : F. Audouze et D. Binder (eds.) *Terre cuite et société, Document Technique, Economique, Culturel :* 31-44. Juan-les-Pins : APDCA.

LIVINGSTONE-SMITH, A. 2007, *Chaîne Opératoire de la Poterie, Musée Royal de l'Afrique Centrale*, Tervuren.

MARTINEAU, R. 2001, La fabrication des poteries du groupe de Clairvaux ancien (Jura, France), entre 3025 et 2980 avant J.-C. Expérimentations et analyses du façonnage et des traitements du Surface, Bourguignon, L; Ortega, I.; Frère-Sautot, M-C. *Préhistoire et approche expérimentale.*Éditions Monique Mergoil, Montagnac.

MOLIST, M. (ed.). 1996, *Tell Halula (Síria): un yacimiento neolítico del valle medio del Éufrates: campañas de 1991 y 1992*. Ministerio de Educación y Cultura. Dirección General de Bellas Artes y Bienes Culturales. Instituto del Patrimonio Histórico Español.

MOLIST, M. (coord.) 2013, *Tell Halula: un poblado de los primeros agricultores en el valle del Éufrates, Siria*. Memoria Científica – Tomo I y II. Ministerio de Educación, Cultura y Deporte. Secretaria General Técnica. Subdirección General de Documentación y Publicaciones, Madrid.

MOLIST, M.; VICENTE, O. 2013, Tell Halula 1995 – 2005. Análisis estratigráfico y arquitectónico de los diferentes horizontes históricos de Tell Halula. MOLIST, M. (coord.) 2013. *Tell Halula: un poblado de los primeros agricultores en el valle del Éufrates, Siria*. Memoria Científica – Tomo I y II. Ministerio de Educación, Cultura y Deporte. Secretaria General Técnica. Subdirección General de Documentación y Publicaciones, Madrid.

ORTON, K., TYERS, P., VINCE, A. 1997, La Cerámica

en arqueología. Ed. Crítica. Barcelona.

PY, M. 1999, Le faciès de la céramique lattoise du IVe s. avant notre ère, Recherches sur le quatrième siècle avant notre ère à Lattes,*Lattara 12*, 287-438

RICE, P. 1987, *Pottery analysis: a source book*. University of Chicago Press, Chicago.

RYE, O. S. 1981, *Pottery Technology: Principles and Reconstruction*. Taraxacum, Washington D.C.

SEMENOV, S.A. 1982, *Tecnologia prehistòrica*. Akal. Madrid.

Anna Gómez-Bach, Jörg Becker and Miquel Molist (ed),
II Workshop on Late Neolithic Ceramics in Ancient Mesopotamia: pottery in context,
Monografies del MAC 1, Barcelona 2018,
ISBN: 978-84-393-9750-2 (pàg. 163-172)

DECORATIVE TECHNIQUES ON POTTERY AT TELL HALULA (EUPHRATES VALLEY, SYRIA) IN THE 7TH MILLENNIUM CAL BC. CONTRIBUTION OF AN EXPERIMENTAL METHOD

Adonis Wardeh*, Anna Gómez-Bach*, Miquel Molist*

La aparición de la cerámica en el Próximo Oriente fue una de las novedades tecnológicas más importantes en el complejo proceso socioeconómico asociado al Neolítico de VII milenio. En el yacimiento de Tell Halula las primeras técnicas utilizadas fueron incisión e impresión, creando una amplia gama de patrones y motivos y estos han sido reproducidos mediante un protocolo experimental.

Cerámica Neolítica, Mitad VII milenio, Valle medio del rio Éufrates, Pre-Halaf, Arqueología experimental.

The appearance of ceramics in the Middle East was one of the most important technological developments in the complex socio-economic process associated with the Neolithic in the seventh millennium BC. At the Halula site, the first techniques used were incision and printing, creating a wide range of patterns and motifs and these have been reproduced by an experimental protocol.

Pottery Neolithic, mid VII millennium BC, Middle Euphrates, Pre-Halaf, Experimental Archaeology.

INTRODUCTION

The appearance and initial development of impressed and incised decoration on pottery in the area of northern Levant (Syria and Turkey) has been studied in order to characterise ceramic production during the seventh millennium (6900-6200 cal BC). At archaeological sites in this area, decoration has been one of the characteristics associated with the first pottery that has most been studied, as it is regarded as a cultural indicator of great potential.

This topic is here addressed with the Pre-Halaf assemblage from the site of Tell Halula (Euphrates valley, Syria) (Molist coord. 1996, 2013), where a full sequence covering the appearance and development of pottery has been found in a very complete stratigraphy (Fig.1)**.** The study carried out by Josep Miquel Faura (Faura 1996a and b, 2013) demonstrated the existence of evolutionary phases in the ceramic production and variable decoration according to its stratigraphic position. With this methodological basis, the decoration of the pottery has been studied in greater detail, particularly the ware with incised and impressed decoration (Faura 1996 a and b; Faura/Le Mière 1999; Faura 2016, Cruells et al. 2017). Incisions and impressions on ceramics provide evidence for fabrics tools in first pottery Neolithic of Near East (Tsuneki et al. 2017; Akkermans et al. 2006; Balossi 2006; Balossi/Frangipane 2002). This type of decoration shows that incisions and impressions can provide information on symbolic aspects (motifs, geometric sequences, etc) and the uses of different tools (lithic, bones, wood) infers in technologies and possible trading or cultural spread. In that sense traditional studies indicate that it was easier to describe and identify patterns in location, measure and type of motif but tools, combinations and position are still unclear for

*Grup de Recerca en Arqueologia del Mediterrani i el Proper Orient (GRAMPO), Department of Prehistory, Autonomous University of Barcelona, Edifici Mòdul de Recerca A, Pl. del Coneixement, Campus de la UAB 08193 Bellaterra, Barcelona adonis_wardeh@yahoo.com anna.gomez@uab.cat, miquel.molist@uab.cat

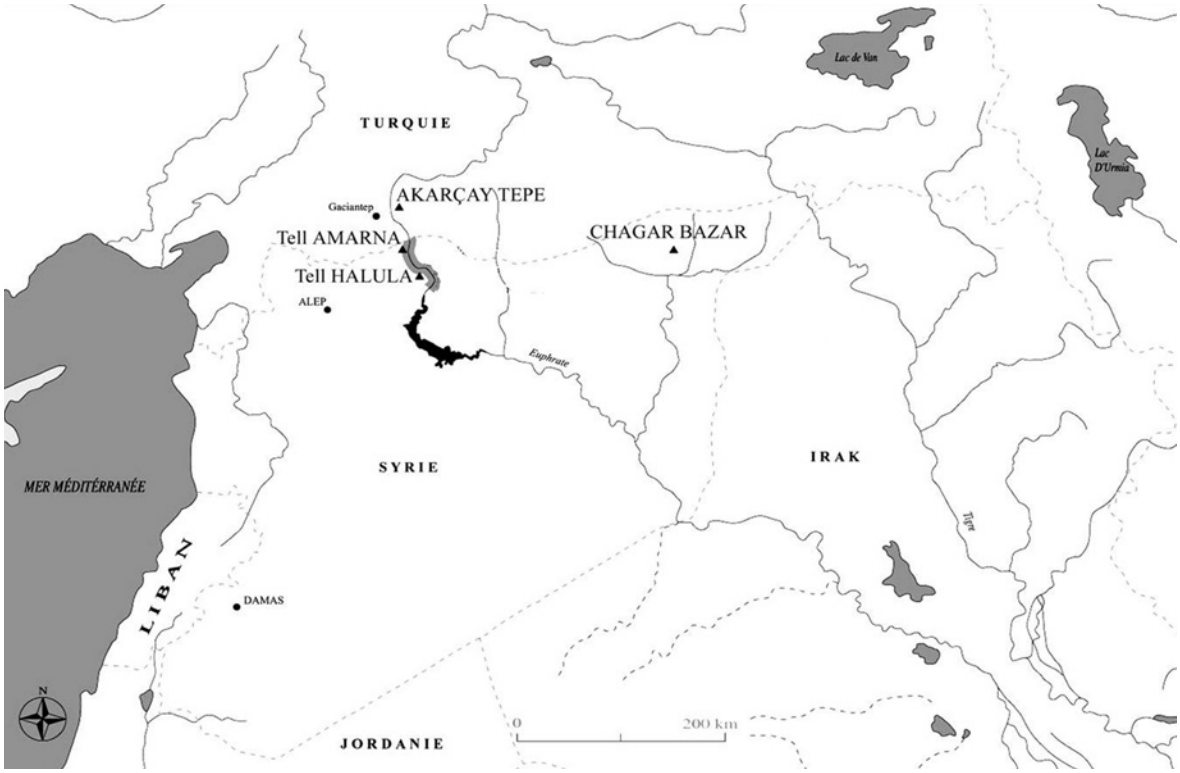

Figure 1. Near East Map with Tell Halula location.

specific assemblages (Shepard 1976; Rye 1981; Rice 1987). But new studies try to go further in description and experimental approach even if only few of them are focused on Near East (Zuckerman 2000; Miller 2007; Hossein 2014).

Following the morphological and descriptive study of the decoration documented at the site of Tell Halula, an experimental protocol was designed in order to characterise the actions, motifs and tools employed in incised and impressed decoration.[1] The study thus aimed to approach the tools used to make the decorations.

TELL HALULA AND THE 7TH MILLENNIUM CAL BC POTTERY ASSEMBLAGE

THE SITE OF TELL HALULA

Tell Halula is located in northern Syria, about 150km northwest of Aleppo, in the "Fertile Crescent". Research carried out at this site is proving to be of great importance within the study and updating of knowledge about the "neolithisation" process in the Near East. It was a large settlement over 8 hectares in size, and the stratigraphy 11 metres thick attests prolonged and continuous occupation during nearly 2,500 years. The chronological sequence begins in the middle Pre-Pottery Neolithic B (c. 7700 cal BC) and reaches the end of the Halaf culture (c. 5400 cal BC) (Molist ed. 1996, 2013).

To document the seventh millennium occupations at Tell Halula, several areas have been excavated, some of them already studied and published (Sector 7, Sector 14, Sector 1, (Molist 1996, Faura 1996a, 1996b) and others partially published or being studied (Sector 30, Sector 2 Squares 2EF and 2G 2HI) (Molist ed. 2013) (Fig.2).

In the Pre-Halaf levels, particularly those in the upper part of the tell, the archaeological remains correspond to a domestic context, with a large number of structures corresponding to two types of buildings: rectangular or square houses (of the pluri-cell type) continuing the PPNB tradition, and the circular houses or *tholoi*, as they are usually called in the region.

In addition to the appearance of pottery, significant technical changes are seen in the chipped and pol-

1. The experimental study was carried out in the laboratory of S.A.P.P.O. (Seminari d'Arqueologia Prehistòrica del Pròxim Orient) in April and May 2012, and was based on the topics established for the European teams working in this line of research (Balossi 2006, Akkermans et al. 2006).

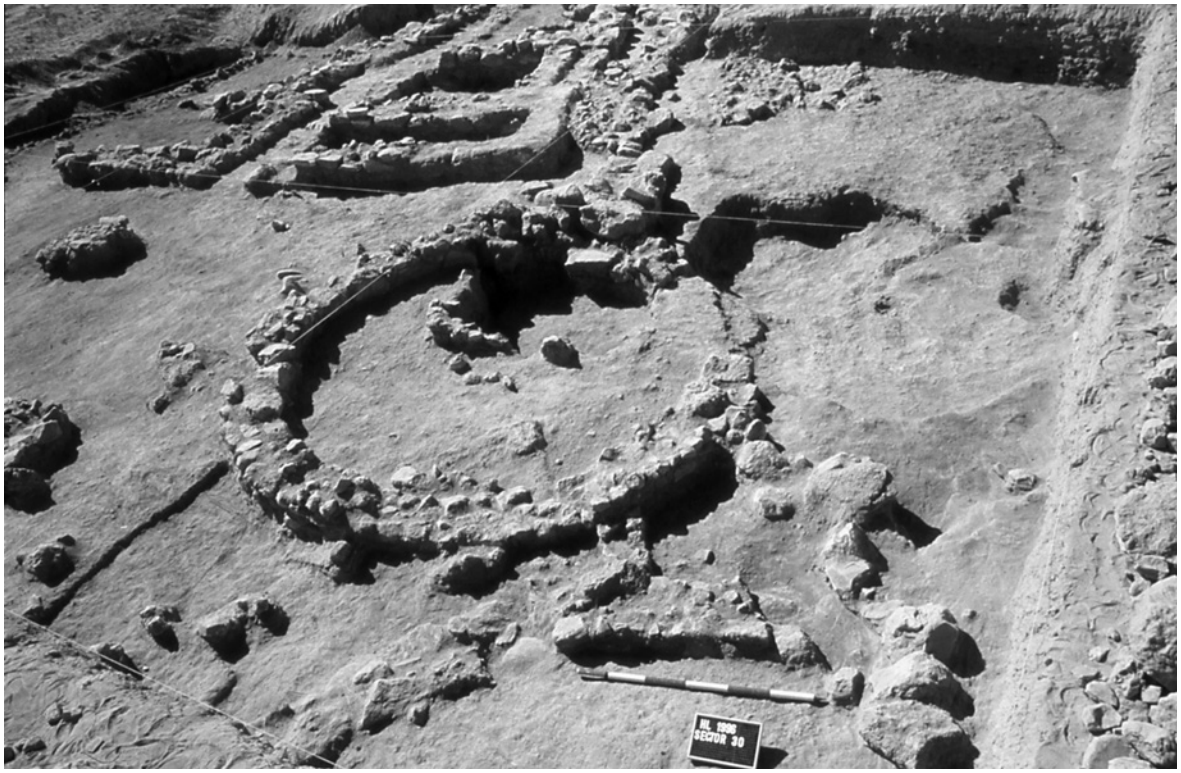

Figure 2. Pre-Halaf area S.30 at Tell Halula (Picture: Sappo-UAB)

ished lithic industries, in comparison with earlier periods. These variations affect both the procurement of raw materials and their management and final results. Lithic tools, for example, mostly consist of arrowheads, retouched blades, retouched flakes, burins and end scrapers, among other implements. These artefacts, together with the faunal remains and the carpological and anthracological record, demonstrate the practice of consolidated farmers and herders throughout the sequence. In addition, the stratigraphy, radiocarbon determinations and pottery studies have established that these occupations covered practically the whole of the seventh millennium (6900-6200 cal BC) (Molist ed. 2013).

The study of the typological and morphological evidence of the pottery, in combination with other artefacts and settlement patterns has been able to discriminate three main phases within this Pre-Halaf period (Faura 1996 a and b; Le Mière/Faura 1999; Faura 2013).

Phase I corresponds to the oldest level and is characterised by a specific pottery group called the "Black Series" owing to the black or brown colour of the paste. This contains calcite inclusions and the surfaces are polished. This group represents 44% of the pottery, whereas the other categories include pastes with plant temper and vessels with a finer paste and a polished finish.

In Phase II, ceramics with plant temper predominate, although the presence of applied clay decoration and some first painted productions are significant. Husking trays have also been documented and grey-black pastes attributed to the group of Grey-Black ware. The surfaces of these vessels display a burnished finish and some fragments are ascribed to the Pattern Burnish group. Incised and impressed decoration occurs, and some fragments of the earlier Black Series persist.

Phase III has yielded a more diverse ceramics assemblage. Despite the presence of productions with simple plant temper, which make up about 75% of the total series, other productions or series appear, such as the burnished red slip ware, and a new series of incised and/or impressed vessels. Some sherds of the Black Series are also documented, together with Grey-Black ware, red slips and, to a lesser extent, some fragments of Early Painted ware.

J. M. Faura's study (Faura 1996 a and b, 2013) provided a detailed catalogue of the decorations existing in this Pre-Halaf sequence. This research, which has acted as our main source of information, discriminated five types of decoration as the most frequent: impression, incision, application of plastic clay, painting and polished motifs. These techniques may appear alone, or combined and mixed.

From the collection conserved in *Seminari d'Arqueologia*

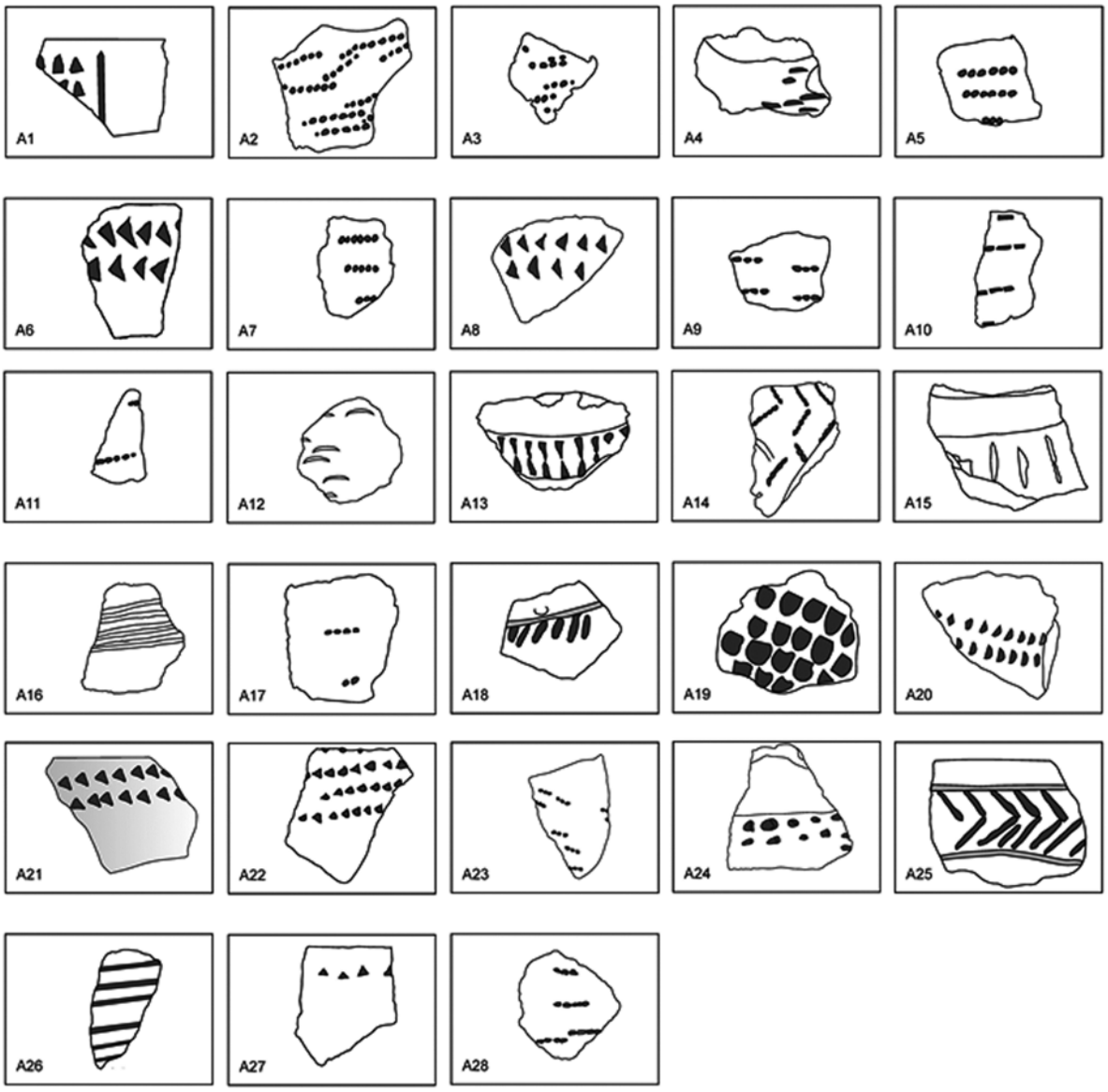

Figure 3. Pre-Halaf pottery collection from Tell Halula and main sherds used for the experimental archaeology.

Prehistòrica del Pròxim Orient laboratory, 28 fragments have been studied and each one has been defined according to the objectives of the present study (Fig.3). In this collection, impression is observed on 68% of the pieces, either digital impression (ungulate type) or using a comb (made of wood or bone). Incision appears on 18% of the pieces, using either continuous or discontinuous pressure and combined with impression, or with painting next to a line incised with continuous pressure. Excision appears on 3% of the fragments.

Therefore, impression is one of the most abundant decorative techniques in the Pre-Halaf pottery at Tell Halula. It may be of three types: stamped or simple impression, impression with a roller, or rocking impression with a range of utensils.[2] This is the group that displays the greatest variability in the type of impression, closely related to the type of utensil used, or in the motifs and patterns. Macroscopic observation identifies large lenticular impressions (Fig. 3. A20), various lenticular dots (Fig. 3. A4 and A12), and dots with a semi-circular cross-section in an irregular pattern (Fig. 3. A24). Other fragments display impressions with a semi-circu-

2. The criteria of identification are the clarity of the motif, which is less marked by impression with a roller or by rocking, the possibility of recognising the trace of a known object or one that can be reconstructed by taking the form of the utensil from a trace, and sometimes a slight accumulation of clay that the impression of the utensil makes rise above the edge.

lar cross-section in lines, with a red slip covering the whole surface, and fragments with comb impressions, in which the number of teeth can be counted (three, Fig. 3. A9, A23; four, Fig. 3. A3, A17; five, Fig. 3. A11, A14, A28; and six teeth, Fig. 3. A5), and the shape of their cross-section can be identified (round, square…). Thus, there are impressions with a comb of three teeth with a square cross-section (Fig. 3. A10) and impressions with different forms of teeth (Fig. 3. A2, A7). Finally, impressions using a comb of seven teeth with a square cross-section create a herringbone pattern (Fig. 3. A25) or motifs of parallel lines (Fig. 3. A13).

These motifs may be in a disordered arrangement or, while disordered, bounded in rows defined by incisions (Fig. 3. A13, A25). Triangular impressions are also common, in diverse arrangements: in rows (Fig. 3. A27), in parallel lines (Fig. 3. A1, A6, A8, A21) or multiple lines (Fig. 3. A22), and in various sizes and positions. These may also be delimited by an incised band (Fig. 3. A1).

The next most common group at Tell Halula is represented by the incised technique. This was carried out by cutting the unbaked clay with continuous or discontinuous pressure. The results are hardly ever the same, as the form of the utensil, the action of cutting in relation to the curvature of the vessel and the state of the paste when making the incision can influence the shape of the cross-section. If the paste is moist, the relief is gentle and displays a raised edge, whereas if the paste is dry, the relief is sharper and the edges of the incisions are clean or with a crest.

The range of techniques and motifs is not very large in the incised decoration. In general the lines are more or less deep (Fig. 3. A16, A26). Decoration using the incised technique combined with other forms is less common. The most usual is the pattern of irregular parallel lines[3] (Fig. 3. A15) and the combination of incisions forming two shallow vertical parallel lines below a horizontal line (Fig. 3. A18).

An example of excision is identified on a fragment of a globular container (Fig. 3. A19) by discontinuous linear pressure causing the removal of clay. Plastic decoration is also common, and defined as decoration with a clay element applied to the surface of the vessel. Although this form of decoration is not specifically studied here, some of the most usual motifs have been noted as this applied technique is very often combined with impression and/or incision and it is interesting to see how it was achieved.

It should finally be pointed out that slips, painting and the polished motif, which appear in combination with the other techniques, but within a different *chaîne opératoire*, are not studied here.

In short, the ceramics assemblage in the Pre-Halaf phase displays great variety in the technical methods associated with the decoration on the vessels. These decorative groups appear in different percentages, and they all correspond to different groups of practices, although they repeat the decorative motif in general terms. Our special interest in the motifs produced with the impressed and incised techniques has allowed the determination of a wide range of techniques, motifs, sizes and utensils. The possibility of studying this variability through an experimental methodology was therefore of great interest.

OBJECTIVES AND METHODS OF THE EXPERIMENTAL PROCESS

Most of the experimental research in archaeology of the Near East is based on the ethnographic observation of communities and concentrates on describing activities and reproducing objects and artefacts. The first studies focused on generating relevant archaeological documentation appeared timidly in the 1980s in the Dutch School.

In the case of experimentation in pottery, it may be said that there is no agreed methodology, but the main research on manufacturing processes and firing techniques has resulted in archaeometric methodologies, whereas the reproduction of decoration has been studied less. In the present research, a mixed experimental method has been chosen, in which the documentation of archaeological objects has been the basis for the structure of the experimental process.

Thus, using a more empirical experimental approach based on the archaeological record, the present research has aimed to obtain information about the relationship between the archaeological evidence and the possible technical procedures and utensils used by communities in the Near East in the seventh millennium cal BC. It should be pointed out that little experimental research has been carried out on the decorative techniques used in this region, and particularly on impressed and incised decoration, as technological studies have tended to focus on the manufacture of the vessels rather than on their decoration.

In this case, the objectives prior to the experimental study of the Pre-Halaf ceramics assemblage consisted of characterising the impressed and incised production

3. An element that J. M. Faura called lightly incised parallel vertical lines on the inflexion between the body and neck of globular pitchers (Faura 1996a).

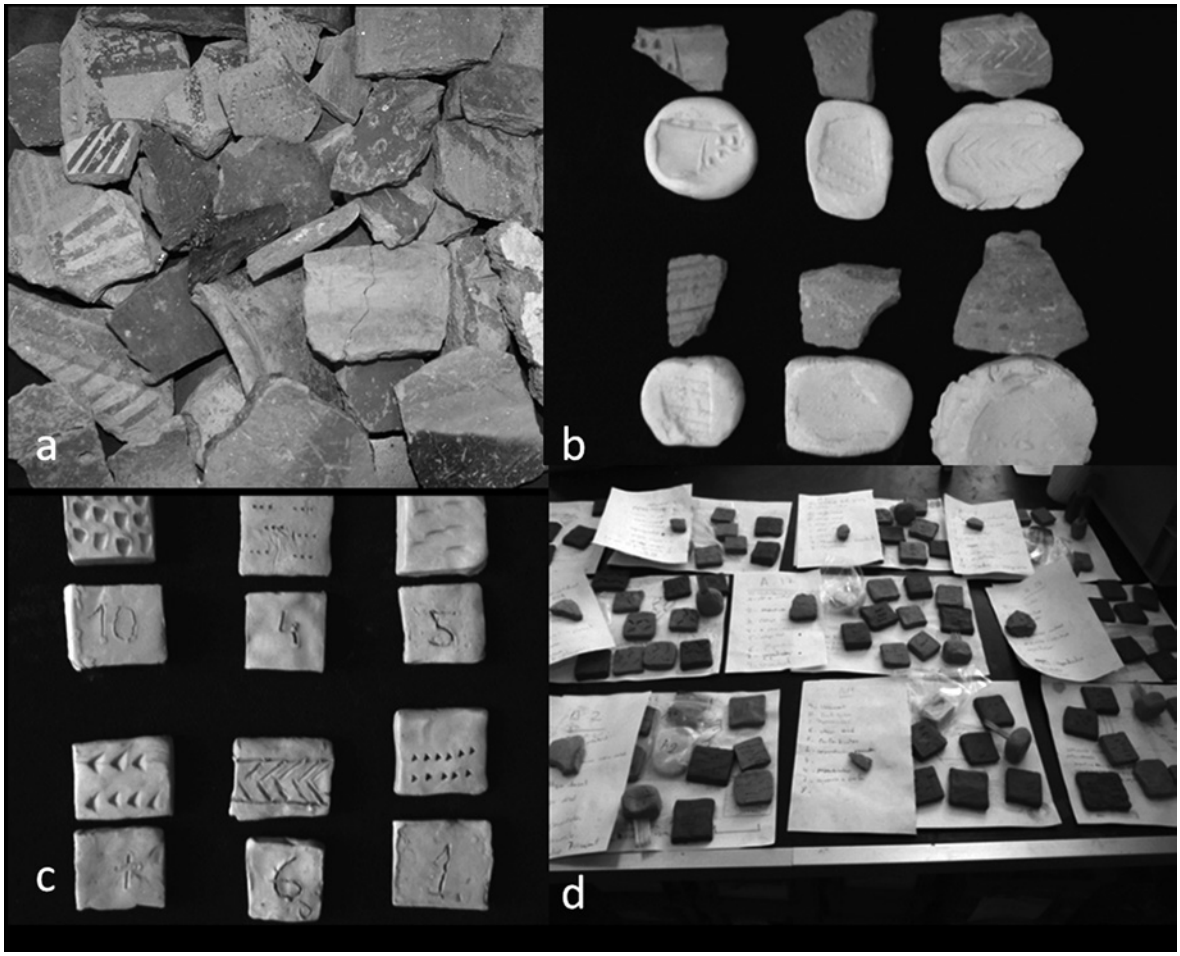

Figure 4. Process description: From sherds classification (4a), molds (4b), motif reproduction (4c) and data recovered (4d).

from the technological point of view. This aspect was complemented with the drawing up of an exhaustive corpus of the decorative motifs found at the site and the stylistic repetitions in order to approach the utensil and material used to decorate the pottery.

A further objective was to approach or infer the action used in the impression or incision of the decorative motif and identify technological recurrences employed by the artisans within a community of practices.

Finally, the ultimate goal of the research was to identify community of practices among the different technological groups used to produce the same decorative motifs.

The experimental protocol set out to reproduce the 28 fragments that have been studied (see Fig. 4) in a process involving six steps:

Production of a database with the fragments, documenting the decorative motifs, their size and position in the vessel, by drawing and digitalising them (Fig. 4a).

Clustering the different motifs in techno-stylistic groups with a preliminary technological description.

Production of a negative of the original fragment,[4] (Fig. 4b) and with this, propose the utensil used among different materials: bone, soft and hard wood, stones and fingernails. These are generally materials that have been retouched or worked fragments with a circular or rectangular shape.[5]

Production of experimental pieces. Although at first the use of SiO_2 clay was thought not to be appropriate for the reproduction of the motifs, this material was used in the end owing to the difficulty in reproducing Near East

4. A process that involve making a mould with the motif using kaolinite clay. These moulds of the pieces make the motif stand out and enable traceological aspects to be documented that were not identifiable macroscopically in the original piece.
5. A basic premise is that similarities can be found between the archaeological evidence and the experimental pieces produced with tools made from abiotic materials (flint and obsidian lithics) and biotic objects (bone, wood, a fingernail). These are the best materials to create clear, precise and easily visible traces, although some of them might require a series of skills, practice and know-how to be able to use them optimally.

clays in the laboratory and because of their well-purified clay matrix (Fig.4c).

In the process of reproducing the motifs, 11 individuals took part, all of whom had no experience in ceramics or in the reproduction of decorative motifs (Fig. 4d).

Digitalisation of the experimental process, analysis of the data obtained and production of tables and summaries were developed. A comparison at a macroscopic level and with a binocular microscope of the experimental sherds and the original archaeological fragments was also done.

PROCEDURE AND RESULTS OF THE EXPERIMENTAL PROTOCOL

Although the decorative ensemble is visually quite homogeneous, with clear parallels with other decorative ensembles of the same chronology in the Euphrates valley, the technological-decorative analysis and experimental study has identified some significant variations in several aspects of the *chaîne opératoire*.

First, the decorative groups appear in different percentages and all correspond to different individuals, although the decorative motif is repeated. The most frequent is comb-impression with discontinuous pressure (39%), followed by impressed triangles (22%), also with discontinuous pressure. The following group is formed by lines and groups of lines (14%) made by continuous pressure and in two cases by discontinuous pressure, the use of mixed techniques (mainly painting and incision) with a percentage of 11%, and finally a more varied group (7%) that includes the excised fragment and complex impressions.

The main part of the research has attempted to define the utensil used in the experimentation and to make the experimental sherds. The 11 individuals who participated made the pieces in clay, paying special attention to the reproduction of the original fragment (its position) and of the action used with a tool that had been prepared previously.

All the individuals made an experimental piece with all the utensils for each archaeological object, without any contact with the other participants, noting the position used and making some brief notes in a log book. This process resulted in the creation of over 1,232 sherds. The motifs were later discussed among the participants to reach an agreement about which were the most similar at a macroscopic level, without those observations conditioning the rest of the analysis.

At the same time, the technical actions have been characterised. They were reduced to two main categories according to the type of pressure:

Continuous pressure: the utensil is moved continuously over the experimental clay piece.

Discontinuous pressure: the utensil makes occasional contact with differing pressure on the experimental clay piece.

Additionally, different variables were established according to the position of the utensil in relation to the clay sample. These were:

Perpendicular: the utensil is held perpendicular to the experimental sample, i.e. at an angle of about 90º.

Proximal oblique: the utensil is held at an angle of about 45º to the experimental piece, and the end of the tool is in a ventral-proximal position.

Distal oblique: the utensil is held at an angle of about 45º to the experimental sample, and the end of the tool is in a dorsal-distal position.

Left-right: the utensil moves (continuously or discontinuously) from left to right across the experimental sample.

Right-left: a right to left movement across the sample.

Rocking: with a fixed point of contact, a rocking, rotational movement is made with unequal pressure.

Horizontal: the utensil is held parallel to the sample and the contact involves a horizontal movement.

The tools and objects for making and applying the motifs are very diverse and hard to identify in an archaeological context (Fig. 5a). The moulds of the motifs make clear the great variability that existed in the hardness and shape of the objects used to create the same motif. With these limitations, for the first part of the experiment, a wide range of materials were used: bone[6] (metapods of *Ovis aries* and *Sus scrofa*, and bovine and galliform ribs) (Fig.5.1), wood (soft wood like cane, etc., and hard wood, from deciduous trees and shrubs) (Fig. 5.b) and lithics (flints and obsidian from the assemblage collected on the surface at Tell Halula) (Fig.5c). Fingernails were also used as a possible utensil to make the ungulate motifs (Fig. 5d).[7]

A series of general observations were made, once all the information had been obtained, based on the main

6. We are grateful to Buchra Taha for access to her experimental collection in bone, produced in the framework of a doctoral thesis, to be able to carry out the part of the experimental protocol using this kind of object.
7. The use of such other objects as shells, pottery and cords was considered but after initial experimentation with the reference collection and observing the results in the clay, they were discarded as raw materials for the main utensils.

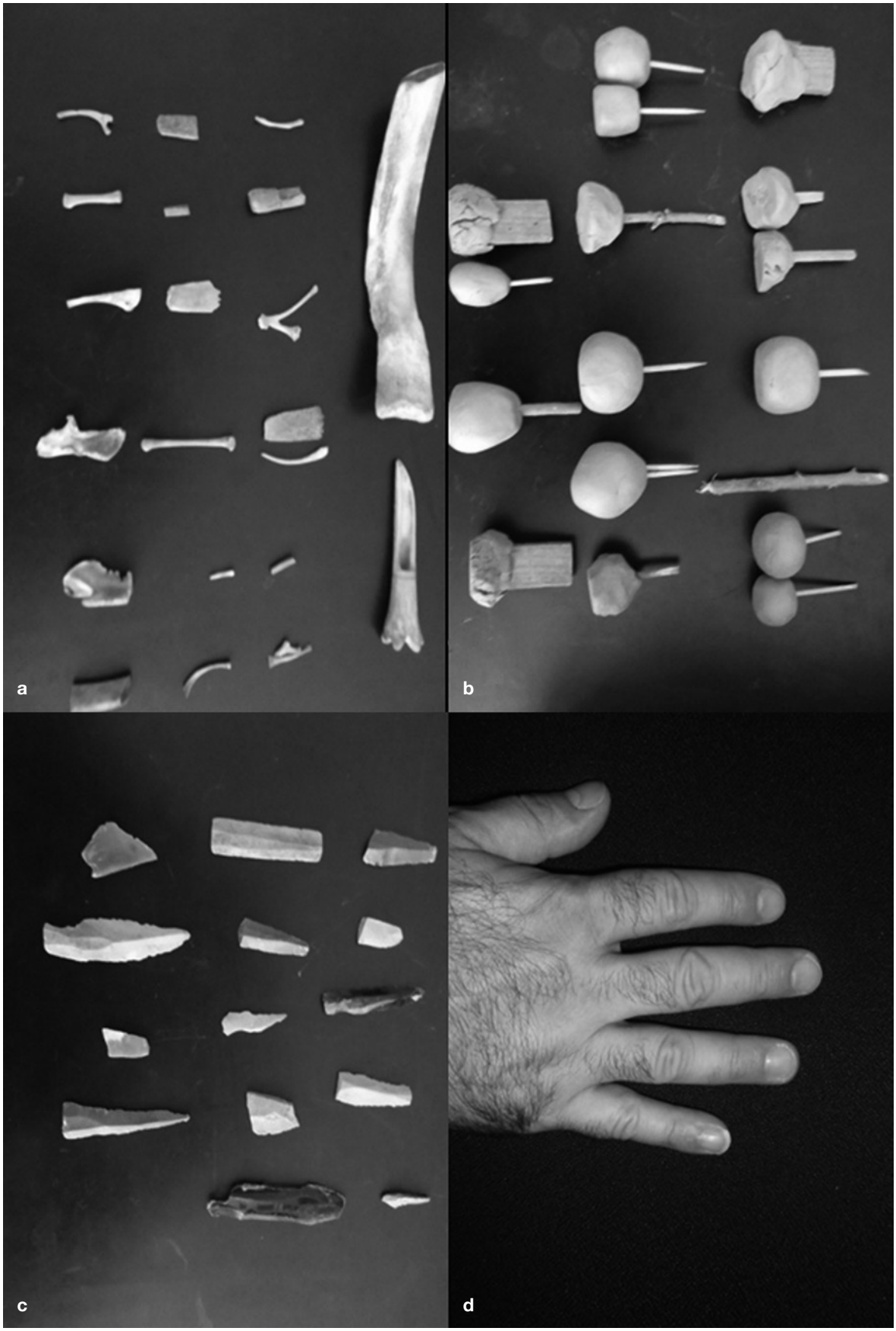

Figure 5. Main tools designed: wood (a), bones (b), lithic (c) and human digitations (d).

motifs. First, through the experimental process it can be affirmed that comb-impression was probably carried out using wood. Bone was also experimented with, but this material was then discarded owing to the impossibility of making rounded teeth and small gaps between the teeth, especially as seen in Fig. 3. A2, A7, A9, A23 and A28. Motifs in the form of triangles were made with wood, bone and lithics. The use of lithics is particularly evident for the large triangles (Fig. 3. A6, A8, A21) and in a more complex way for the small triangles (Fig. 3. A22). Wood is the best material only in the case of the fragment in Fig. 3. A27 and part of Fig. 3. A1. Lines were drawn with wood, bone and lithics. The three materials gave positive results. Additionally, the gap between lines suggested experimentation with long combs with large gaps, and the results were not unacceptable.

For mixed types of decoration (incision, impression and painting), although the use of different implements cannot be ruled out, it seems that the mixed incised types may have been carried out with lithic and bone utensils. In the case of ungulate decoration (Fig. 3. A4. A12), it has been shown that a human fingernail or a bone utensil (made from the epiphysis of an ovicaprid) do not produce significant differences and therefore both methods may have been used.

The suggested experimental protocol is extrapolatable to other assemblages and an exhaustive analysis of the results will be able to infer aspects of technological regionalisation and innovation, and also intermittences in the acquisition of technical know-how.

FINAL REMARKS

The study of the productions known as impressed-incised pottery, comb-impressed and comb-incised pottery has focused on their decorative motifs, which are defined according to stylistic variations, taking into consideration the decorative technique, the structure of the design and the motif itself.

Bearing in mind the significant regional variations in the technology of seventh millennium ceramics with mineral temper and the rapid adoption of these inclusions at sites in Upper Mesopotamia, it appears that this technology was taken up more or less simultaneously over a wide geographic area.

The experimental research has aimed to concentrate on descriptive technological aspects associated not only with the reconstruction of the technological process but also the role of decorative motifs themselves.

Decoration has undoubtedly helped to "mark" the most visible and distinctive element of individuality within a community and between communities. These containers seem to express in a material and collective way practices that involve the consumption of food and drink and the motifs were probably associated with particular people, occasions and memories, allowing the Neolithic communities to establish networks beyond the immediate surroundings.

It is curious that early Neolithic pottery is characterised by decoration with impressed, incised and painted motifs as these elements are traditionally associated with a phenomenon of certain exclusiveness and linked to a factor of "prestige". This prestigious production may be connected with technological innovation which, in the course of time, was partially consolidated with the tradition of painted pottery (Akkermans et al. 2006). Ceramic assemblages are characterised within this context, but practically without any technological approach being carried out.

The first trial of our experimental methodology indicates the feasibility and interest of developing it further to define technological characteristics inherent in Pre-Halaf productions. As has been stated, this type of research is practically non-existent in the region and it opens a new perspective of study to understand the human groups better and the communities of practices who produced and consumed the ceramic products.

Although the present study has not concluded, it has shown that experimentation is able to contribute interesting hypotheses not only as regards decorative actions and techniques, but also the utensils and transformed materials. For example, combed decoration appears with great morphological variability, within and among the same refitted fragments. Similarly, the identification of the lithic tools for the reproduction of the triangular motif allows decorative sub-groups to be determined and, through comparison with other sites, at a large-scale this will enable aspects of technological regionalisation to be inferred.

We are aware that this study is only a first approach to a complex topic with a long tradition in archaeological studies. Both the methodology of this approach to Near East assemblages and the hypotheses generated are regarded as very positive and should be developed further in future research.

ACKNOWLEDGEMENTS

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this research is part of the main project “Origen de las sociedades agrarias en el Próximo Oriente: Consolidación de las comunidadesneolíticasen el norte de Siria y sudeste de Anatolia”, Ministerio de Ciencia y Innovación Ref. HAR 2010-18612. This article vas revised by Peter Smith. Experimental project has been developed in co-operation with Pep Novellón, Laia López, Ariadna Reverter, Alex Carrasco, Silvia Calvo, Adrià Breu, Adrià Ruiz, Teresa Capella, Pau Alberch and Sara Martin.

REFERENCES

AKKERMANS P.M.M.G., CAPPERS R., CAVALLO C., NIEUWENHUYSE O.P., NILHAMN B., OTTE I. 2006, Investigating the Early Pottery Neolithic of northern Syria: new evidence from Tell Sabi Abyad, *American Journal of Archaeology,* 110-1, 123-156.

BALOSSI, F. 2006, *The development of “cultural regions” in the Neolithic of the Near East. The Dark Faced burnished ware horizon”,* BAR, *British Archaeological Reports,* International Series 1482.

BALOSSI, F., FRANGIPANE, M. 2002, La ceramica impressa del Vicino Oriente, Fugazzola Delpino, M.A..; Pessina, A; Tiné, V. (dir.), *La ceramiche impresse nel Neolitico Antico*. Instituto Poligrafico e zecca dello Stato. Studi di Paletnologia I. Roma, 3-15.

CASTRO, A.G. 2010, Shared painting: The Practice of Decorating Late Neolithic Pottery from Northern Mesopotamia, Steadman, S.R. Ross, J.C. (eds.), Agency and Identity in the Ancient Near East: New Paths Forward, Serie Approaches to Anthropological Archaeology.

CRUELLS, W., FAURA, J.M., MOLIST, M. 2017, Akarçay Tepe and Tell Halula in the Context of the Earliest Productions of Ceramics in West Asia, Tsukeni, A. Nieuwenhuyse, O., Campbell, S., The emergence of pottery in West Asia, Oxbow Books, 43-54.

FAURA, J. M. 1996 a, *Un conjunt ceràmic del VIII mil·lenni B.P. a la Vall de l’Èufrates: Les produccions de Tell Halula Síria,* Trabajo de Tercer Ciclo, Universitat Autònoma de Barcelona, 2 vol. 348 p.

FAURA, J.M. 1996b, La cerámica pre-Halaf, Molist, M. (ed.): *TellHalula (Siria): unyacimiento Neolítico del valle medio del Éufrates, campañas de 1991 y 1992*, Instituto del Patrimonio Histórico Español, Madrid, 91-97.

FAURA, J.M. 2016, El conjunt ceramic del VII mil·leni cal Bc de Tell Halula (Siria). una evidencia dels processos de canvi socioeconomic . PhD. Universitat Autònoma de Barcelona.

FAURA, J.M., LE MIÈRE, M. 1999, La céramique néolithique du haut Euphrate Syrien, Del Olmo, G.; Montero, J. L. (eds.), *Archaeology of the Upper Syrian Euphrates. The Tishrin Dam Area,* Proceedings of the International Symposium held at Barcelona, January 28th- 30th 1998, Ed. Ausa, Sabadell, 281-298.

HOSEIN MARDI, G. 2014, Experimental Approach to Studying the Technology of Pottery Decoration, Experimental Archaeology, 2014/3

MILLER, H.M-L., 2007, *Archaeological approaches to technology.* Amsterdam: Elsevier/Academic Press.

MOLIST, M. (coord.) 2013, *Tell Halula: unpoblado de losprimerosagricultoresen el valle del Éufrates, Siria*. Tomo I y II.Ministerio de Educación y Ciència, Madrid.2 vol.

MOLIST, M. (ed.) 1996, *Tell Halula (Siria). Un yacimiento neolítico del valle medio del Éufrates. Campañas de 1991 y 1992*, Ediciones del Ministerio de Educación y Ciencia. Madrid.

RICE, P. M., 1987, *Pottery analysis: a sourcebook*. Chicago: University of Chicago Press.

RYE, O. S., 1981, *Pottery technology: principles and reconstruction*. Washington D. C.: Taraxacum.

SHEPARD, A. O., 1976. *Ceramics for the archaeologist*. Washington D.C.: Carnegie Institution of Washington.

TSUNEKI, A., NIEUWENHUYSE, O., CAMPBELL, S. 2017, The emergence of pottery in West Asia, Oxbow Books, 192 p.

ZUCKERMAN, D. 2000, Experimental archaeology at Sha’ar Hagolan: a reconstruction of Neolithic pottery production in the Jordan Valley. *Near Eastern Archaeology,* 63(1), pp.45-50.

Anna Gómez-Bach, Jörg Becker and Miquel Molist (ed),
II Workshop on Late Neolithic Ceramics in Ancient Mesopotamia: pottery in context,
Monografies del MAC 1, Barcelona 2018,
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THE CREATIVE CENTURIES: DIVERSITY AND INNOVATION IN IRANIAN NEOLITHIC CERAMICS

Frank Hole*

Los primeros siglos del Neolítico cerámico se caracterizan por las diferencias regionales en arcillas y diseños cerámicos, que reflejan la creatividad en decoración y modelado. Durante el Neolítico tardío se opta por un repertorio limitado de diseños y productos que trascienden las fronteras regionales. Los estudios de caso del oeste de Irán ilustran estas tendencias.

Irán, Neolítico Cerámico, Innovación, Diseño

The early centuries of the ceramic Neolithic are noted for regional differences in ceramic wares and designs, which reflect creative innovation in decoration and modeling. During the later Neolithic there is growing convergence on a limited repertoire of designs and wares, which transcend regional boundaries. Case studies from Western Iran illustrate these trends.

Iran, Neolithic ceramic, Innovation, Design.

INTRODUCTION

The first five centuries of the sixth millennium BC saw a burst of creativity and innovation in ceramic crafts. This was manifest in experimentation with different vessel forms, the uses of colored slips and incising, and especially in painted designs. Remarkably, each region of the Near East saw similar developments at essentially the same time, but with distinctive regional variants. During the late sixth millennium, innovation in local productions declined and evolved into greater uniformity, both in designs and wares across regions, as represented by the spread of Samarran/Ubaid and Halaf/Ubaid ceramics. These trends and developments are especially well illustrated in four regions of Iran.

Pottery vessels were introduced over some hundreds of years across the regions of the Near East. During the Early Neolithic, pots made with vegetable temper were fired at a low temperature, forms were relatively simple as befits hand-made vessels, and were often painted. In some cases the surfaces were well smoothed and even burnished, but often surfaces were left uneven to the touch. Depending on region, vessels might have knobs or ledge handles, but most lacked such features. Painting tended to be simple strokes irregularly applied so that every vessel was unique.

Once pottery had been in service for some time –perhaps a few generations– a creative explosion took place, with styles of decoration and wares displaying new combinations of color and design rapidly replacing one another or co-existing. The burst of creativity ebbed by 5500 BC, when people settled on fewer wares and more consistency in design. The greater homogeneity across the region was expressed in Samarran-derived designs and Halaf motifs in the North and Samarran/Ubaid-derived wares and designs in the South and East. Eventually, Ubaid-related wares spread across the entire region from the Euphrates to the Zagros. In

* C.J. MacCurdy Professor Emeritus of Anthropology, Yale University, 10 Sachem Street, Room 302, New Haven, CT, U.S.A. frank.hole@yale.edu

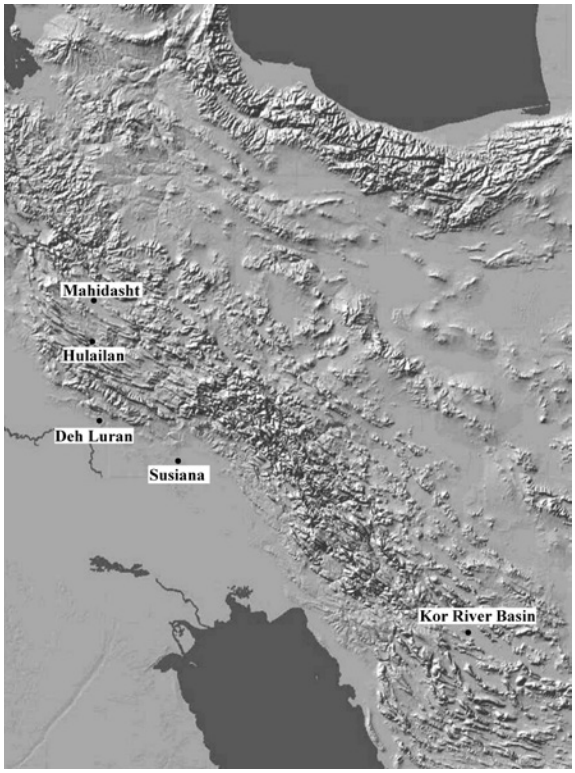

Figure 1. Locations of regional examples discussed in the text.

Phase	Types
Mohammad Jaffar	Jaffar Plain, Jaffar Painted, Khazineh Red
Sefid	Jaffar Plain, Khazineh Red, Sefid Painted, Sefid Red-on-Cream, Sefid Black-on-Cream, Sefid Burnished, and Sefid Black Painted.
Surkh	Jaffar Plain, Khazineh Red, Sefid Black-on-Cream, and Sefid Painted (with new vessel forms)
Chogha Mami Transitional	Jaffar Plain, Khazineh Red, Susiana Black-on-Buff (CMT style), Susiana Plain Buff, Sialk Black-on-Red, and White-on-Red.
Sabz	Jaffar Plain, Khazineh Red (new forms), Susiana Plain Buff, Susiana Black-on-Buff

Figure 2. Neolithic phases in the Deh Luran sites of Ali Kosh, Chogha Sefid and Tepe Sabz.

this paper I examine the creative centuries and ceramic variants in four regions of Iran, a land divided by topography (Fig. 1).

As compared with Mesopotamia, the Neolithic ceramics from Iran show greater variability within and between regions. The reasons for this are varied, but, as Mallowan remarked, within the mountain systems of Iran there are "isolated pocket communities," and the absence of major rivers "has tended to concentrate homogenous developments within restricted areas" (Mallowan 1954, 16). The contrast with the relatively open landscape of Mesopotamia and its two rivers that run the length of the land is obvious and striking. Equally striking and supporting Mallowan's observations, the Neolithic ceramics from Mesopotamia are relatively undifferentiated as is evident in the Hassuna and Halafian periods. This is not to say that there is no regional differentiation, rather that it is strikingly less than we see in Iran. Here we examine four sequences of changes, which illustrate the diversity, and each sequence terminates in a region-wide ceramic change that ushers in a long period marked by uniformity in wares and similarities in painted designs.

In this paper *variability* is defined on such attributes as paste, tempering material, surface treatment, including slips of various colors, painted designs and vessel forms. In the literature, combinations of these may be referred to as "wares" or "types." *Innovation* refers to changes in vessel forms and style of decoration, tempering and firing.

There is little consistency in the ways wares and types are defined, but all authors make distinctions that can be counted. Similarly authors differ in the way they segment their sequences, e.g., phases, sub-phases, and levels.

Diversity refers to differences in attributes between regions. Different authors report wares and types in different ways, but they make distinctions that can be counted, e.g., four types in the Mushki Phase.

The four regions to be compared are two piedmont/lowland plains, Deh Luran and Susiana, and two intermountain plains, little Hulailan and Fars, the latter much larger and more open (Fig. 2). In each, excavations have revealed sequences of Neolithic ceramics that illustrate both change and diversity.

DEH LURAN

The longest and best known sequences are from the Deh Luran sites of Ali Kosh, Chagha Sefid, Tepe Sabz and Farukhabad, which encompass the earliest Neo-

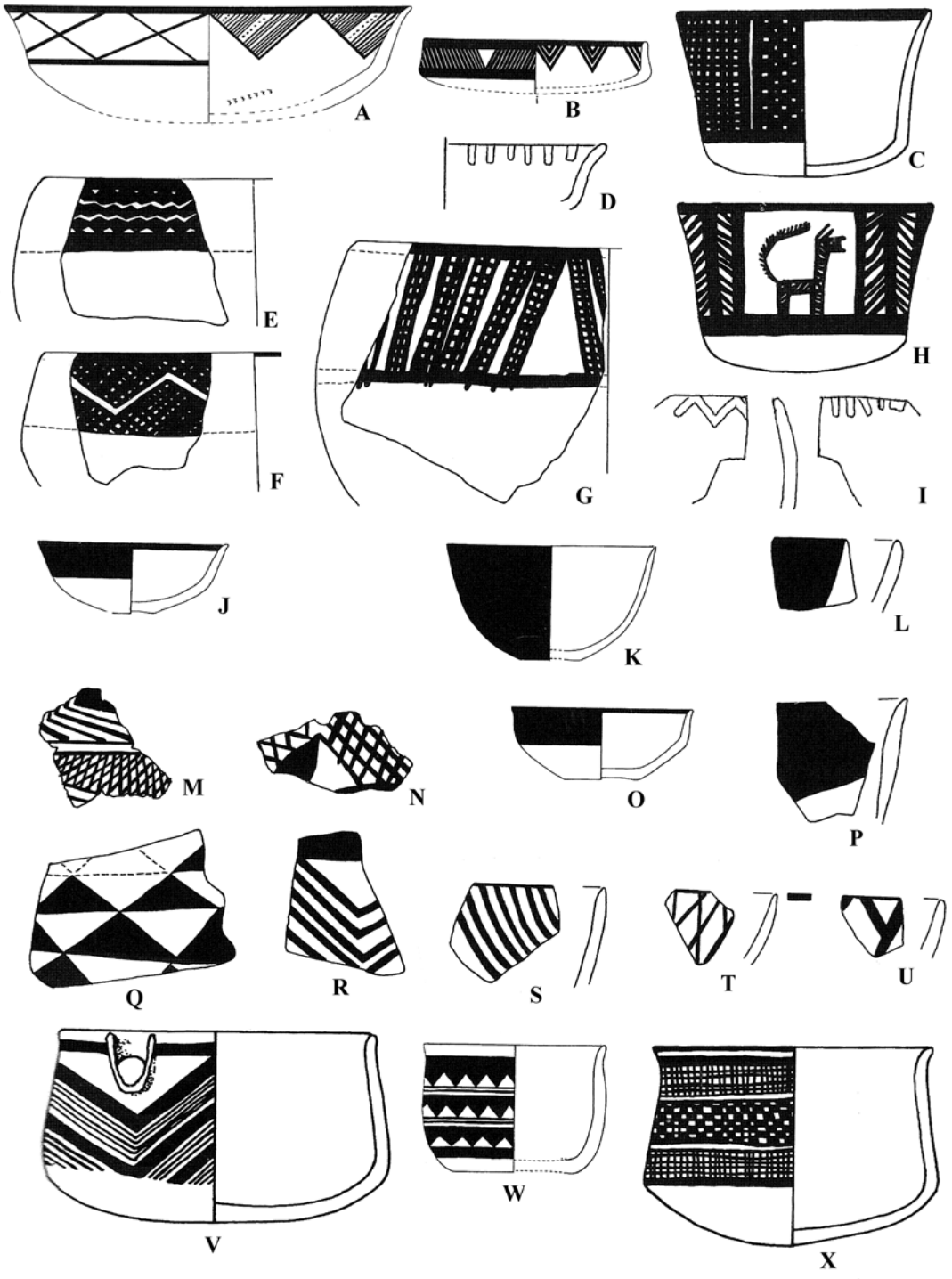

Figure 3. Examples of ceramics from Deh Luran. (Figures from Hole 1977, Hole/Flannery/Neely 1969).

A Chogha Mami Transitional; B, C, H Sabz Phase; D, I White-on-Red; E–G Sialk Black-on-Red; J, Surkh Black-on-Red; K Sefid Black Painted; L Maroon-on-Cream; O Black-on-Cream; L, P Maroon-on-Cream; M, N, Q–U Red-on-Cream; V–X Jaffar Painted.

lithic through the Bronze Age (Hole 1977; Hole/Flannery/Neely 1969; Wright 1981), but only the first three sites are relevant to this paper.

The Neolithic ceramic sequence has six phases: Mohammed Jaffar, Sefid, Surkh, Choga Mami Transitional, and Sabz. Within each phase there are types, as shown in Figs. 2, 3 (Hole 1977; Hole/Flannery/Neely 1969). (Fig. 3).

During the Ceramic Neolithic, eleven types appeared; some existed throughout, but others were diagnostic

Phase	Types
Formative Susiana	Coarse Straw Tempered, Red Burnished, Smear Ware
Archaic Susiana 0	Jaffar Plain, Khazineh Red, Sefid Painted, Sefid Red-on-Cream, Sefid Black-on-Cream, Sefid Burnished, and Sefid Black Painted.
Archaic Susiana 1	Standard Painted Burnished, Standard Straw Tempered
Archaic Susiana 2	Dense Sandy Ware, Red-line/ Band Ware, Dark Painted, Standard Straw Tempered
Archaic Susiana 3	Matte Painted, Close-Line Ware, Straw tempered Smoothed
Susiana 1	Standard grit tempered Plain, Standard grit tempered Painted, Red Washed

Figure 4. Neolithic phases in the Susiana sites: Chogha Bonut, Chogha Mish and Tula'i.

of only short periods. The variety is not only in painted designs, but also in the combinations of slip and paint colors. Currently no region other than Susiana displays as much variability in the outward appearance of ceramics. The Sefid Phase saw the greatest experimentation and thereafter it diminished. While there is little doubt that the first three phases manifest purely local developments, the CMT was intrusive and developed into relatively crude Black-on-Buff wares in the Sabz Phase, before the more widely known "Susiana" Black-on-Buff sequence began.

We can regard the sequence from Mohammad Jaffar to Sefid to Surkh as an essentially internal development in the sense that the vessels share a soft, chaff-tempered fabric. On the other hand, the Red-on-Cream, Black-on-Cream, and Black-on-Red introduce an entirely different mode of decoration, in which design patterns are replaced with solid panels and bands on variable backgrounds.

With the CMT and Sabz Phases, we find two major changes: the use of sandy grit temper and the earliest manifestation of Black-on-Buff ceramics that continues through the end of the fifth millennium. The CMT is an import to Deh Luran from Mesopotamia, and is analogous to the proto-Halaf of the Jazireh. It is also found with two wares that may come from sites outside the piedmont. By the Sabz Phase, these extraneous sherds have disappeared and the sequence in Deh Luran continues in what appears to be a local variant of the Susiana sequence of Khuzistan, but with lesser variety.

SUSIANA

Two sites, Chogha Mish and Chogha Bonut provide the Neolithic sequence, augmented by a small excavation at Tula'i (Alizadeh 2003, 2004; Hole 1974). Helene Kantor described the Chogha Mish ceramics by type, without clear stratigraphic context; however the inferred sequence essentially matches that of Deh Luran (Figs. 4, 5). Pottery comparable with the Mohammed Jaffar Phase has not yet been described, but *Formative Susiana*, with coarse, straw-tempered, and smeared paint wares, may be. However, this short-lived phase is considered to be "an experimental stage in manufacturing painted pottery" (Alizadeh 2004, 44).

This is followed by *Archaic Susiana 0,* an assemblage with Maroon-on-Cream pottery, also found at Tula'i and similar to the Sefid Phase. Alizadeh's discussion of the sequence recognizes that the ceramics from Chogha Bonut are older than, and only partially overlap, with the sequence that continues with Chogha Mish Archaic Susiana 1.

Archaic Susiana 1 has Standard Painted Burnished Ware. *Archaic Susiana 2* has Red-line/Band Ware, with fine grit or sand temper. This ware is equivalent to the CMT of Deh Luran. *Archaic Susiana 3* features Matte Painted, Dense-Sandy, and Close-Line wares, all of which are also similar to CMT. (Fig. 4).

Comparisons between Deh Luran and Susiana are obvious, although there are specific differences in design elements and forms (not discussed here). Each region develops along the same trajectory and sees the introduction of foreign elements in the Late Neolithic, which establish the baseline for a new trajectory of change that has much to do with the Ubaid of eastern Mesopotamia. The essential separation of the piedmont Neolithic sites from Mesopotamia prior to the CMT is reinforced by the absence of typical Hassuna types. With the CMT/Archaic Susiana 3 there is the reduction in wares–a simplification of the ceramic inventory and an end to the creative innovations seen earlier.

Deh Luran and Susiana exhibit characteristics of both a closed and open system. Closed because they comprise closely similar sequences that are not paralleled elsewhere; open because the two distinct regions are similar despite the distance between them. The piedmont is a relatively open northwest-southeast corridor along the base of the Zagros. Indeed it was part of the ancient "Achaemenian Highway," used by Persian kings and other travelers, and some intercourse along

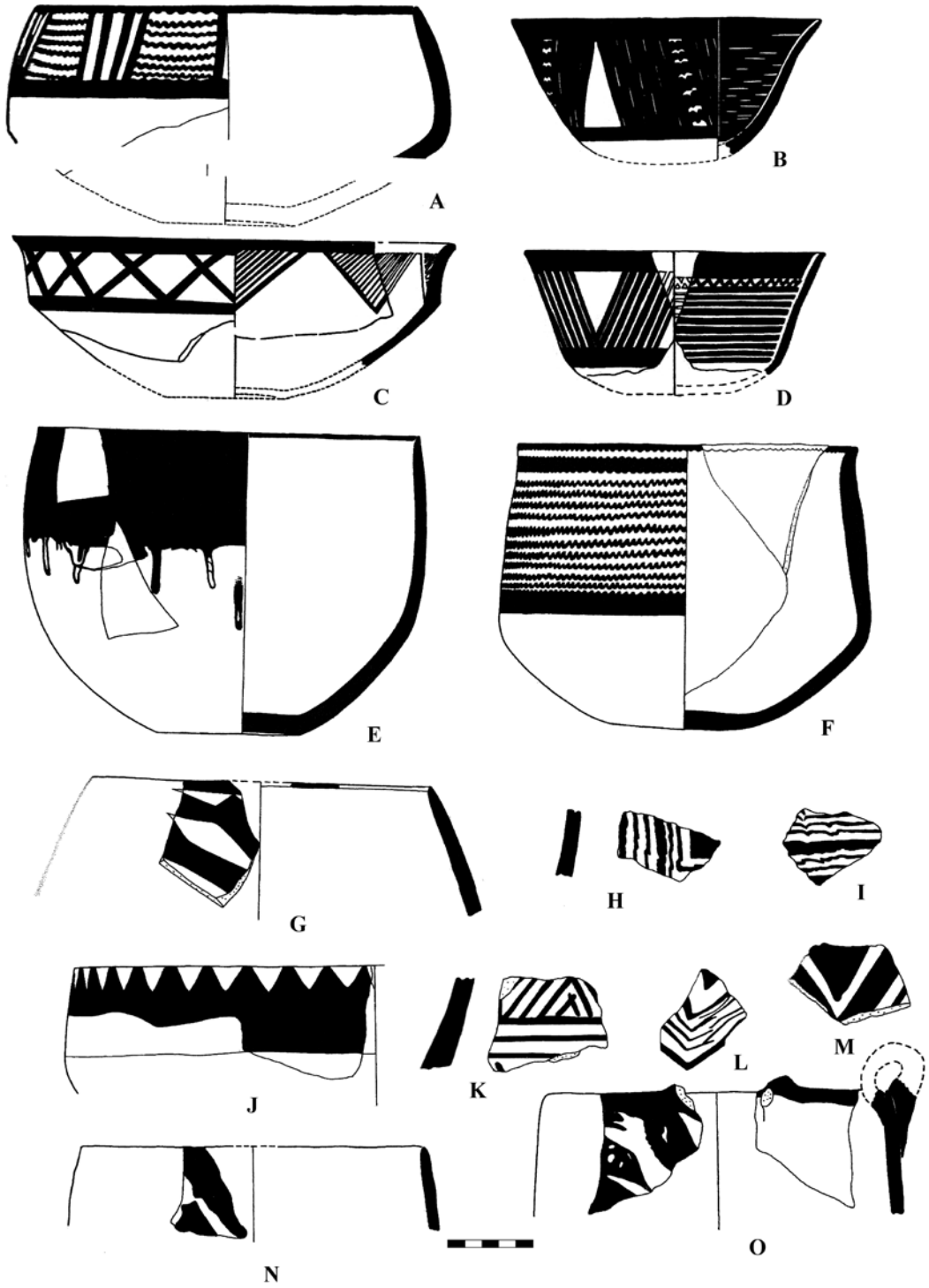

Figure 5. Examples of Susiana Ceramics (various scales) A, E–O Chogha Bonut :Figs. 24, 26, 28); B–D Chogha Mish (Delougaz/ Kantor 1996).

A, F Painted Burnished; B, D Close-Line; D Chogha Mami Transitional; E Broad Painted; G Red Slip; H, I Maroon-on-Red; J Black-on-Cream; K, L, M Maroon-on-Cream; N, O Smeared Ware.

the mountain front no doubt existed during the Neolithic as well. However, the long stretch of the "highway" from Susa to the pass via Ilam leading to the plateau is largely waterless, dry steppe. Westward from Susiana, only at Deh Luran and Mehran are there streams and large expanses of arable soil. While there are obvious parallels between Deh Luran and Susiana, they are not as strong with the next arable plain to the west, Mehran, where connections seem stronger with Mesopotamia (pers comm, Ardeshir Javanmardzadeh). The Zagros is

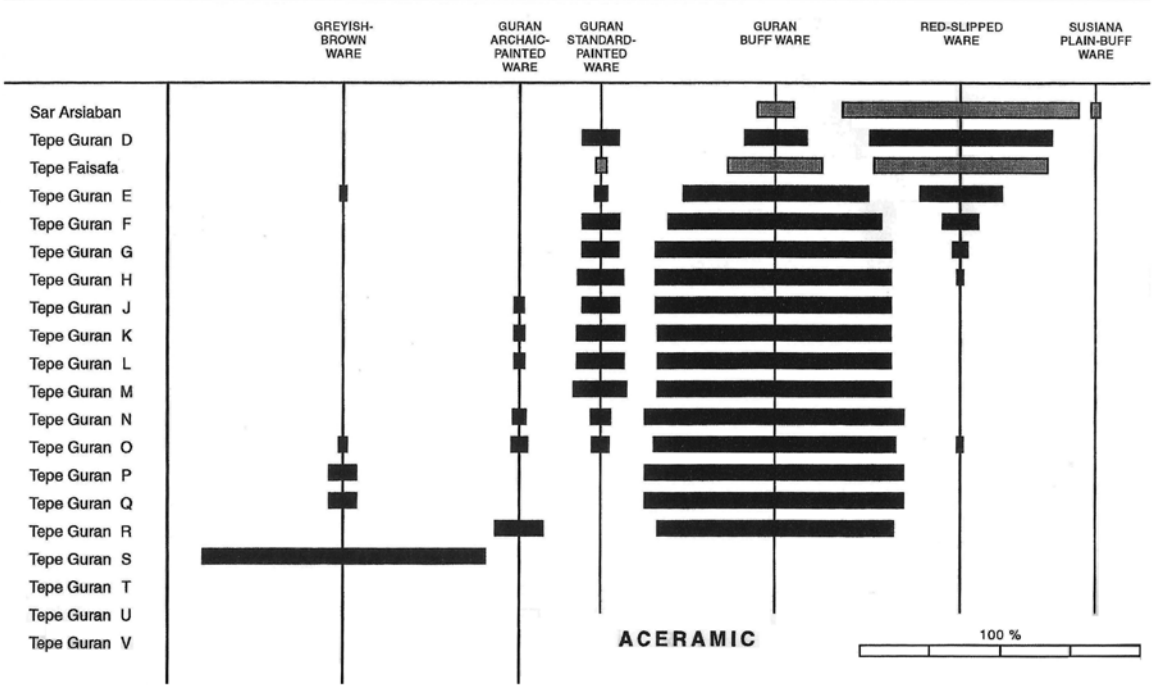

Figure 6. A seriation of Neolithic pottery at Tepe Guran (Mortensen 2014: Fig. 75).

a formidable mountain mass with few passes that make for easy travel, so in spite of the proximity of mountain valleys, they developed independently.

THE HULAIN PLAIN AND MAHIDASHT

The Hulailan Plain is a case in point. Situated in a straight line nearly 150 km northwest of Deh Luran, but with no pass to the piedmont through the formidable Kabir Kuh, it was unlikely to have had close interaction with the lowland sites. The small Hulailan Valley lies at an elevation of 900–1000 masl and is part of the headwaters of the Saimarreh River. With relatively little arable land and surrounded by mountains it is a "closed" environment.

The site of Tepe Guran provides the essential sequence (Mortensen 2014), although it is not subdivided into phases; rather ceramics are recorded by level (Fig. 5, 6). The sequence started somewhat earlier than at Ali Kosh/Chagha Sefid with a crude Greyish-Brown Ware. This was followed by Archaic Painted, a style very different from Jaffar Painted. The sequence continues with Buff Ware and Standard Painted, which is recognized in three successive styles: Jarmo Style, Guran Style and Sarab Style, none of which is similar to the painted vessels of Deh Luran. In fact, the closest parallels to Standard Painted are with Jarmo in Iraqi Kurdistan and Sarab in the higher valley of Kermanshah (Mahidasht); hence the naming of the styles. The wide geographic spread of these styles suggests an interaction zone extending roughly Northwest-Southeast along the valleys of the Zagros. Additionally there is Red-slipped Ware, which is confined to the latest levels of Guran (Fig.7).

Unfortunately the excavated sequence ends earlier in Hulailan than in Deh Luran and Susiana, but it can be followed in the Mahidasht where, based on surveys and small excavations, there is a Later Neolithic (Levine/McDonald 1977; Levine/Young 1987). This is found at Sarab and basal Siahbid and features "red-slipped burnished ware, sometimes painted with thickly applied white paint…and a black slipped ware with the same white paint" (Levine/Young 1987, 17). Surveys have also found "J Ware," which is attributed to a variant of Halaf. Some of these sherds bear white paint reminiscent of the Surkh White-on-Red of Chagha Sefid. The Mahidasht was something of a melting pot of interleaving ceramic cultures during the Middle Neolithic, with both J Ware and Dalma Painted occurring on sites (Levine/Young 1987; McDonald 1979). While the earlier ceramics suggest interaction along the Northwest-Southeast folds of the Zagros, similarities in the Late Neolithic are with the higher valleys to the east. The early sequence comes to a close with the appearance of Black-on-Buff, Ubaid-related ceramics.

KOR RIVER BASIN

A final example of Neolithic diversity is from the Kor River Basin (KRB), a relatively large, elongate system,

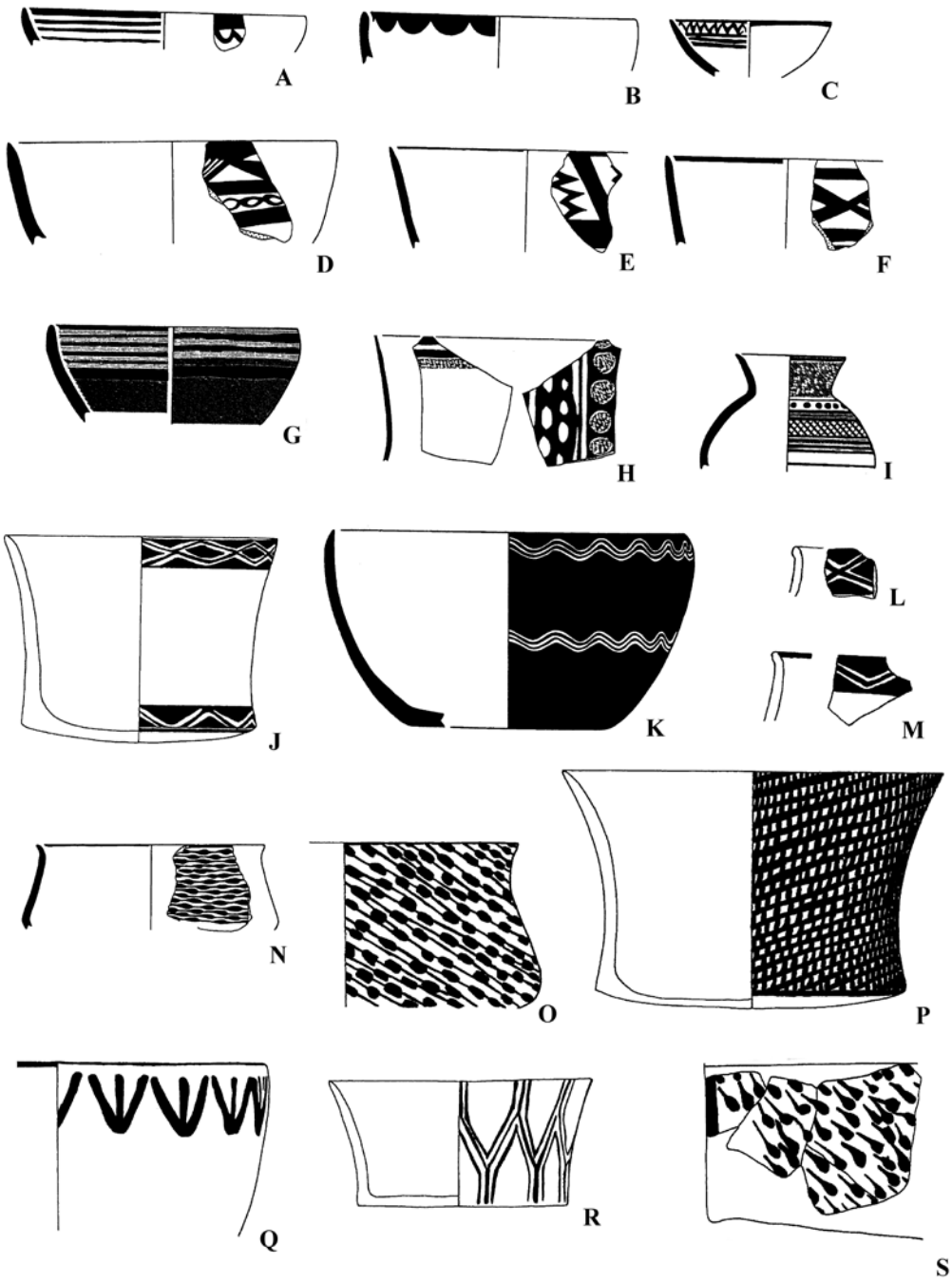

Figure 7. Examples of ceramics from Tepe Guran and sites in Mahidasht (variable scales) Mahidasht figures A–I, N from (Levine/Young 1987); figures K–S from Hulailan from (Mortensen 2014).

Mahidasht sites: A–C Black-on-Buff, Late Siahbid; D–F Black-on-Buff, Early Siahbid; G–I J-Ware; L, M, Sarab Style; K Late Neolithic; Tepe Guran: J Sarab Style; O, S Jarmo Style; P Guran Style; Q–R Archaic Painted.

the site of the Persian capital Persepolis, and traditional seasonal pasture for transhumant tribes. The valley is isolated from the locales previously discussed by the rugged Bakhtiari Mountains and distance.

Excavations at five sites provide the sequence: Mushki, Tol-e Bashi, Jari B, Kushk-e Hezar, and Bakun B1, while the latest phase, Shamsabad, is found at Jari A (Alden *et al.* 2004; Alizadeh 2006; Fukai/Horiuchi/Matsutani 1973; Nishiaki 2003; Pollock/Bernbeck/Abdi 2010; Hole/Flannery/Neely 1969). So far an early ceramic Neolithic has not been found, perhaps an indication that settlement had not yet advanced into this region; pottery may have arrived in a well-developed form. While there are stylistic changes, which denote

Phase	Types
Muskhi	Plain Coarse Ware, Painted Burnished, Red Slipped Ware, and Painted Buff Ware
Bashi	Coarse, Unpainted, Black-on-Red, Black-on-Buff, Red Burnished, Black-on-White Wash, Red-on-Buff, Black-and-Red-on Buff, and Red-on-Red. Any of these might be solely vegetable tempered or have some mineral temper
Jari	Coarser and Finer plain wares and Painted Buff Ware.
Hiatus	
Susiana 1	Standard grit tempered Plain, Standard grit tempered Painted, Red Washed
Bakun B2	"Completely different classes of pottery" (Alizadeh 2006:11)

Figure 8. Neolithic phases in the Kor River Basin sites: Jari B, Bashi, Jari A, Bakun B1.

two or three phases, depending on how the sequence is divided, the developmental consistency was built of "soft, crumbly, thick-walled, dark core" fabrics formed in a basket (Alden *et al.* 2004, 37; Alizadeh 2006). Despite the relatively low technical competence seen in the low-fired, coarse wares, there is considerable variety in the wares. These imply an innovative approach within the constraints of unsophisticated techniques of manufacture. In the reports, wares are defined by their color, surface treatment and whether painted or not (Fig. 8 and Fig. 9).

Designs that occur in the KRB seem to reflect indigenous development, for already in the Mushki Phase there are design elements that appear to be likely antecedents to the Bashi Phase and these segue into the Jari designs, albeit with a reduced number of design elements and wares. Pollock and Bernbeck refer to the obvious standardization of designs within the region as a case of people favoring sameness over innovation. This comment seems apt despite the proliferation of ware variants during the Bashi Phase. As in the other regions, the local developments were replaced by variants of Black-on-Buff wares, known as Bakun B2 (Alizadeh 2006, 11).

DIVERSITY

This brief overview of the Ceramic Neolithic in Western Iran reveals striking regional differences in the use of designs on pottery. In some regions, styles change rapidly and there is greater variability in the wares, while conversely, there is a slow pace of change and greater internal consistency in others. In some regions there is a compulsive obsession with careful rendering of paint in repetitive ways, while in others there appears to be a disregard of such norms.

WHY DID A CREATIVE BURST TAKE PLACE?

Although clay had been formed, used and fired for perhaps tens of thousands of years in the form of figurines, containers and fire pits, the first use that may have presaged pottery is bins for storage. An example is the site of Ganj Dareh where a fire destroyed the settlement, baking in place clay bins (Smith/Crepeau 1983). Similar accidents may have occurred repeatedly before people recognized that clay could be formed and fired into useful objects. Once the quality of fired clay was recognized –perhaps many times across the Near East– it was adopted for limited uses. In Iran (but not Mesopotamia) primitive pottery was not durable, but could hold liquid and may have been adopted for that purpose. Once the advantages of the new technology were recognized, its uses grew and containers for different purposes emerged. Not the least is the use of pots for cooking and storing liquids, which must have had an important effect on food preparation and storage.

Manufacture of pots was most likely a purely domestic activity by groups of people in a settlement sharing techniques. Experimentation led to making pots with different surface treatments and shapes to serve different purposes. For example, pots for cooking required careful tempering to ensure that they would endure the fire, and such pots could be burnished or slipped to reduce their porosity. Vessels for serving food, either dry or moist, could be made for individual use and decorated for identification or display. With the idea that clay was malleable and adaptable to a range of tasks, the way was open to exploit this variability. Over a few hundred years we see that local potters created variety within the constraints of their limited knowledge of tempering, firing and slipping, and the products generally became more durable and the decorations more elaborate.

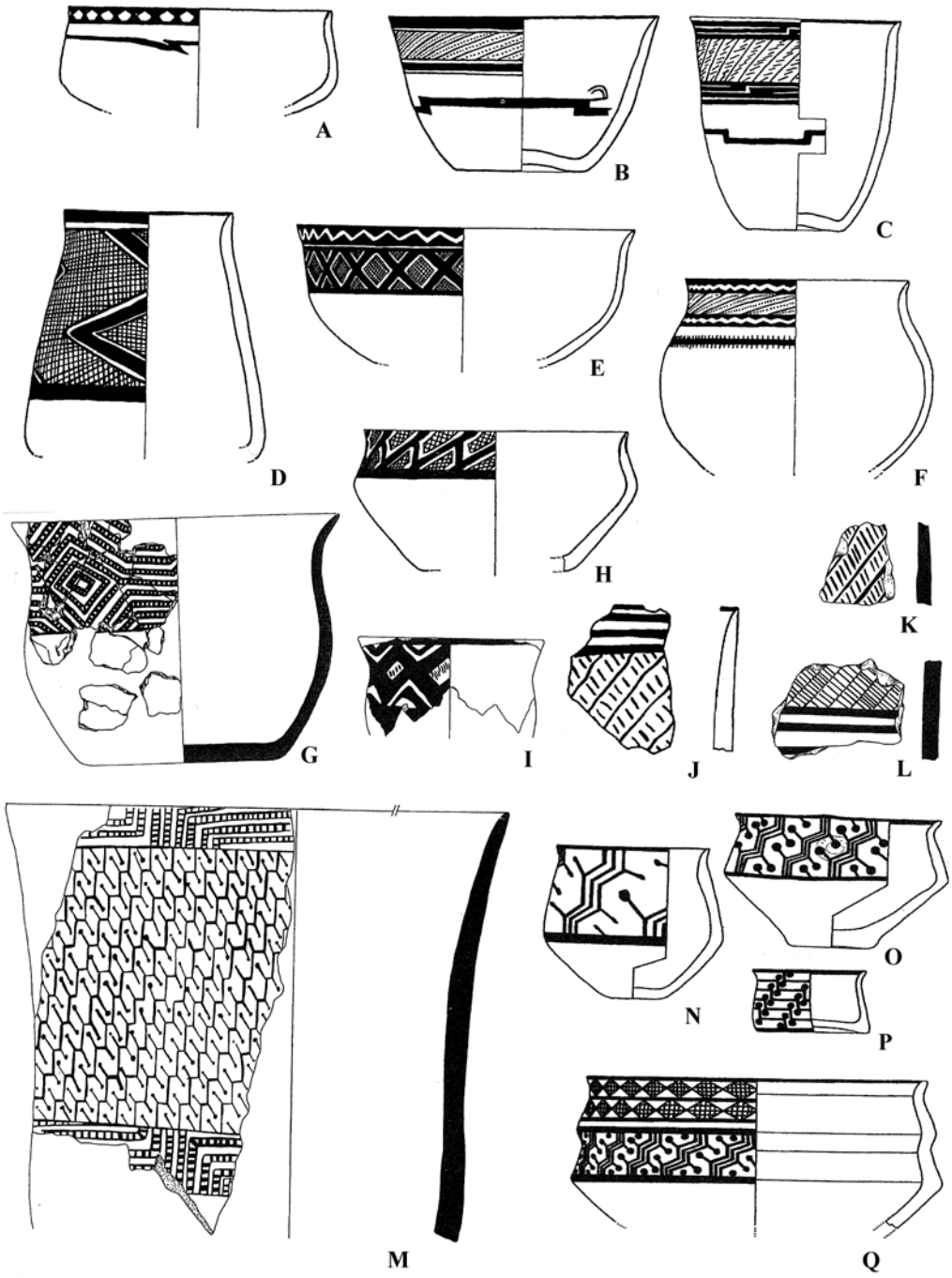

Figure 9. Examples of ceramics from the Kor River Basin (variable scales).

Mushki illustrations from (Fukai/Horiuchi/Matsutani 1973: Figs. 3–6), (Maeda 1986), Jari B (Hori/Maeda 1984), and H, I, K–M Tol-e Bashi (Pollock/Bernbeck/Abdi 2010) A–I examples of Jari Phase ceramics; J–Q examples of Mushki Phase ceramics.

WHY WERE SOME REGIONS MORE CREATIVE THAN OTHERS?

As Mallowan remarked, the topography of Iran results in many relatively isolated enclaves. In a sense these are "closed" as opposed to the openness of northern Mesopotamia. Whether a region is open or closed is difficult to assess *a priori*, for these conditions depend not only on geography, but also on modes of economy–for example year-round agriculture in a rich environment, versus seasonal transhumance of all or part of the settlement. It may also depend on whether a site or region has routes that can facilitate trade and travel, and whether needed resources are

available locally. Rivers, suitable soil, precipitation, sources of fuel, and other resources, can also affect self-sufficiency of settlements. While we cannot know such things directly, we can gain some appreciation for what they may have been from carefully charting the way ceramics develop and change. Creativity occurs in a milieu of curiosity, accident and experimentation, and it can take place when it is not discouraged. Both the experimentation with pottery and quality of painting changed with the later Neolithic as its utilitarian novelty faded and specialists came to dominate production of the decorated wares.

DID CREATIVITY CEASE AROUND 5500 BC?

During the 500 years of the early and middle Neolithic, populations and settlements grew rapidly on an agricultural base. New techniques for making pottery emerged, including the use of a tournette, molding methods for forming pots, the introduction of mineral temper, and firing temperatures that exceeded those of earlier stages. All of these allowed for greater standardization and exploitation of the utilitarian qualities of pottery. There also emerged individuals who were specialists in the painting of pots, and many of these adopted distinctive styles. The emergence of much wider regional similarities is a sign of both population increase and greater connections between regions. Thus creativity did not "cease," but its nature changed. In the Late Neolithic, innovation was in the qualities of the vessels and the specialized array of forms for diverse purposes. From this time onward there are suggestions of specialist production along with continued domestic production in the households. For example, in Deh Luran this is manifest in the continued uses of red slipped and burnished wares. The continuity during the Neolithic was broken with the intrusion of Ubaid-related wares, which had little in common with their predecessors. In many regions this is denoted by a break in the sequences.

CONCLUDING REMARKS

The introduction and spread of pottery occurred at roughly the same time across the Near East. Like the introduction of any new technology, which opened previously unexplored or unattainable avenues, it lent itself to innovation. Just in western Iran, what at first were simple containers, developed into those with special functions such as cooking and storage of wet or dry material. Individuality began to be expressed through the use of colored slips and painted designs. During the earlier phases of the Neolithic, populations were relatively sparse and concentrated in enclaves separated from one another so that interregional exchanges were limited. By the later Neolithic, as the landscape filled with settlements and routes of movement and trade had become established, the exchange of techniques and designs became more frequent, providing new sources for innovation through syncretism. In the Later Neolithic, specialists came to dominate the productions of wares for service and display, further eroding the strictly regional characteristics.

We can now imagine that there were two sets of "Centuries of Creativity."

The first, lasting some 500, years saw experimentation in wares produced by local households. The second set is the Late Neolithic, expressed in very different ways across the Near East, but characterized by specialist production and the effacing of local traditions. While household production remained for some wares, those for display and special functions were created by a limited number of trained artisans. The Ceramic Neolithic thus encompasses two kinds of dynamism: the first, local settlement-centered innovation that characterizes defined regions; the second, multi-settlement entrepreneurial craft specialization, reflecting widening social-economic horizons across regions.

BIBLIOGRAPHY

ALDEN, J. R. *et al.* 2004, Kushk-e Hezar: a Mushki/Jari period site in the Kur river basin, Fars, Iran, *Iran* 42, 25–45.

ALIZADEH, A. 2003, *Chogha Mish II*. *Oriental Institute Publications*, Chicago, University of Chicago.

ALIZADEH, A. 2004, *Excavations at the Prehistoric Mound of Chogha Bonut, Khuzestan, Iran, Seasons 1976/77, 1977/78, and 1996*, Chicago, The Oriental Institute of the University of Chicago.

ALIZADEH, A. 2006, *Excavations at Tall-e Bakun A. Seasons of 1932 and 1937. The Origins of State Organizations*, Chicago, The Oriental Institute.

DELOUGAZ, P., KANTOR, H. 1996, *Chogha Mish Volume I: The First Five Seasons of Excavations*, Chicago, University of Chicago Press.

FUKAI, S. S., HORIUCHI, K. MATSUTANI, T. 1973, *Marv Dasht, vol. III. The Excavations of Tall-i Mushki, 1965*, Tokyo, The Institute of Oriental Culture.

HOLE, F. 1974, Tepe Tula'i, an early campsite in Khuzistan, Iran, *Paléorient* 2, 219–242.

HOLE, F. 1977, *Studies in the Archaeological History of the Deh Luran Plain*. *Memoir, Museum of Anthropology*,

Ann Arbor, MI, University of Michigan.

HOLE, F., FLANNERY, K. V., NEELY, J. A. 1969, *Prehistory and Human Ecology of the Deh Luran Plain*, Ann Arbor, MI, University of Michigan.

HORI, A., MAEDA, A. 1984, Prehistoric cultures in the Marv Dasht Plain, Iran, *Orient-Express* 27, 1, 54–75.

LEVINE, L. D., MCDONALD, M. M. A. 1977, The Neolithic and Chalcolithic Periods in the Mahidasht, *Iran* 15, 39–50.

LEVINE, L. D., YOUNG, T. C., JR. 1987. A summary of the ceramic assemblages of the Central Western Zagros from the Middle Neolithic to the late Third Millennium B. C., *in* Huot, J.-L. (ed) *Préhistoire de la Mésopotamie*, Paris, Éditions du CNRS, 15–53.

MAEDA, A. 1986, A study on the painted pottery from Tape Djari B, *Bulletin of the Ancient Orient Museum* 8, 55–86.

MALLOWAN, M. E. L. 1954, *Early Mesopotamia and Iran*, London, Thames and Hudson Ltd.

MCDONALD, M. M. A. 1979, *An Examination of Mid-Holocene Settlement Patterns in the Central Zagros Region of Western Iran*. *Anthropology*, Toronto, University of Toronto.

MORTENSEN, P. 2014, *Excavations at Tepe Guran: The Neolithic Period*, Leuven-Paris-Walpole, MA, Peeters.

NISHIAKI, Y. 2003, *Catalog of Archaeological materials in the Department of Archaeology of Western Asia, Part 6: Prehistoric Pottery From the Marv Dasht Plain, Iran*, Tokyo, The University Museum, The University of Tokyo.

POLLOCK, S., BERNBECK, R., ABDI, K. 2010, *The 2003 Excavations at Tol-e Bassi*, Iran, Social Life in a Neolithic Village, Archäeologie in Iran und Turan 10, Verlag Philipp von Zabern, Mainz.

SMITH, P. E. L., CREPAU, R. 1983, Fabrication experimentale de repliqes d'un vase néolithique du site de Ganj Dareh, *Paléorient* 9/2, 55–62.

WRIGHT, H. T. 1981, *An Early Town on the Deh Luran Plain. Excavations at Tepe Farukhabad*, Ann Arbor, University of Michigan.

Anna Gómez-Bach, Jörg Becker and Miquel Molist (ed),
II Workshop on Late Neolithic Ceramics in Ancient Mesopotamia: pottery in context,
Monografies del MAC 1, Barcelona 2018,
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WHY POTS EAT THEIR MOTHER? A GENERAL OVERVIEW ON THE NEAR EASTERN LATE NEOLITHIC ANTHROPOMORPHIC POTTERY

Catherine Breniquet*, Béatrice Robert**

En este artículo se presentan los recipientes cerámicos antropomórficos del Pròximo Oriente, si bien escassos y de Europoa, donde los ejemplos son más numerosos y abundantes. Se propone una tipología formal de seis categories dónde se discuten algunas de las cuestiones relativas como las predominantes formas femeninas, su decoración,usos y significado.

Recipientes antropomórficos, Oriente Medio, Europa, Neolítico.

Anthropomorphic vessels from the Near East and the European Late Neolithic are presented in this paper. In the first case, the vases are scarce. They are more numerous in the second area. A formal typology structured in six categories is proposed. We discuss also issues relating to the predominantly female form of the containers, their decoration, their uses and their meaning.

Anthropomorphic vases, Near East, Europe, Neolithic.

INTRODUCTION

Our paper concerns anthropomorphic vases from the Late Neolithic of the Near East. This category of vessels is quite uncommon in this context and has received very little attention from the scholars. On the contrary, zoomorphic vases are better known (Robert/Daverat 2016 and 2017), probably because they remain in use during historical periods as rhytons. We took the opportunity offered by this conference to have a new look on these productions. We define anthropomorphic vases as human shaped pots and we will not be concerned by the anthropomorphic painted decoration they have.

Since the beginning of the 20th century, our knowledge of the late Neolithic cultures increases. Well after Gordon Childe proposed the term “Revolution”, we understood that the introduction of the different characteristics of the Neolithic was progressive; the last one around 6500 BCE is pottery. Several distinct painted traditions rose after the emergence of pottery technology in different places: northern Syria, Mesopotamia, Anatolia, Iran (Mellaart 1981; and for an up-to-date perspective: Nieuwenhuyse *et al*., 2013).

Anthropomorphic vessels appear in the Near East when the technical skill of making pottery is at a good level. Initial ceramic productions are figurines, miniature vases and soon after, ceramic starts to have a domestic use as vessels for storage, cooking and so on. As far as we know, anthropomorphic vases come all after these first steps, from Late Neolithic and Chalcolithic contexts, when pottery starts being painted. Most of them belong to the 5th millennium. The same phenomenon appears in Europe, where anthropomorphic vessels are, however, more numerous. Although the anthropomorphic pots

* Pr. Université Clermont-Auvergne, EA 1001 CHEC, UFR LCSH, 29 boulevard Gergovia, 63000 Clermont-Ferrand, França. catherine.breniquet@uca.fr
**Associated researcher, Laboratoire TRACES Toulouse – UMR 5608, Equipe Préhistoire Récente du Bassin Méditerranéen, Université Toulouse – Jean Jaurès, 31058, 5 Allée Antonio Machado, 31100 Toulouse, França. bealithic@yahoo.fr

are very uncommon, none of them are made of coarse ware. They all present fine clays and have specific painted and incised decorations, or both. Their quantities are much smaller than those of other types, mostly cooking-pots, hole-mouth pots, storage jars, etc. As they are very few in the Near East, it is hard to link them with any regional style's variation. This first observation leads us to think that we are facing a specific production, probably not connected with daily life, but with specific uses. The following points will be surveyed: historiographical background and definition, anthropomorphic vessels from the Near East and Europe, and interpretation.

The first anthropomorphic vases were discovered at the beginnings of the 20th century when the excavators of Troy brought to light several amazing pots from the Bronze Age. Some of them are composite: a round shaped jar for the body and a cup, apparently put upside-down for the head. Some others are in shape of a character with body details. These astonishing discoveries received a wide audience at that time by the media. The Troy discoveries were also the starting point of some popular diffusionist theories and played an unwitting role in some well-known forgeries such the Glozel affair (Adam 1988, fig. 6, p. 77). Despite these aspects, which remain marginal to us here, a quick look at the available literature shows that the problem received very little attention from the Near Eastern archaeologists until now (with the exception of Schwarzberg 2006). On the contrary, anthropomorphic vessels from Europe are better documented (see for instance: Chirica 1995; Dumitru/Boghian 2012; Mantu 1991, 1993; Monah 2016; Naumov 2006, 2008, 2010; Virag 2000).

The first question assigned to the material concerns the definition: what is an anthropomorphic vase? A common idea today invented by ethnologists is that any pot has an anthropomorphic dimension (David/Sterner/Gavua 1988, 365-366). According to Marcel Mauss, for instance in his famous handbook of field ethnography: «Very often, the pot has a soul, the pot is a person » (Mauss 1967, 46)[1]. This seems to be confirmed by the vocabulary we still use for describing pots, even in our modern societies. Pots have a foot (for base), a body, a neck, lips and so. The general shape of a pot could of course remind the female attitude, angry, arms on the hips… in a universal analogy… suggesting that pot is female. However, the analogy is probably not based on this general observation. Making a general statement by inferring from specific cases is probably excessive. Mauss didn't bring a lot of information about the pots which are concerned, nor of the geographical area of where the observations came from. Shall we consider any pot as an anthropomorphic one? And if so, why some of them only have a clear human shape? In order to solve the issue, we must have an overview of our sample.

Focusing now on the ancient Near East, we must make a quick statement of the corpus. Four main categories, rather than types, can be distinguished:

- **Type 1:** Round bowl in shape of a human head, found only in Anatolia.

- Type 2: Round open pot in shape of human body, found only in Anatolia.

- Type 3: Globular jar in shape of a complete human body, from Anatolia and Mesopotamia. This third category can be divided in sub-types.

- Type 4: Small vase in shape of a personage, from Mesopotamia and Anatolia.

All of these vases are hand-made with care. We shall see below that they exist also in Europe. This typology remains quite unperfected as some Near Eastern types are represented by a unique specimen. On the contrary, the excavations at Hacilar brought to light several specimens, belonging to different types. We are also mostly dealing with sherds and not complete vessels. For instance, the female sherd from Sawwan (Breniquet 1992, fig. M, here: fig. 3, type 3a) may fall into several categories: 2, 3 or 4. Also, two different categories could be connected together, for instance globular pot and bowl, as in the Trojan examples. And, last, some shapes could be intermediate between two categories. The geographical distribution of each type and of all the types together is also a major issue and is probably not representative. Near Eastern anthropomorphic vessels seem to belong to the northern Mesopotamian and Anatolian ceramic traditions (Fig. 1). But, nothing is known about the adjacent areas.

Generally speaking, most of these vessels are jars or bowls. The details making them anthropomorphic are the contour of the human face and the general shape of the human anatomy. Decorations are made with paint, incisions or appliqué. Most of them seem to have a female body. None seems truly male.

GROUPS AND TYPES

Our first group comes from Late Neolithic or beginning of Chalcolithic in Anatolia, from the two well-known sites: Çatal Höyük and Hacilar (Fig. 2. Type 1). The vases are open bowls or cups, in the shape of a human

1. « Très souvent, le pot a une âme, le pot est une personne ».

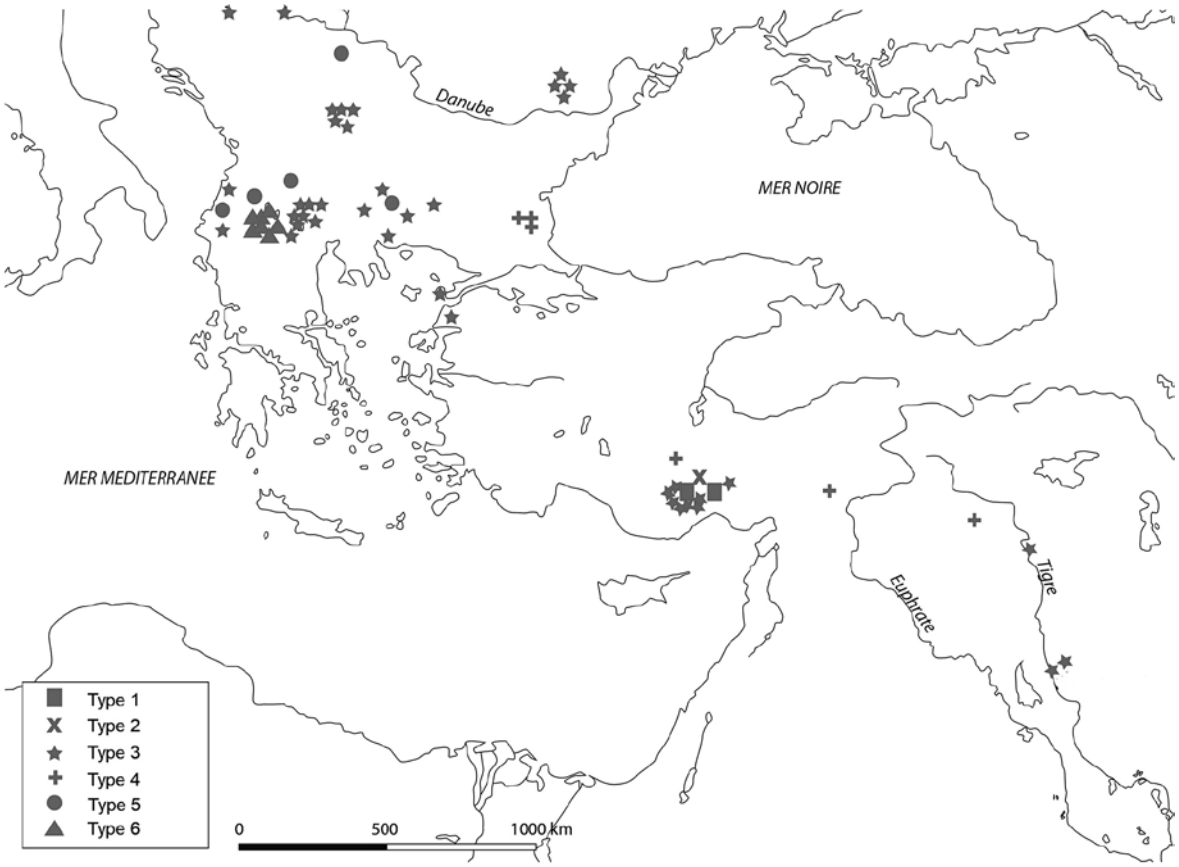


Figure 1. Distribution of anthropomorphic vessels (DAO B. Robert).

head. This peculiar shape allows us to think that these pots could have been used upside down, as lid and as bowl (an even suspended, as some lugs exist on the Hacilar specimen). They all came from domestic contexts: houses, pits and burnt house. The Hacilar specimen was found wrapped in a fine fabric. As far as we know, these productions are specific to Anatolia, but remain different from each other. This type is not homogeneous.

The Çatal Höyük bowl has an incised and modeled decoration: a face with closed eyes, nose in relief, closed mouth and dimples. On the preserved side, two eyes and an incised decoration in shape of horns, suggesting that of a *bucranium*, are represented. The pot is broken but the design seems to be symmetrical. It is amazing to observe that the horns come back to the forehead making eyebrows or hairs. From a wider point of view, this depiction makes sense regarding the wall decoration of the site, with a specific combination of human and animals.

The Hacilar cup has an elongated neck with lugs, the face is modeled and incised, but eyes are open and eyebrows are suggested. A specific design in very low relief suggests hairdressing and another larger lug on the back could be a grip or handle, in shape of a bun, as Mellaart suggested. The depiction is close to the Hacilar figurines' style.

It is hard to assign a gender to these depictions. The Çatal Höyük bowl, with its round cheeks and pout, is realistic and could refer to a baby face. The second, more schematic, is more probably female or ungendered.

Our second group is represented by a unique hole-mouth pot with human arms in relief on both sides of the pot, coming from Hacilar, once again, level VI. The complete pot is a human body. The shape is common but the arms are not. Their attitude could refer to the female depictions, arms coming under the breasts which is usual for the figurines, but it remains unclear as no other detail is added. It is difficult to assign a gender to this depiction with a good degree of certitude (Fig. 2, Type 2).

Our third group is the most complete one (Fig. 2, Type 3). Three sub-types can be distinguished.

3A: COMPLETE HUMAN SHAPE

The whole pot has a human anatomy: face appears on the vase's neck, with ears, eyes, nose and mouth is hardly suggested. This type is mostly Anatolian. Some

TYPE	DESCRIPTION	NEAR EAST	EUROPE
1	Bowl, drinking cup (head)	Çatal Höyük  Hacilar VI 	Vinça culture Durankulak 
2	Pot (body)	Hacilar VI 	Ludwigshafen Slippengen 
3	3a Complet jar (head on neck, Arms up or joined, breasts)	Hacilar I Sawwan III? 	Erfurt Gorzsa Ulucak Svodina Marz Kazanlak 
	3b Jar (face on neck, no arm?)	Samarra culture 	Amzabegovo Vinça Bekasmegyer Cavdar Gradesnica 
	3c Twinn head jar	Hacilar 	

Figure 2. Anthropomorphic pottery belonging to Type 1: round bowl in shape of a human head.
Çatal Höyük: After Hodder 2006, 198, fig. 141 and 2007, 77, fig. 40; from space 279, area 4040, niv. V-VI. The sherds were scattered in several pits.
Hacilar: After Mellaart 1960, fig. 27.
Vinça: After Villes/Luci 2015, 48, fig. 24. See also Boghian 2010, 19-20, fig. V 13-14 and V.

specimens have inlay eyes with obsidian. Arms come under the breasts or are suggested by decoration. Decoration is mostly painted with red-brown geometric designs, even on the face. They could refer to tattoos, clothes, jewelry or ornaments, but can also recall painted ware's style. With the general shape with breasts and preeminent belly suggesting pregnancy, these vases seem to have the typical characteristics of the female body.

3B: JAR WITH HUMAN FACE

The 3b sub-type is close to our 3a group. However, it is a typically Mesopotamian production (Hassuna-Samarra period). All specimens are broken but they seem to have a round body with a human face on the neck. Eyes, in relief, are systematically closed, in shape of coffee beans (*pastillé* technique), recalling the ophidian figurines from the Ubaid culture. Black geometric decoration could represent anatomic details (eyebrows, eyelashes, could be hair and tattoos as well). They also remind the usual stylistic patterns found on contemporary wares. The depiction of the face doesn't seem to be male but as all the examples are broken, no other anatomic detail can be observed.

3C: DOUBLE FEMALE BODY JAR

Sub-type 3c is a jar with a double female body, specific to the Anatolian area. The upper part is twinned, with double necks and faces but the lower part, from the shoulder to the legs, is common to both of them. Obsidian eyes and geometric painted decoration suggests the different parts of the body typical of the Hacilar specimens rather than clothes. Arms are represented coming under the breasts once again, in the usual attitude. This sub-type is clearly female. The specimen from Hacilar recalls the double figurines from the Neolithic PPNB: stone figurine from Çatal Höyük, or lime plastered sculptures in the round from Aïn Ghazal. Due to the specific shape, double neck for a single body, one can wonder if the so typical Ubaidian double neck jars from Northern Mesopotamia are not anthropomorphic too.

Our last group, number 4, is mainly Halaf (Fig. 3, Type 4). Vessels are in shape of a complete human body, with or without a head. They evocate a figurine but are true vessels (« flower vase »). Anatomic details such as breasts, arms or hair, are clearly depicted with paint. Sexual attributes are highlighted, mixed with the depiction of the legs in one case. Body ornaments such as jewelry or leg ornaments, or body paintings are present. Clearly, these vases are female.

The Neolithic reaches Europe from Anatolia (Demoule 1993 and 2007, 85; Özdoğan 2011). Two main ways are identified: one is the northern way, the Danubian, the other is the maritime way, the Cardial. They gave birth to original cultures depending on the areas, with specific pottery, which received various names. If we have a look on the European Neolithic, in the Balkans area, we must conclude that anthropomorphic vases are much more numerous than in the Near East. Their quantity increases with the time, but remains smaller than any other ceramic production. As far as we know, the anthropomorphic European vases are connected to the north way coming from the Near East rather than the Cardial one.

We can then add two more types to our typology:

- Type 5: with only the lower part of the body, i.e. legs,

- Type 6: in shape of a house and hearth.

Our other first four types remain slightly unchanged and are represented too with a high percentage. The only type which is typical to the Near East is the twin jar. Generally speaking, these European Neolithic vases could have an incised or painted or relief decoration, which makes sense with the decoration found on painted vessels, houses, figurines, etc. The most common type (our first category) is a jar with a round body. The neck receives the depiction of the face, frequently limited to joined eyebrows and nose. The body receives geometric painted motives, rather than in relief. Some other anatomic details of the face are sometimes present, such as the mouth and some scarifications' like painted decoration appearing on the cheeks. Jars are with or without an anthropomorphic head cup. The lack of the cup could be explained with the circumstances of the discoveries (old excavations, broken pieces, etc.). In some other cases, the vessels receive a special shape with modeled arms in an upward position, often called « worship position ». Judging from the breasts, these vases could be female. Two pouring jars from Ludwigshafen and Slippingen can be assigned to our type 2. They are clearly female.

A special mention should be added considering bowls from the Vinça culture: they are usually described as zoomorphic, in shape of a cat's head (Villes/Luci 2015, 48). That is true only regarding the ears of one, not for all, and that the face is always human. We would suggest that they are in fact hybrids, an in-between human and animal (Bànffy 2001). We must notice too that some vessels are intermediate between figurines and anthropomorphic vases as they depict a woman holding a small vessel in her hands or on her head (Cohen 2003, 163). These depictions are quite uncommon and represent a kind of self-depiction (*mise en abyme* in French).

Let us come to our Type 5 (Fig. 3, Type 5). This type is amazing and mixed. With the painted decoration and/or

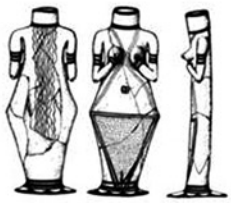
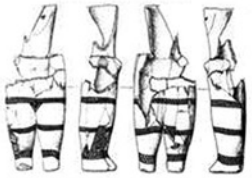
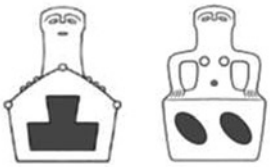
TYPE	DESCRIPTION	NEAR EAST	EUROPE
4	Personaje	Yarim Tepe II  Domuztepe 	Sultana Novi Becej Troy Scinteia Maroslele   
5	Bowls (legs)		Smilcic Vrsnik Drenovac Amzabegov  
6	House	Toptepe 	Macedonia, Albania 

Figure 3. Anthropomorphic pottery belonging to Type 2: round open pot in shape of human body. Hacilar VI: After Mellaart 1961, p. 68, fig. 27. Ludwigshafen and Slippingen: After Schlichtherle 2015, 13, fig. 5.

the general shape, we can admit the anthropomorphic parallel. The positions are varied: standing, kneeling or even sitting. The example from Drenovač is in fact a visual game in 3D: a contraction of the human (female) body as the nose seems to appear very close to the waist, without any other detail of the face (Cohen 2003, 133). Moreover, the knees are in relief and seem to play also the role of the breasts. No Near Eastern counterpart exists.

Our type 6 is the most astonishing: the figurine-house models, more or less all from Macedonia (Fig. 3, Type 6). They combine a female body (upper part from the waist, or just the head) linked with a round, cubic or parallelepiped shape which makes the lower part of the object. A building (probably more a granary than a house) is sometimes clearly depicted with its saddleback roof. Sometimes, holes suggest that the lower part could be used as incense burner (Naumov 2006, 2013). A unique example from Toptepe is an intermediate type between our types 4 and 6 (Özdoğan 2003). Its squared shape with four bases suggests that a kind of granary or storage vessel is depicted here and that it must be separated from our type 4. On these examples, the human body is clearly a female one, often eyes closed, jewels (necklaces, bracelets). In another case, the body has a clear prominent belly, which suggests pregnancy.

Which kind of conclusions can we draw from this survey? It seems clear that the anthropomorphic vases appear late in the neolithization process, and well after the introduction of ceramic. Their shapes (bowl, jar, house…) are variable regarding to the different areas checked. They are enriched constantly with human details (arms for instance) or houses details, with decorations too, incised, painted or both. Sometimes, bowl and jar could be associated; merging the parts of human anatomy they represent (body and head). However, they appear everywhere in small quantities regarding to the other types of vessels.

Several questions arise, concerning the following points:

- Their shape is usually a round bowl or pot. Elaborated examples come from the Bronze Age, but houses are typically European. It is hard to clearly define their degree of anthropomorphism, especially regarding to the rest of the ceramic production. Generally speaking, pots are thought in terms of a human body, the female one. No true male depiction is known, nor for the Near East, neither for Europe. We already noticed that words used for describing a pot, even used by the specialists, have a link with the human body. The hollow shape of a vessel or a building, whatever it is, easily recalls a pregnant body or at least a womb (Eliade 1959, 115-116; Héritier 2012a, 262 and 2012b, 19; Naumov 2006). This analogy is almost universal. We can also add that the creation process is linked with the use of clay in the Near East. However, we do not know if this analogy works also for basketry work or stone vases…

- The decoration they have may be incised, painted or both, sometimes with additional elements such as obsidian eyes. These decorations could only be a cultural style, but could also be related to clothes or body paintings, tattoos, etc. (Boghian 2010). From our point of view, there is little to gain from this immediate perception. It has been convincingly argued that the semantic signification of the object (Boghian 2009) contains several parts. The human body is encoded with “signs”, between style, aesthetics and shape (volume and details such as arms). In most cases, the vases remind the contemporary figurines, between simplification and complexity. Art is much more a communication system than the depiction of the real world. These vases are an abstraction.

- Their production. The production process of these vases both Near Eastern and European received no attention. As pots, we can conclude that they were made by potters or specialists, in domestic or specialized contexts, depending on the cultures. All of them are hand-modeled. But, as anthropomorphic vessels, we know nothing about the link between the object and the producer. Who was devoted to the production of such objects and if so, which kind of relations should we imagine about self-depiction?

- Their uses. In many cases, especially for old excavations, the contexts of the vessels are unclear. But, when they are known, the vases come from rubbish pits as well as from domestic areas inside the houses. In Europe, some pots seem to be funerary urns. With their anthropomorphic cover in shape of a cup, jars can be used in special occasions such as banquets or “rituals” involving drinking. In other words, these vases were possibly connected with specific uses, which are not daily-life uses. This fact could explain why they are not numerous in the settlements.

- Their signification. It is clear that they conveyed particular ideas related to essential principles and believes of the Neolithic communities. But we are far from understanding what is really involved. We would stress here some of the hypotheses usually used by the archaeologists. As the analogy with a female body is accurate in most cases, it is tempting for some scholars to correlate these vases with some ritual purposes related to the cult of a female deity, Great Mother, Mother Goddess (Boghian 2012; Cohen 2003, 122-149 and 151-154; Demoule 2007, 89-90; Gimbutas 1974). Some of them refer to it as a universal symbol or as a symbol of the prehistoric matriarchy. No evidence of it exists and matriarchy appears to be much more a modern myth rather than a prehistoric one.

REMARKS

Anthropomorphic vases could be a universal phenomenon in relation with the perception of the female body. However, they seem to be correlated with specific uses far from our understanding. We would suggest here to follow also a slightly different perspective. This phenomenon appears when Neolithic societies are well developed, that is to say, when the complete process of neolithization is finished and gave birth to a new social order linked with the agricultural process and a new social organization for the family with new relations between people. In other words, we are facing with a symbolic construction historically dated, reconciling anthropological and historical points of view. These vessels line the spread of the Neolithic progression from the Near East to Europe. They are probably part of the Neolithic complexity. In the Near East, this complexity developed, and followed another way and other forms of societies appeared. However, it doesn't mean that the symbolism disappeared: during the historical periods children were very often buried in a jar or in a sherd. They seem to be put back in their mother's belly.

REFERENCES

ABU ES-SOOF, B. 1968,Tell es-Sawwan. Excavations of the Fourth Season's (Spring 1967), Sumer 24: 3-15.

ADAM, J.-P. 1988, *Le passé recomposé. Chroniques d'archéologie fantasque*, Paris, Seuil.

BÁNFFY, E. 2001, Notes on the Connection Between Human and Zoomorphic Representations in the Neolithic, in Niehl P. and Bertemes F. (eds.), *The Archaeology of Cult and Religion*, Archaelingua, Budapest, 53-71.

BOGHIAN, D. 2009, Gestualité et sémantique dans la plastique anthropomorphe de la culture pré-Cucuteni. Entre tradition et innovation, in Cotiugă V., Tencariu F.A. and Bodi, G. (eds.), *Itinera in praehistoria. Studia in homonrem magistrati Nicolae Ursulescu*, Iasi, Editura Universitatii, 61-80.

BOGHIAN, D. 2010, Les marquages corporels chez les communautés néolithiques et énéolithiques carpato-danubiennes, *Codrul Cosminului* XVI-1, 5-20.

BOGHIAN, D. 2012, Unele considertii asupra vaselor cucuteniene antropomorfe şi antropomorfizate, *Arheologia Moldovei* XXXV, 107–136.

BRENIQUET, C. 1992, Rapport sur deux campagnes de fouilles à Tell es-Sawwan 1988-1989, *Mesopotamia* 27, 5-30.

CARTER, E., CAMPBELL, S. 2006, Report on the 2004 Excavation Season at Domuztepe, *Kazı Sonucları Toplantısı* 27-1, 313-324.

CAMPBELL, S. 2010, Understanding Symbols: Putting Meaning into the Painted Pottery of Prehistoric Northern Mesopotamia, in Bolger, D. and Maguire, L.C. (eds.) *Development of pre-State Communities in the Ancient Near East*, Oxford, Oxbow Books, 147-155.

CHIRICA, C.-V. 1995, Les vases anthropomorphes du Néolithique-Enéolithique de la Roumanie. *Préhistoire européenne* 7, 203-224.

CILINGIROĞLU, C. 2012, *The Neolithic Pottery of Ulucak in Aegean Turkey: Organization of Production, Interregional Comparisons and Relative Chronology*, British Archaeological Report Int. Series, 2426, Archaeopress, Oxford.

COHEN, C. 2003, *La femme des origines. Images de la femme dans la préhistoire occidentale*, Paris, Belin.

DAVID N., STERNER, J. and GAVUA, K. 1988, Why Pots are Decorated?, *Current Anthropology* 29, 365-389.

DEMOULE, J.P. 1993, Anatolie et Balkans: la logique évolutive du Néolithique égéen, *Anatolica* XIX, 1-17.

DEMOULE, J.-P. 2007, *Naissance de la figure. L'art du Paléolithique à l'Âge du Fer,* Paris, Hazan.

ELIADE, M. 1959, *Initiation, rites, sociétés secrètes*. Paris, Gallimard.

GIMBUTAS, M. 1974, *The Gods and Goddesses of Old Europe, 7000 to 3500 BC: Myths, Legends and Cult Images*, London, Thames and Hudson.

HERITIER, F. 2012a, *Masculin/Féminin I. La pensée de la différence*, Paris, Odile Jacob.

HERITIER, F. 2012b, *Masculin/Féminin II. Dissoudre la hiérarchie*, Paris, Odile Jacob.

HODDER, I. (dir.) 2006, *Çatalhöyük 2006 Archive Report*. Çatalhöyük Research Project, on line.

HODDER, I. (dir.) 2007, *Çatalhöyük 2007 Archive Report*. Çatalhöyük Research Project, on line.

LLOYD, S., SAFAR, F. 1944, Tell Hassuna: Excavations by the Iraq Government Directorate of Antiquities in 1943 and 1944, *JNES* 4, 255-289.

MANTU, C.-M. 1991, Vases anthropomorphes du site Cucuteni A3 de Scinteia (département de Iasi), in Chirica, V. and Monah, D. (eds.) *Le Paléolithique et le Néolithique de la Roumanie en contexte européen,* (Bibliotheca Archaeologica Iassiensis IV), Iasi, 328-334.

MANTU, C.-M. 1993, Anthropomorphic Representations from the pre-Cucuteni and Cucuteni Cultures, *Anatolica* XIX, 129-141.

MAUSS, M. 1967, *Manuel d'ethnographie*, Paris, Payot (rep. from the 1947 edition)

MELLAART, J. 1960, Excavations at Hacilar. Third Preliminary Report, 1959, *Anatolian Studies* 10, 83-104.

MELLAART, J. 1961, Excavations at Hacilar. Fourth Preliminary Report, *Anatolian Studies* 11, 39-75.

MELLAART, J. 1970, *Excavations at Hacilar 2*, Ankara, British School of Archaeology.

MELLAART, J. 1981, *The Neolithic of the Near East*, London, Thames and Hudson (reprinted from the 1975 edition).

MERPERT, N.Y., MUNCHAEV, R.M. 1993, Yarim Tepe II: The Halaf Levels, in : Yoffee, N. et Clark, J.J. (eds.), *Early Stages in the Evolution of Mesopotamian Civilization. Soviet Excavations in Northern Iraq*, Tucson University of Arizona Press, p. 128-162.

MONAH, D. 2016, *Anthropomorphic Representations in the Cucuteni-Tripolye Culture,* Archaeopress Archaeology, Oxford.

NAUMOV, G. 2006, The Vessel, Oven and House in Symbolical Relation with the Womb and Women. Neolithic Bases and Ethnographic Implications*, Studia Mythologica Slavica* 9, 59-95.

NAUMOV, G. 2008, The Vessel as a Human Body: Neolithic Anthropomorphic Vessels and Their Reflection in Later Periods, in Berg, I. (ed.) *Breaking the Mould: Challenging the Past Through Pottery*, (Prehistoric Ceramics Research Group: Occasional Paper 6), Oxford, (BAR IS 1981), 93-101.

NAUMOV, G. 2010, Neolithic Anthropocentrism: the Principles of Imagery and Symbolic Manifestation of Corporeality in the Balkans, *Documenta Praehistorica* XXXVII, 227-238.

NAUMOV, G. 2011, Visual and Conceptual Dynamism of the Neolithic Altars in the Republic of Macedonia, in Nikolov, V., Bacvarov, K. and Popov, H. (eds.) *Interdisciplinäre Forschungen zum Kulturerbe auf dem Balkanhalbinsel*, Sofia, Nice, 89-129.

NAUMOV, G. 2013, Embodied Houses: the Social and Symbolic Agency of Neolithic Architecture in the Republic of Macedonia, in Hofmann, D. and Smyth, J. (eds.), *Tracking the Neolithic House in Europe. Sedentism, Architecture and Practice*, New York, Dordrecht, Heidelberg, London, Springer, 65-94.

NIEUWENHUYSE, O., BERNBECK, R., AKKERMANS, P.M.M.G., ROGASCH, J. (eds.) 2013, *Interpreting the Late Neolithic of Upper Mesopotamia,* Turnhout, Brepols (PALMA, 9).

OATES, J. 1968, Prehistoric Investigations Near Mandali, *Iraq* 30, 1-20.

ÖZDOGAN, M. 2003, Le vase anthropomorphe de Toptepe, *Dossiers d'archéologie 281: Néolithique, découvert d'un berceau anatolien*, 19.

ÖZDOGAN, M. 2011, Archaeological Evidence on the Westward Expansion of Farming Communities from Eastern Anatolia to the Aegean and the Balkans, *Current Anthropology* 52 suppl.4, 415-430.

PALUCH, T. 2013, Maroslele-Panahát, Legelő: Data to the Middle Neolithic Anthropomorphic Vessel, Budapest, in Anders A., and Kulcsár G. (eds.), *Moments in Times, papers Presented to Pál Raczky on His 60th Birthday*, L'Harmattan, Budapest, 203-212.

ROBERT, B., DAVERAT, L. 2016, Modeling Images by Shaping Ceramics, *Proceedings of the 9th International Congress of Archaeology of the Near East, 9-13 June 2014*, Freie Universität Berlin, Harrassowitz Verlag, Wiesbaden, 259-272.

ROBERT, B., DAVERAT, L. 2017, De l'art ou du cochon », Actes du Workshop tenu à Brno (République Tchèque) 27-30 janvier 2012, Oxbow Book, 129-140.

SCHLICHTHERLE, H. 2016, Älteste Wandmalereien nördlich der Alpen. Zur Rekonstruktion der Bilder für die Präsentation auf der Großen Landesaustellung, in *Denkmalpflege in Baden-Württemberg, Nachrichtenblatt der Landesdenkmalpflege* 1, 11-17.

SCHWARZBERG, H. 2006, Neolithische Gesichtsgefäße Von Aşağı Pınar, Türkisch Thrakien, in Sven Conrad, S., Einicke, R., Furtwängler, A., Löhr, H. und Slawisch, A. (eds.) *Pontos Euxeinos. Beiträge Zur Archäologie Und Geschichte Des Antiken Schwarzmeer-Und Balkanraumes*, (Schriften Des Zentrums für Archäologie und Kulturgeschichte des Schwarzmeerraumes 10), Langenweißbach, Beier und Beran, 1-12.

VILLES, A., LUCI, K. 2015, *Dieux des Balkans. Figurines néolithiques du Kosovo*, Paris, Artlys.

VIRÁG, M. Zs. 2000, Anthropomorphic Vessels of Transdanubian Linear Pottery Culture, in Hiller S., Nikolov V. (eds.) *Karanovo III. Beiträge zu Neolithikum in Südosteuropa,* Phoibos, Wien, p. 389-403.

Anna Gómez-Bach, Jörg Becker and Miquel Molist (ed),
II Workshop on Late Neolithic Ceramics in Ancient Mesopotamia: pottery in context,
Monografies del MAC 1, Barcelona 2018,
ISBN: 978-84-393-9750-2 (pàg. 195-205)

THE FIRST HALAF PAINTED FINE WARE FROM THE TIGRIS VALLEY IN TURKEY

Mücella Erdalkıran*

El valle del Tigris turco se investigó, de manera más exhaustiva gracias a los trabajos de la presa de Ilısu iniciadas hacia el año 2000. En este contexto, se obtuvo información más detallada sobre el Neolítico tardío de esta región. En este trabajo, se hablará de la cerámica fina pintada, la producción típica del Período Halaf, y se identificará la presencia de una fase de "Transición al Halaf" en esta región.

Halaf, Valle del Tigris turco, Transición Halaf, Cerámica pintada, Takyan.

The Anatolian Tigris Valley was investigated more comprehensively particularly with the Ilısu Dam Salvage fieldworks, which started near 2000. In this context, more detailed information on the Late Neolithic Period was obtained. In this paper, the Painted Fine Ware, the typical ware of the Halaf Period, will be addressed and the presence of the Transition to Halaf Phase in the region will be revealed.

Halaf, Anatolian Tigris Valley, Transition to Halaf Phase, Painted Fine Ware, Takyan.

INTRODUCTION

Bordered by the South-eastern Taurus Mountains in the north and within greater Mesopotamia, South-eastern Anatolia is quite rich in raw materials and it is convenient for settlement. The Tigris River is one of the most important waterways in this area, which, together with its branches and tributaries, offered an optimal environment for settlement as well as a natural passageway between the northern high mountainous region and the low steppes to the south. This region has been settled at least since the Paleolithic Age (Taşkıran 2007; 2013) with archaeological evidence continuing through the prehistoric and historic periods and features various anthropogenic activities along this natural route of communication such as material culture diffusion, interaction, and trade.

This paper discusses the Painted Fine Ware from the Transition to Halaf phase (6000-5900 cal. BC)[1] settlements detected during surveys and excavations of Halaf settlements in the Anatolian Tigris Valley within the boundaries of Turkey. The paper presents the Painted Fine Ware as evidence of the first Halaf settlements within the Anatolian Tigris valley. I will first describe the geographical and regional context which made this region ideal for and cultural interaction between Transition to Halaf phase settlements, including those further south within the borders of Syria and Iraq. Then, the ceramic evidence including characteristics, vessel shapes and decoration of Painted Fine Ware from four

1. For discussions of Late Neolithic chronology for Upper Mesopotamia in Cruells/Nieuwenhuyse 2004 and Bernbeck/Nieuwenhuyse 2013.

* Ege University, Faculty of Letter, Department of Protohistory and Near Eastern Archaeology, 35100 Bornova/İzmir/Turkey. mucellaerdalkiran@gmail.com

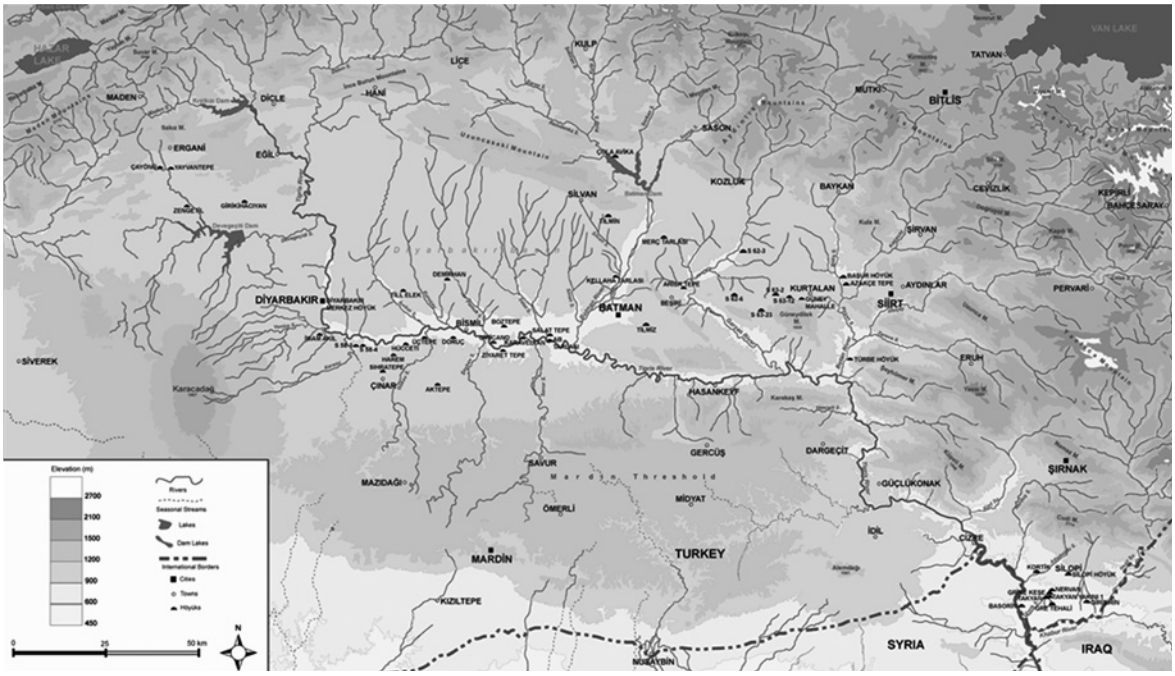


Figure 1. The physical geography of the Tigris Valley in Turkey and the Halaf settlements on the valley (Adapted from Erdalkıran 2010, Harita 2).

settlements dated to the Transition to Halaf Phase in the Anatolian Tigris Valley will be described. This data will be then compared with Painted Fine Ware known from contemporary settlements excavated in Iraq and Syria, where it has been proven to be diagnostic of the Transition to the Halaf Phase (Cruells/Nieuwenhuyse 2004).

THE TIGRIS VALLEY IN TURKEY

The Tigris River originates near Lake Hazar, north of Diyarbakır; a large number of brooks as well as streams with a higher flow join to form the Tigris, which flows southwards into Syria and Iraq (Fig. 1). Passing through numerous plains, plateaus, and canyons, the Tigris River leaves the Turkish border at Şırnak, some 523 km from where originates. The geological structure of the Tigris Valley consists of a large basin with a central depression covered by relatively new layers but whose margins are high and encircled by some older land which includes partially plain and hilly areas, plateaus, and valleys with wide floors (Sözer 1969, 3).

The Tigris valley offers wide fertile riverside plains formed by these alluvial processes as well as fluvial processes resulting from changes in the river bends and flows. Thick with fluvial and alluvial sedimentation, these plains are optimal for agricultural activities since they offer favorable soil morphology and climatic conditions. Narrow alluvial plains and vast limestone plateaus at 500-600 m above the sea level are seen in the Upper Tigris Valley north of Diyarbakır to the Batman River (Özgen 2007, 53). The Upper Tigris Valley is intersected by streams originating from the foot-hills of the South-eastern Taurus Mountains in the north and from the Mardin-Midyat Threshold in the south. The highest flowing rivers are the Batman, Garzan, and Botan in the north, while the southern tributaries such as the Göksu, Şeyhan, and Savur tributaries have a small flow which desiccates in summer (Sözer 1969, 27; Saraçoğlu 1990, 263). The Cizre and Silopi are the western and southern plains bordering the Tigris Valley south of Mt Cudi. The Tigris flows in a south-east direction from Turkey through Syria into Iraq. These plains end east of the Khabur headwaters and the Hezil Su, where the river flows across the Turkish-Syrian and Iraqi state borders (Algaze 1989, 246; Algaze et al. 2012, 4). The Cizre and Silopi plains are irrigated by a system of small brooks joining rivers such as Kızılsu, the Neduş Tributary, and Atladıoldu. Besides the aforementioned waterways, there are also underground water and small lakes in the Tigris Valley (Doğan 2005).

BRIEF SUMMARY OF ARCHAEOLOGICAL RESEARCH IN THE TIGRIS VALLEY

As also stated above, the Tigris Valley offered a well-watered geological structure optimal for settlement with a river system, underground waters, small lakes, terraces, and alluvial plains. Despite these features, the region,

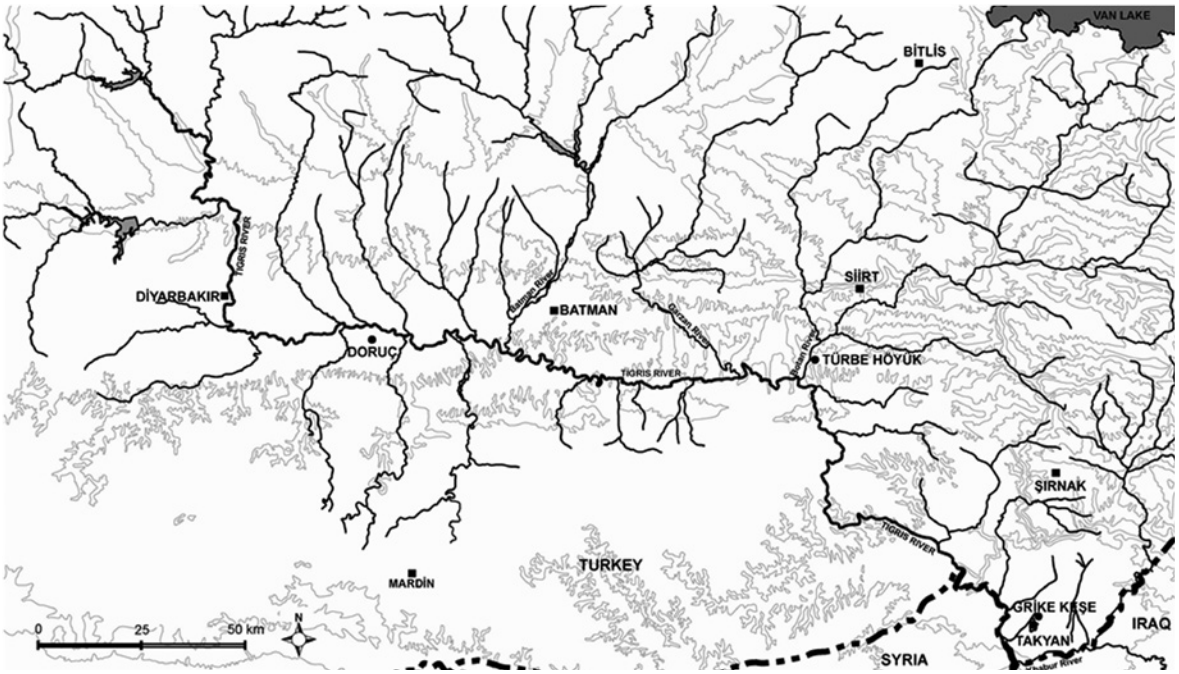


Figure 2. The Transition to Halaf Phase settlements on the Tigris Valley in Turkey.

settled since the Paleolithic Ages, has not been adequately explored and the full archaeological picture of the region is unknown. To date, there have been only two major extensive survey projects in the region. The first project was the "Prehistoric Research in Southeastern Anatolia", carried out in 1963 by H. Çambel and R.J. Braidwood (Çambel/Braidwood 1980). The scope of this project was to investigate the Tigris River Valley from Diyarbakır east to Siirt. The second was "The Tigris-Euphrates Archaeological Reconnaissance Project", conducted between 1988 and 1990 by G. Algaze (Algaze 1989; Algaze et al. 1991; Algaze et al. 2012). The scope of this project was to survey a quite vast area of the Tigris River Valley between Bismil and Silopi in advance of the construction of the Ilısu, Batman, and Cizre Dams. In addition to these two large projects, various smaller-sized surveys were carried out in the region (Velibeyoğlu/Schachner/Schachner 2002; Kozbe 2006, 2007, 2008; Tekin 2009).

Surveys conducted on the Tigris Valley were followed by excavations carried out in the region. The Halaf was detected during excavations at Girikihacıyan (Watson/LeBlanc 1990) and Yayvantepe, (Caneva 2011) located north of Diyarbakır, as well as at Boztepe (Parker/Creekmore 2002), Hakemi Use (Tekin 2011a), Salat Tepe (Ökse/Görmüş 2013), Karavelyan (Tekin 2011b), and Türbe Höyük (Sağlamtimur/Ozan 2007), which are within the Ilısu Dam area (Fig. 2). Some of these settlements were generally dated to the Halaf Period, but no distinction was made between the developmental phases of this period.

STUDY METHODOLOGY

Forty-seven Halaf settlements were identified during the aforementioned surveys carried out on the Tigris River Valley. As part of the author's PhD dissertation research,[2] I was able to study the pottery collections from twenty-six of these settlements. As no settlement representing all phases of the Halaf Period has yet been excavated on the Tigris Valley, the overall criteria for phasing in this study was based upon available pottery analysis and diagnostics from the settlements with reliable stratification in Northern Syria (Tell Sabi Abyad; Le Miére/Nieuwenhuyse 1996, Nieuwenhuyse 2007, Chagar Bazar; Cruells 2006) and Northern Iraq (NJP 72; Campbell 1992, 1998) The following diagnostic qualities of the Painted Fine Ware group were identified: varying paste characteristics, vessel shapes and decorations. Corresponding to the five-stage developmental chronology of the Halaf Period, these phases are: the

2. This study was carried out for my PhD dissertation, entitled "The Development of the Halaf Period in the Tigris Valley Based on the Pottery Evidence".

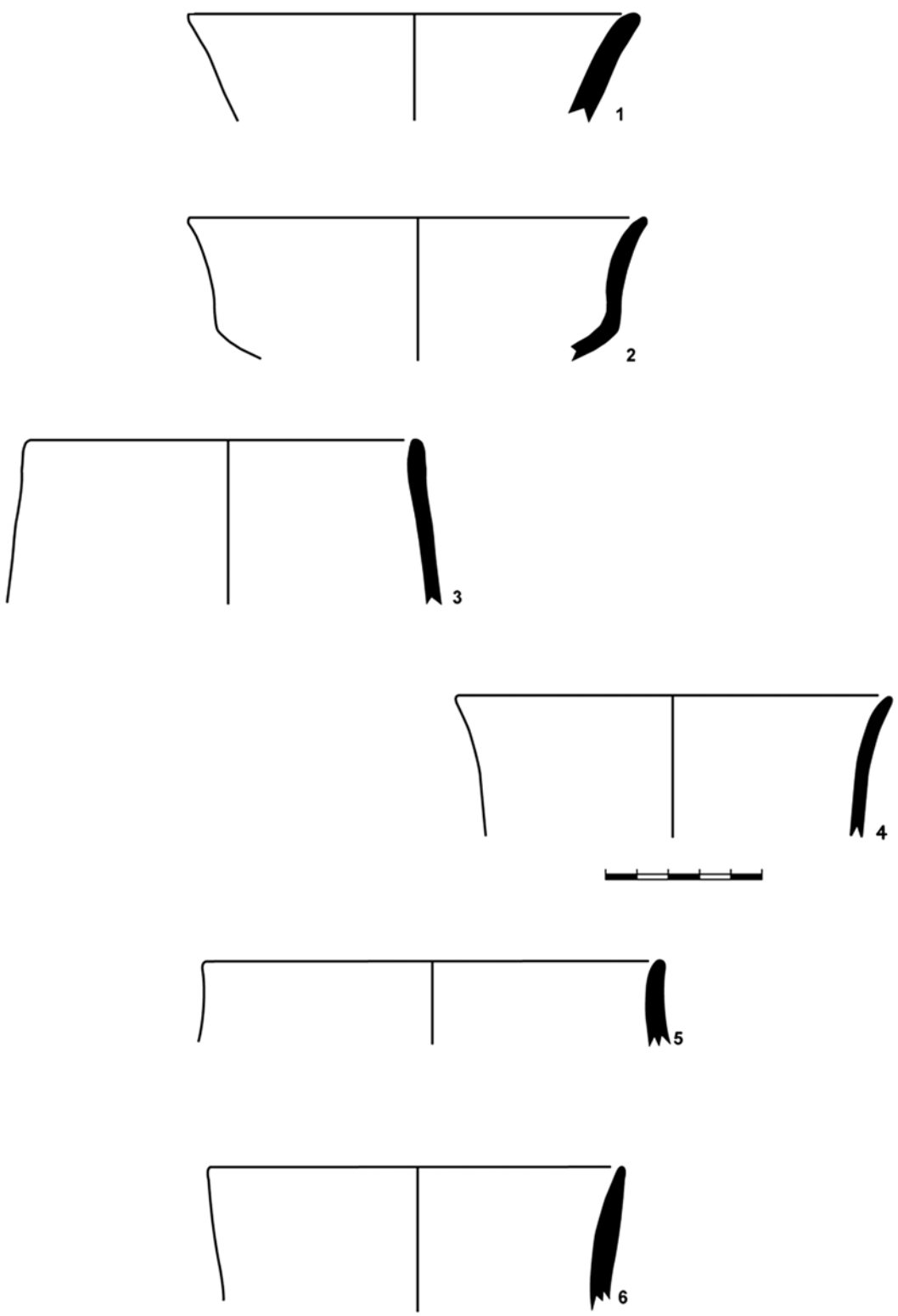


Figure 3. The Transition to Halaf Phase vessel forms; 1: the everted sided bowl (Form IA), 2: the carinated bowl (Form IB), 3: the deep bowl (Form IC), 4: the sinuous sided bowl (Form ID), 5: the short-necked jar (Form IIA), 6: the high-necked jar (Form IIB).

Transition to Halaf, Early Halaf, Middle Halaf, Late Halaf, and Halaf-Ubaid Transition Phases (Erdalkıran 2010, 323-338). The Painted Fine Ware collected from Halaf settlements in the Tigris Valley was studied and divided into its phases according to the diagnostic criteria established. As a result of my analysis of the Painted Fine Ware, all developmental stages of the Halaf Period were determined to be present in the Tigris Valley. The evidence for Transition to Halaf settlements in the Tigris Valley based upon the Painted Fine Ware evidence follows.

THE FIRST HALAF PAINTED FINE WARE FROM THE ANATOLIAN TIGRIS VALLEY

In the Anatolian Tigris Valley, the Painted Fine Ware of the Transition to Halaf Phase was detected in four settlements: Doruç, Türbe Höyük, Grike Keşe, and Takyan (Fig. 1-2) (Erdalkıran 2010, 324). Although the Transition to Halaf Phase was also detected at Hakemi Use, the Halaf Painted Fine Ware was not reported there (Tekin 2011a), so it is not included in this study. Each of the Transition to Halaf settlements with Painted Fine ware are presented from east to west.

DORUÇ

Doruç is located in the Upper Tigris Valley, by the Köseli Brook, a branch of the Tigris River, in the district of Bismil, in Diyarbakır (Fig.1-2). Doruç is about 6 m high and has a width of more than a hectare. Tekin, who discovered the settlement, states that the Hassuna/Samarra, Halaf and Ubaid cultures all existed here and highlights the significance of their coexistence (Tekin 2009, 282-284, Resim 2 and 3). He therefore emphasizes the significance of the place due to the presence of this apparently uninterrupted and long sequence in the settlement.

According to the Painted Fine Ware pottery collected from Doruç, the Halaf Period is represented with the Transition to Halaf, Early Halaf, and Middle Halaf phases. The vessel shapes of the Transition to Halaf at Doruç comprise the everted sided bowl (Form IA), the deep bowl (Form IC), the flat base, and body sherds likely to have belonged predominantly to jars (Fig. 3).

The Transition to Halaf Painted Fine Ware pottery from Doruç was decorated exclusively with geometric patterns such as horizontal crosshatching, a step motif between straight bands, and diagonal lines.[3]

TÜRBE HÖYÜK

Located east of the Botan River around 27 km to the south-west of Siirt province, Türbe Höyük is on a natural hill roughly 6 km away from the intersection of the Botan and Tigris Rivers (Fig. 1-2). Measuring approximately 100 m by 40 m, Türbe Höyük was excavated between 2002 and 2007 by H. Sağlamtimur within the scope of the salvage excavations of the area to be inundated by the Ilısu Dam (Sağlamtimur/Ozan 2007, 2).

Structures with a stone foundation at Türbe Höyük, constructed in the 2nd millennium BC destroyed the settlement layers of the Pre-Halaf, Halaf, Ubaid and Uruk periods. These earlier periods were predominantly identified through the pottery unassociated with settlement layers. However, grain pits dug into the virgin soil in the south of the mound date to the Halaf Period; these are the only architectural elements representing this culture. This discovery led to the interpretation that settlement had been concentrated in the southern part of the mound (Sağlamtimur/Ozan 2007, 8).

Around thirty six Painted Fine Ware items from Türbe Höyük were studied, and twelve of them were determined to date to the Transition to Halaf Phase. The paste of the Painted Fine Ware of the Transition to Halaf Phase at Türbe Höyük is generally light brown and, to a less extent, cream and sand-tempered or limestone-tempered. The vessels are generally highly fired, and the core is either scarce or undetectable at the edges. It has been observed that all sherds other than one example had been cream or buff slipped and unburnished. The decoration paint color is dark with homogenous shades of brown and grey, with no difference in shades, creating a monochrome effect. It is striking that the exterior surfaces of the sherds studied were densely decorated. In this pottery group, dancing ladies and naturalistic elements such as birds were used as decorative motifs as well as geometric patterns such as horizontal crosshatching, vertical crosshatching, undulating lines, pendants, diagonal lines, steps, and crosshatched lozenges (Fig. 4).

Six shapes, in which bowls predominated, were among the Transition to Halaf Phase pottery from Türbe Höyük, namely the everted sided bowl (Form IA) (Fig. 4: 1), the carinated bowl (Form IB) (Fig. 4: 2-5), the deep bowl (Form IC) (Fig. 4: 7-8), the sinuous sided bowl (Form ID) (Fig. 4: 6), and the short-necked jar (Form IIA) (Fig. 4: 9). Apart from the vessel shapes listed, two jar body sherds were studied. A neck-shoulder sheds, a shoulder sherd and three pottery sherds comprised again of another

3. No detailed study was carried out on this pottery, but their shapes and decorations were recorded. Some of these vessels can be seen in Tekin (2009, Resim 3).

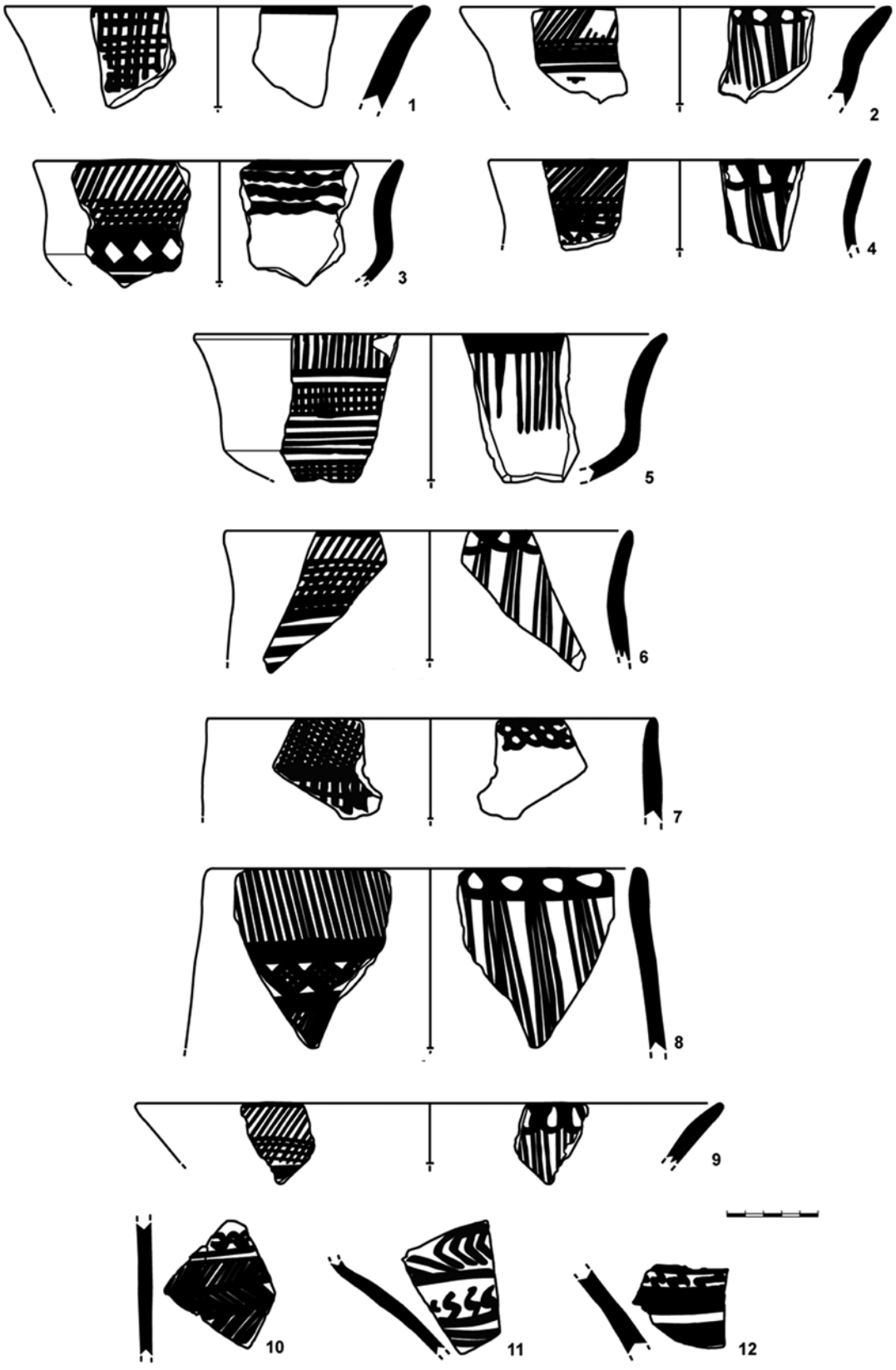


Figure 4. Sherds of the Transition to Halaf Phase Painted Fine Ware from Türbe Höyük.

example of a jar without a reconstructable profile were examined (Fig. 4: 10-12) (Erdalkıran 2010, 267-269).

GRIKE KEŞE

Located by the Şurik Brook in the district of Silopi in Şırnak province, Grike Keşe is 100x220x4 m in dimension (Fig. 1-2). The Transition to Halaf, Early Halaf, Middle Halaf and Late Halaf phases were reported at Grike Keşe (Erdalkıran 2008, 756-757, Table 1). In other words, it was settled almost throughout the entire Halaf Period. Out of the one hundred thirty seven pottery sherds of the Halaf Period from Grike Keşe that were collected by G. Kozbe, twenty were identified as Painted Fine Ware, which is diagnostic of the Transition to Halaf Phase.

The paste of the Painted Fine Ware of the Transition to Halaf Phase from Grike Keşe is generally light brown and buff; sand temper and limestone temper were generally used either collectively or individually and plant temper was observed in only one example. Half of the pottery items were highly fired, whereas the rest were fine fired. Therefore, no core was encountered in their edges. Although slipping the vessels was generally uncommon in this phase, buff slip was found in six examples. Even though burnishing was not widely used, it is striking that it was seen on both inner and outer surfaces on some of the sherds from this site. Paint used to decorate the vessels was monochrome and mostly shades of dark brown and grey were used. The decoration motifs generally comprise geometric elements except for the dancing ladies. Among the patterns observed are single or multiple simple bands, crosshatching, crosshatched lozenges, vertical zigzags, diagonal lines, and pendants. It is notable that the vessel surfaces were densely decorated by painted motifs (Fig. 5).

Body sherds were identified in the Transition to Halaf Phase at Grike Keşe, along with five vessel shapes. The everted sided bowl (Form IA) (Fig. 5: 1), the sinuous sided bowl (Form ID) (Fig. 5: 2-4), the short-necked jar (Form IIA) (Fig. 5: 5-6) and the long-necked jar (Form IIB) (Fig. 5: 7-9) are the vessel shapes detected. Apart from these, non-diagnostic body sherds of various vessel shapes were also found (Fig. 5: 11-16). The sinuous sided bowl is the most common shape among the bowls with three forms, whereas the long-necked jar is the most common shape among the jars. The other vessel shapes are represented with one or two examples (Erdalkıran 2010, 282-285).

TAKYAN

Takyan, which is another of the important settlements of the Halaf Period in this region, located about 10 km to the south-west of the district of Silopi in Şırnak and in the east of the Şurik Stream, which flows on the same plain (Fig. 1-2). It is particularly striking because of its size, being 350x680x15 m in dimension. Pottery analysis suggests that this mound was settled throughout all phases of the Halaf Period (Kozbe 2006, 297; Erdalkıran 2008, 757-758, Table 1). Takyan was first discovered during the survey that Algaze carried out in the region (Algaze 1989, 247) and then re-investigated by Kozbe (Kozbe 2006, 297; Erdalkıran 2008, 757-758, Table 1).

The pottery collected from Takyan documents a long sequence of settlement starting from the pre-Halaf. Moreover, as Algaze and Kozbe have stated, Takyan had its densest settlement in the Halaf Period (Algaze 1989, 247; Kozbe 2006, 297). I conducted a study of the pottery which supports the suggestion that Takyan is a mound settled throughout all phases of the Halaf Period (Erdalkıran 2008, Table 1).

I examined over a thousand items of Halaf Period pottery found at Takyan by Kozbe and thirty seven sherds collected by Algaze. Out of the potsherds studied, eleven belonged to Painted Fine Ware dating to the Transition to Halaf Phase. The phasing of a large number of non-diagnostic body sherds could not be determined.

The paste of the Painted Fine Ware in the Transition to Halaf Phase at Takyan is in shades of brown and buff and is generally sand or limestone-tempered, or a combination of them. The vessels are fine or highly fired; hence no core was detected on the sherd edges. Although applications of slip and burnish were uncommon in the Transition to Halaf phase, light brown and buff slip and burnish were detected in a few examples. The paint is dark shades of brown and grey, which appeared quite worn in some examples. The decoration motifs are comprised of geometric elements such as horizontal crosshatching and vertical, undulating, and diagonal lines. In one sherd, dancing ladies were depicted holding hands with each other. These sherds also demonstrate these vessels were densely decorated with these painted motifs (Fig. 6).

Out of the Painted Fine Ware items of the Transition to Halaf Phase found from Takyan, eight offered reconstructable profiles that yielded the vessel shapes: the deep bowl (Form IC) (Fig. 6: 1), the short-necked jar (Form IIA) (Fig. 6: 2-3), the long-necked jar (Form IIB) (Fig. 6: 4-6), and the flat base (Form VIA) (Fig. 6: 7-8). Whilst there is a bowl among the detected vessel shapes discovered, the dominant group is jars. Apart from these, non-diagnostic body sherds of various vessel shapes were also found (Fig. 6: 9-11) (Erdalkıran 2010, 299-301).

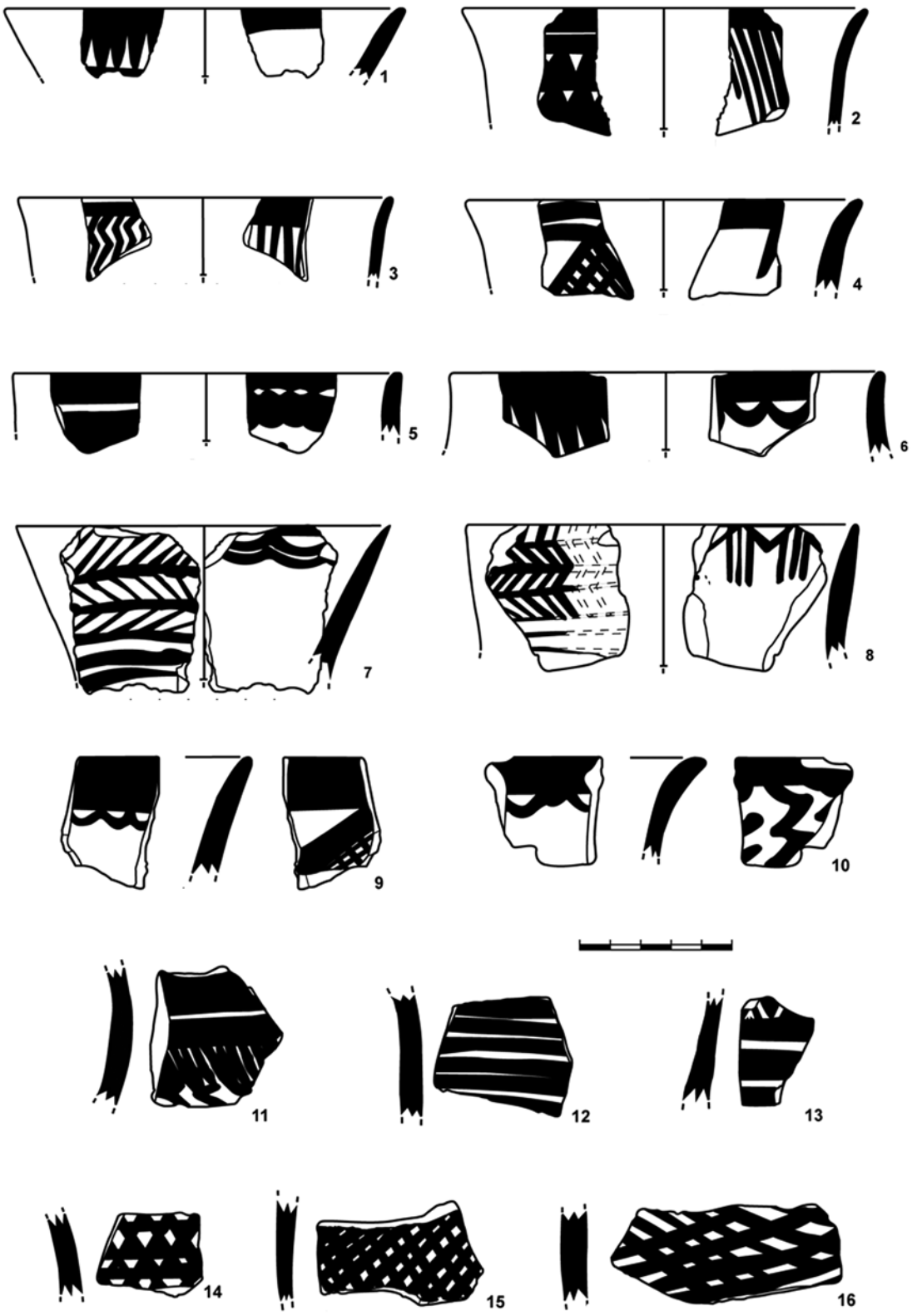


Figure 5. Sherds of the Transition to Halaf Phase Painted Fine Ware from Grike Keşe.

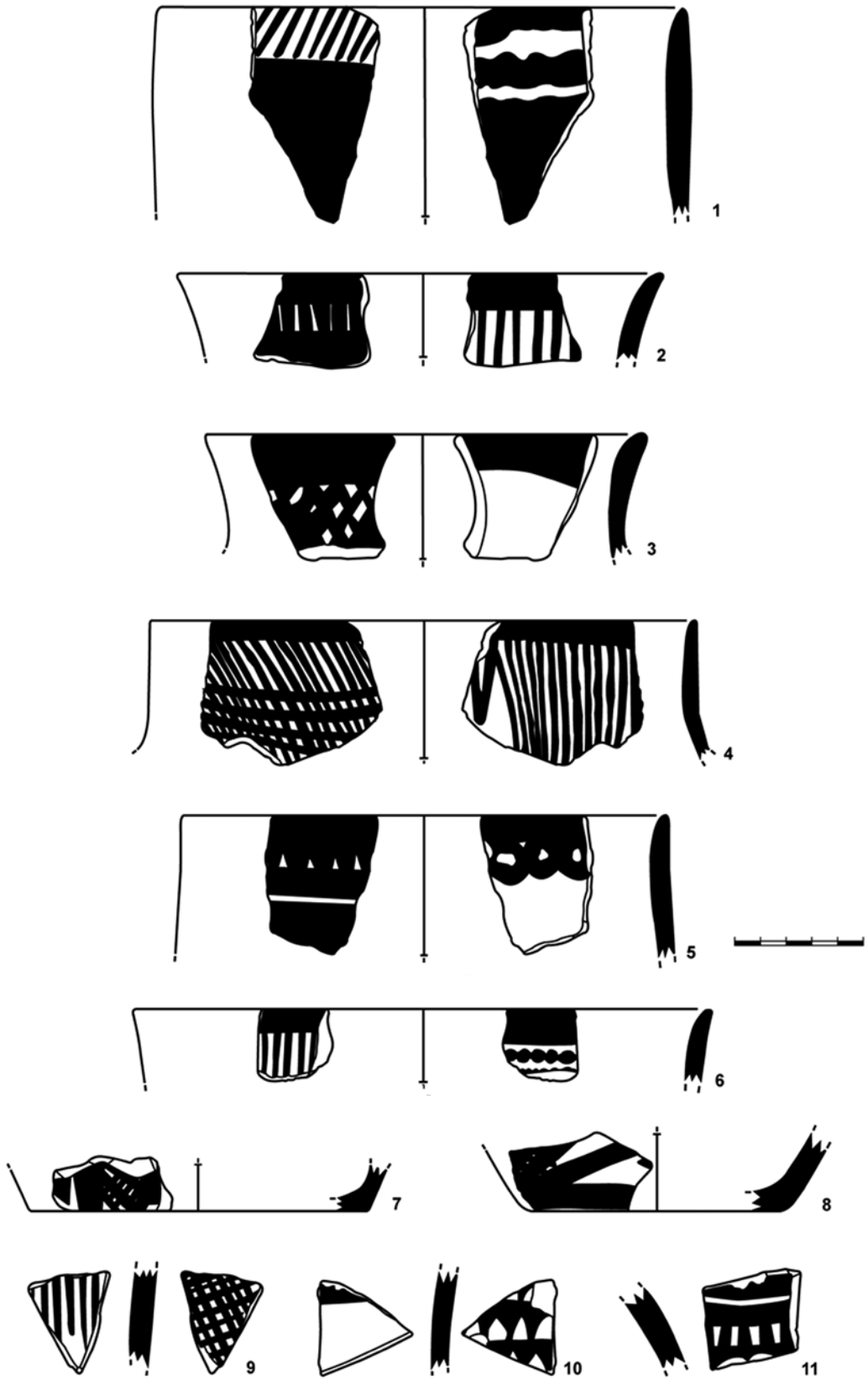


Figure 6. Sherds of the Transition to Halaf Phase Painted Fine Ware from Takyan.

DISCUSSION AND CONCLUSIONS

A few general traits are shared across the pottery from the Transition to Halaf Phase. For example, vessels of the Transition to Halaf Phase on the Tigris Valley are sand-tempered or limestone-tempered or a combination of both, and highly fired. The paste used is in light colors such as cream, buff, and light brown, sometimes colored through the use of slip. The painted decoration is monochrome in shades of black and grey. Almost all the whole surface, particularly the exterior, of the vessels was densely decorated with painted motifs. The interior surface decoration was limited to the rim. The decoration particularly highlighted the contrast of paint in the dark shades on a light background. The typical decoration motifs of this phase include dancing ladies and naturalistic elements like birds but geometric elements such as horizontal crosshatching, vertical crosshatching, undulating lines, pendants, diagonal lines, steps, and crosshatched lozenges were predominant. Six Halaf vessel shapes can be identified in the Transition to Halaf Painted Fine Ware in the Anatolian Tigris Valley. Predominant forms are open bowls, namely the everted sided bowl (Form IA), the carinated bowl (Form IB), the deep bowl (Form IC), the sinuous sided bowl (Form ID), the short-necked jar (Form IIA), and the high-necked jar (Form IIB) (Fig. 3).

It should be mentioned that pottery diagnostic to the Transition to Halaf period and other than that of the Halaf Fine Ware is also present in the Anatolian Tigris Valley. As previously discussed in the author's study on the pottery collected from the Cizre-Silopi plains, Samarra Painted Ware, Red Slipped Burnished Ware, Dark Faced Burnished Ware, and Orange Fine Ware were detected.[4] In addition to this, Bitumen Painted Ware was observed as present in this phase at Türbe Höyük.

As described above, the Transition to Halaf Phase was detected in four settlements in the Tigris Valley; Doruç, Türbe Höyük, Grike Keşe, and Takyan. Out of these settlements, Doruç and Türbe Höyük are located at a great distance from each other (see map) and in different geographies. This study also demonstrates that the Tigris Valley functioned as a passageway for communication between far distant settlements in the Transition to Halaf phase. Despite the limited data available, it is possible to say that the Transition to Halaf Phase can be found throughout the entire Tigris Valley. Therefore, it is now possible to establish Transition to Halaf Fine Ware pottery analogies with concentrations of settlements in the Balikh and Khabur River Valleys, south of the Tigris in Syria, and other settlements in the Mosul district adjacent to the Tigris Valley. In this context, Fine Painted Ware pottery of the Transition to Halaf Phase is analogous to that published from Layers 7-4 at Tell Sabi Abyad (Le Miére/Nieuwenhuyse 1996; Nieuwenhuyse 2007) and Layer I at Chagar Bazar Cruells 2006. in Northern Syria as well as from the NJP 72 (Campbell 1992, 1998) settlement in Northern Iraq.

As a result of all these data, it is possible to state that the communities producing painted ware in the Late Neolithic Period did not remain merely within a limited area such as Northern Iraq and Northern Syria but existed as far as the feet of the South-eastern Taurus Mountains in Anatolia.

Further systemic surveys and excavations focusing on prehistoric settlements in the Tigris Valley and in the plains south of and within the Mardin foothills, (planned for the future) will undoubtedly provide us with an opportunity to better understand the scope of Transition to Halaf settlements in the Anatolian region, and its material culture relationships with the surrounding regions.

BIBLIOGRAPHY

ALGAZE, G. 1989, A New Frontier: First Results of the Tigris-Euphrates Archaeological Project, 1988, Journal of Near Eastern Studies 48/4, 241-281.

ALGAZE, G., BREUNINGER, R., LIGHTFOOT, C. et al. 1991, The Tigris-Euphrates Archaeological Reconnaissance Project: A Preliminary Report of the 1989-90 Seasons, *Anatolica 17*, 175-240.

ALGAZE, G., HAMMER, E., PARKER, B. *et al.* 2012, The Tigris-Euphrates Archaeological Reconnaissance Project. Final Report of the Cizre Dam and Cizre-Silopi Plain Survey Areas, *Anatolica 38,* 1-115.

BERNBECK, R., NIEUWENHUYSE O.P. 2013, Established Paradigms, Current Disputes and Emerging Themes: The State of Research on the Late Neolithic in Upper Mesopotamia, in Nieuwenhuyse, O.P. et al. (ed.), Interpreting the Late Neolithic of Upper Mesopotamia, Turnhout, Brepols, 17-37.

CAMPBELL, S. 1992, *Culture, Chronology and Change in the Later Neolithic of North Mesopotamia*, University of Edinburgh (Unpublished PhD thesis).

CAMPBELL, S. 1998, Problems of Definition: The Origins of the Halaf in North Iraq, in Lebeau M. (ed.), About Subartu, Studies Devoted to Upper Mesopotamia, (Subartu IV/1), Brepols, Turnhout, 39-52.

4. Prepared by me, this paper was presented by Kozbe. Kozbe/Erdalkıran 2009.

CANEVA, I. 2011, Til Huzur-Yayvantepe, in Özdoğan M. et al. (ed.), The Neolithic in Turkey, İstanbul, Archaeology and Art Publications, 173-184.

CRUELLS, W. 2006, La Poterie, in Tunca Ö. et al. (ed.), Chagar Bazar (Syrie) I: Les Sondages Préhistoriques (1999-2001), Peeters, Leuven, 25-80.

CRUELLS, W., NIEUWENHUYSE, O.P. 2004, The Proto-Halaf Period in Syria. New Sites, New Data, Paléorient 30/1, 47-68.

ÇAMBEL, H., BRAIDWOOD R.J. 1980, *The Joint Istanbul-Chicago Universities Prehistoric Research in Southeastern Anatolia*, İstanbul, Edebiyat Fakültesi Basımevi.

DOĞAN, U. 2005, Land Subsidence and Caprock Dolines Caused by Subsurface Gypsum Dissolution and the Effect of Subsidence on the Fluvial System in the Upper Tigris Basin (Between Bismil-Batman, Turkey), Geomorphology 71, 389-401.

ERDALKIRAN, M. 2008, The Halaf Ceramics in *Şırnak* Area, Turkey, in Cordoba J.M. et al. (ed.), Proceedings of the 5th International Congress on the Archaeology of the Ancient Near East, Vol I, Centro Superior de Estudios sobre el Oriente Próximo y Egipto, Madrid, 755-766.

ERDALKIRAN, M. 2010, Çanak Çömlek Verilerine Dayanarak Dicle Havzasındaki Halaf Döneminin Gelişimi, Ege Üniversitesi, (Unpublished PhD thesis).

KOZBE, G. 2006, Şırnak İli, Cizre-Silopi Ovası 2004 Yılı Yüzey Araştırması, Araştırma Sonuçları Toplantısı 23/1, 293-308.

KOZBE, G. 2007, Şırnak İli Cizre-Silopi Ovası Yüzey Araştırması, 2005, Araştırma Sonuçları Toplantısı 24/1, 307-326.

KOZBE, G. 2008, Şırnak İli Yüzey Araştırmaları, 2006, Araştırma Sonuçları Toplantısı 25/1, 175-186.

KOZBE, G., ERDALKIRAN, M. 2009, A Missing Piece of the Late Neolithic: the Şırnak Area (Turkey), *Interpreting the Late Neolithic of Upper Mesopotamia. March 26-28, 2009, Leiden.*

LE MIÉRE, M. NIEUWENHUYSE, O.P. 1996, The Prehistoric Pottery, in Akkermans P.M.M.G. (ed.), Tell Sabi Abyad: the Late Neolithic Settlement, Nederlands Historisch-Archaeologisch Instituut, İstanbul, 119-284.

NIEUWENHUYSE, O.P. 2007, *Plain and Painted Pottery: The Rise of Late Neolithic Ceramic Styles on the Syrian and Northern Mesopotamian Plains*, Brepols, Turnhout.

ÖKSE, A.T. GÖRMÜŞ, A. 2013, Salat Tepe 2005-2008 Excavations, The Ilısu Dam and HEP Project Excavations Seasons 2004-2008, TC Kültür ve Turizm Bakanlığı Kültür Varlıkları ve Müzeler Genel Müdürlüğü, 163-200.

ÖZGEN, N. 2007, *Bismil* İlçesinin *Coğrafyası*, Ankara Üniversitesi, (Unpublished PhD thesis).

PARKER, B.J., CREEKMORE, A. 2002, The Upper Tigris Archaeological Research Project: A Final Report from the 1999 Field Season, Anatolia Studies 52, 19-74.

SAĞLAMTİMUR, H., OZAN, A. 2007, Siirt-Türbe Höyük Kazısı, Ön Rapor, Arkeoloji Dergisi 10/2, 1-31.

SARAÇOĞLU, H. 1990, *Bitki* Örtüsü*, Akarsular ve Göller*, Milli Eğitim Bakanlığı Öğretmen Kitapları Dizisi, İstanbul.

SÖZER, A.N. 1969, *Diyarbakır Havzası*, İş Matbaacılık ve Ticaret, Ankara.

TAŞKIRAN, H. 2007, Dicle havzasının Paleolitik Potansiyeli, in Öztepe E. (ed.), Patranvs Coşkun *Özgünel'e* 65. Yaş Armağanı; Festschrift für Coşkun *Özgünel* zum 65. Geburtstag, Homer Kitabevi, İstanbul, 351-359.

TAŞKIRAN, H. 2013, Ilısu Paleolithic Survey Since the Beginning, The Ilısu Dam and HEP Project Excavations Seasons 2004-2008, TC Kültür ve Turizm Bakanlığı Kültür Varlıkları ve Müzeler Genel Müdürlüğü, 442-455.

TEKİN, H. 2009, Ilısu Projesi Seramikli Neolitik Yerleşimleri Yüzey Araştırması, 2007, Araştırma Sonuçları Toplantısı 26/1, 279-287.

TEKİN, H. 2011a, Hakemi Use. A newly discovered Late Neolithic site in Southeastern Anatolia, in Özdoğan M. et al. (ed.), *The Neolithic in Turkey*, İstanbul, Archaeology and Art Publications, 151- 172.

TEKİN, H. 2011b, Diyarbakır'da Bir Halaf Yerleşimi: Karavelyan (Hınçıka) 2009 Yılı Kazıları, Kazı Sonuçları Toplantısı 32/2, 350-363.

VELİBEYOĞLU, J., SCHACHNER, A., SCHACHNER, Ş. 2002, Erste Ergebnisse eines Surveys im Botan-Tal und in Çattepe (Tilli), in Tuna N. et al. (ed.), *Salvage Project of the Archeological Heritage of the Ilısu and Carchemish Dam Reservoirs, Activities 2000*, Ankara, METU Center for Research and Assessment of the Historic Environment (TAÇDAM), 783-835.

WATSON, P.J., LEBLANC, S.A. 1990, *Girikihaciyan: A Halafian Site in Southeastern Turkey*, Monograph 33, Institute of Archaeology, University of California, Los Angeles.

Anna Gómez-Bach, Jörg Becker and Miquel Molist (ed),
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Monografies del MAC 1, Barcelona 2018,
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STRAINERS: OBSERVATIONS ON A DISTINCT TYPE OF NEOLITHIC AND CHALCOLITHIC POTTERY IN THE KHABUR VALLEY (NORTHEASTERN SYRIA)

Anna Hanzelková*, Maximilian Wilding*

El artículo se centra en la distribución de coladores/tamices en el valle de Khabur durante los periodos Neolítico final y Calcolítico. Se pretende corroborar la concurrencia de estos vasos dentro de los conjuntos cerámicos de los yacimientos estudiados mediante gráficos y tablas. En base a las evidencias arqueológicas se proponen nuevos caminos para el estudio funcional de estos artefactos en el Medio Oriente.

Valle del Khabur, Coladores, Tamices, Ceràmica, Neolitico Final, Calcolítico.

The paper focuses on the distribution of strainers/sieves in the Khabur Valley during the Late Neolithic and Chalcolithic periods. This contribution tries to substantiate the rare occurrence of this vessel type within the ceramic assemblages of sites in the named area by the use of graphs and tables. On the basis of the evidence, new paths are suggested for a further research of this functional type of Middle Eastern pottery.

Khabur Valley, strainers, sieve, pottery, Late Neolithic, Chalcolithic.

INTRODUCTION

This investigation focuses on the distribution of strainers (also labeled 'sieves' or 'colanders') in the Khabur Valley region during the Late Neolithic and Chalcolithic period. By a *'strainer'*, we mean a vessel, often plain and made from coarse paste that is perforated by holes (Nieuwenhuyse 2007, 111*)*. Our interest in this particular type of pottery derives from past Czech excavations at the Late Neolithic site of Tell Arbid Abyad (Masaryk University, 2006 - 2010) as well as from our current collaboration between Masaryk University and Yale University in the analysis of yet unpublished pottery material that was collected by the Khabur Basin Survey Project (director: Frank A. Hole, Department of Anthropology/Yale University) during the years 1984 - 1997. As a consequence of this ongoing study of survey material, the paper attempts to express the vaguely felt scarcity of perforated vessels in the pottery assemblages of the region in more exact, *quantitative* terms. In order to achieve this, the amount of strainer fragments from a site is put in direct relation to a comparison sample: the best suited non-perforated pottery assemblage available at the respective site.

AIMS AND METHODS

Whereas published sources about strainers found in Europe do exist, e.g. Bogucki (1984) on Neolithic strainers or Valentová and Šumberová (2012) on specimen dated back to the La Tène period, for Upper Mesopotamia there are still no contributions that deal with the issue of the strainers or report their quantities in relation to a other pottery material that has been retrieved from site. Exceptions for the Late Neolithic of the Near East are, for example, the findings of strainers at sites like Tell Sabi Abyad (Nieuwenhuyse 2007) and Tell el-Kerkh

* Centre of Prehistoric Archaeology of the Near East (PANE), Department of Classical Studies, Faculty of Arts Masaryk University, Brno, Czech Republic. AnnaHanzelkova@seznam.cz; max.wilding@phil.muni.cz.

(Tsuneki *et al*. 2000), where subsequent analysis have revealed traces of animal fat, possibly milk (Tsuneki *et al.* 2000, 36), which could be associated with the production of dairy products (Gouin 1990). Currently, this type of perforated sherds is often subsumed in the 'Miscellaneous' or 'Others' categories of found objects, or, in some cases (Matsutani 1991, 24; Çilingiroglu 2009; McMahon *et al*. 2009, 188; Al Quntar 2010, 56), marginally mentioned. This was the reason to undertake an investigation that focuses upon the actual rate of strainer-finds in the chosen region (Khabur Valley).

Apart from the Khabur Basin Project ceramic assemblages, the main body of evidence used for the research consists of the reports, papers, publications, catalogues and various unpublished sources - table of sites, radiocarbon dates, paper drafts - and personal information provided by professor emeritus Frank Hole about his Yale Khabur Basin Survey Project (in the following: KBP). Additionally, this contribution builds upon the published data of other smaller and larger sites in the Khabur region which have been described in the wake of field projects such as *surveys* - namely the KBP (Hole 1993/1994), the Rescue Project of Jean-Yves Monchambert (1984), the Project of Tübinger Atlas des Vorderen Orients (Röllig/Kühne 1983; 1987/88), the prospection project of Bertille Lyonnet (Lyonnet 2000; Nieuwenhuyse 2000), the Tell Hamoukar Survey Project (Ur 2010), the Tell Beydar Survey Project (Nieuwenhuyse/Wilkinson 2008; Ur/Wilkinson 2008), Tell Arbid Prehistoric Survey (Mateiciucová *et al.*. 2012) – and *excavations* at sites like Tell Arbid Abyad (Mateiciucová 2010; Mateiciucová/Wilding 2010), Tell Boueid II (Nieuwenhuyse/Suleiman 2002; Nieuwenhuyse *et al*. 2002), Tell Halaf (Lutz 2012; Becker 2015; Tell Halaf, online), Tell Kashkashok (Koizumi 1993; Matsutani 1991), Tell Chagar Bazar (McMahon *et al.* 2001; 2005; Cruells/Nieuwenhuyse 2004; Cruells 2006; Cruells and Molist 2006), Tell Brak (Oates/Oates/McDonald 1997; 2001; Matthews 2003), Tell Leilan (Weiss 1983; 1985; Weiss *et al.* 1990; Brustolon/Rova 2007) and Tell Ziyadeh (Arzt 2001; Hole 2000a, 2000b; Hole/Arzt 1998; Hole/Tonoike 2016). All strainer sherds found by the Khabur Basin Project in the 1980 and 1990ies were described with the aid of a database created on the basis of the

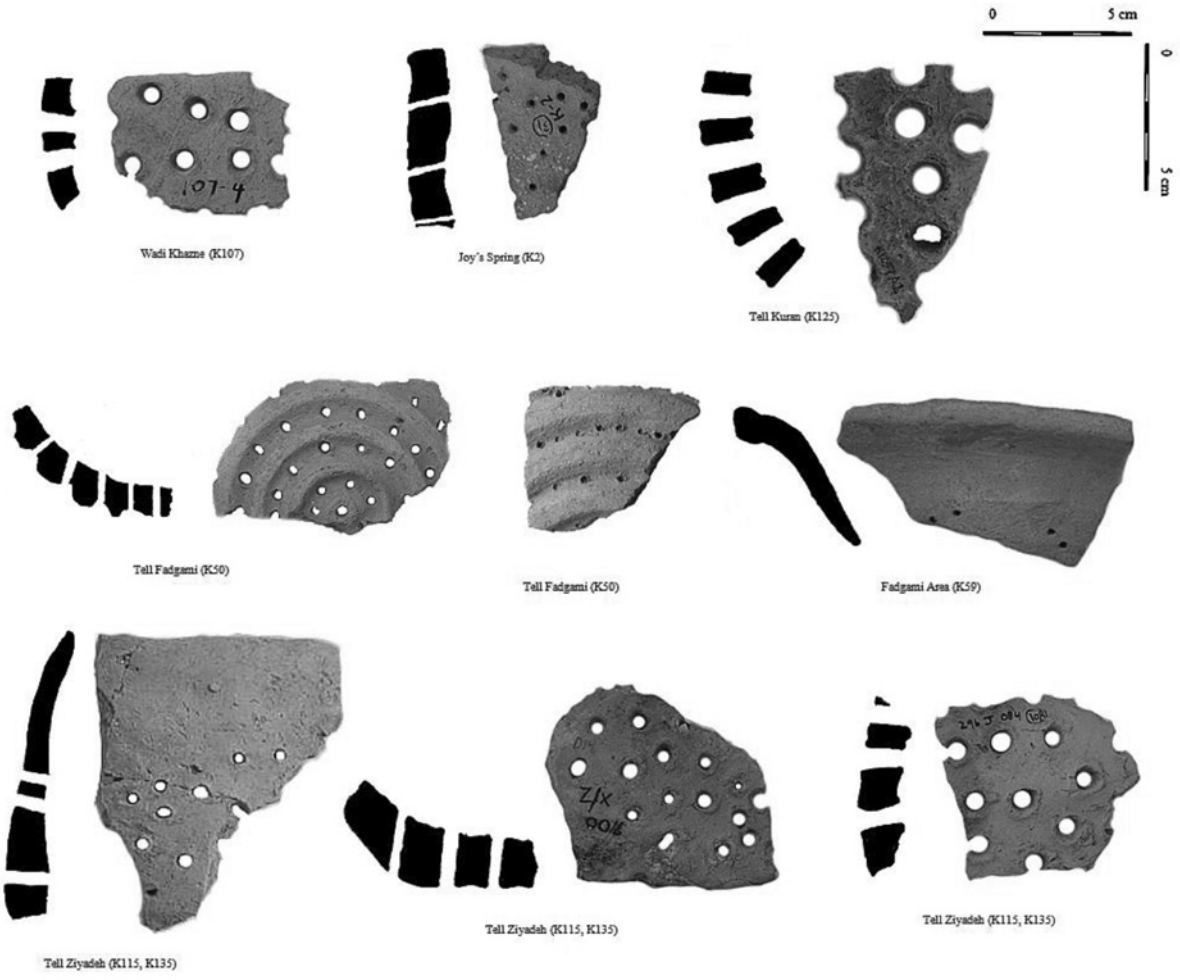

Figure 1. The strainer sherds found by the Yale Khabur Basin Survey Project (1988 – 1997).

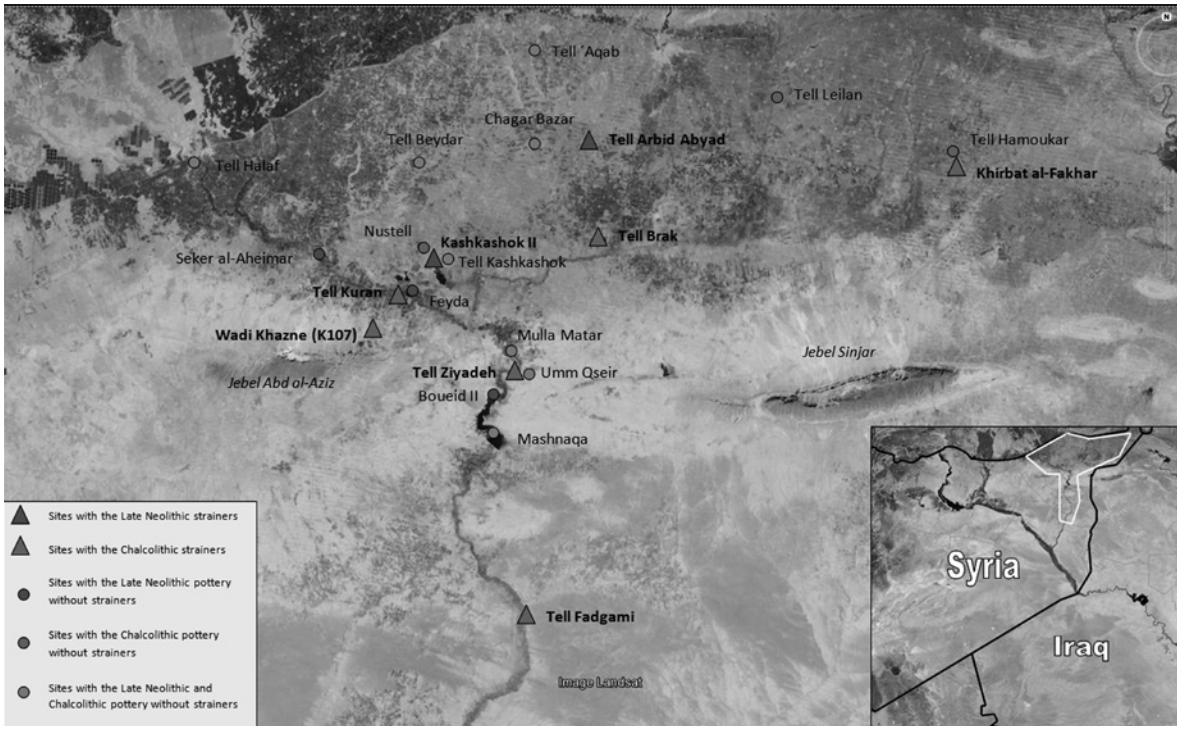

Figure 2. Late Neolithic and Chalcolithic sites with/without strainers in the Khabur region (based on Google Earth, 2015).

description and classification system that has been developed by Olivier Nieuwenhuyse for the Late Neolithic pottery of Tell Sabi Abyad (Nieuwenhuyse 2007)[1]. Furthermone, the KBP strainers have been documented by photos and drawings (Fig. 1). Pottery assemblages presented in published sources by other projects have been searched for 'strainers' or other terms that are in common use for that kind of pottery ('perforated vessels', 'sieves', 'colanders') (Fig. 2). In some cases, the amount of strainers in the pottery assemblages were explicated by drawing up graphs (Fig. 3 a and b; Fig. 5 a and b) which serves to visualize the frequency of strainers in the bulk of pottery found at a particular site[2].

The rationale of the selection has been to obtain as much concrete information on strainers in the Khabur region as possible and to try to show the number of strainer findings in relation to the 'nearest' existing body of non-strainer sherds, both in a temporal as well as spatial sense. However, it has not been within the scope of the present paper (which is based on a BA thesis – Hanzelková 2015) to present all the sites within the Khabur region but only a sample that would serve the investigative purpose. The authors of the paper are fully aware of the differing quality of sources and published data, as well as the differences in the systematization of the research projects and the varying sizes of the investigation areas. Despite these shortcomings, it is hoped that the overall aim of this paper is achieved: by highlighting the *factual trend* on strainer-remains to serve as lever for further studies on this underrated type of Upper Mesopotamian ceramics (see Fig. 4).

RESULTS

Via the study of the material from the Khabur Basin Survey Project and published sources, the following specimens could be identified in the Khabur Valley: *four Neolithic strainer sherds* coming from three out of a total of 135 investigated sites, and *16 Chalcolithic strainer sherds* coming from seven of the 92 examined sites. Of the 20 Khabur strainers in total, eleven stem from five sites in the Khabur headwaters. Two body sherds were discovered at Tell Kashkashok II during the excavations in 1987 and 1988 in K/9-1 and G/12/1 (Layer 1, Proto-Hassuna period) (Matsutani 1991, 19, 24, PL 63-6, 7). At Tell Arbid Abyad, one body sherd

1. A standard description has already been used by the Masaryk University team for investigation of the Late Neolithic pottery at the site Tell Arbid Abyad (Vostrovská *et al.* 2011).
2. Because the data for the calculations were obtained from manifold sources it is likely that not all strainers are listed here that were found at the mentioned sites. What nevertheless becomes apparent, however, is the over-all trend.

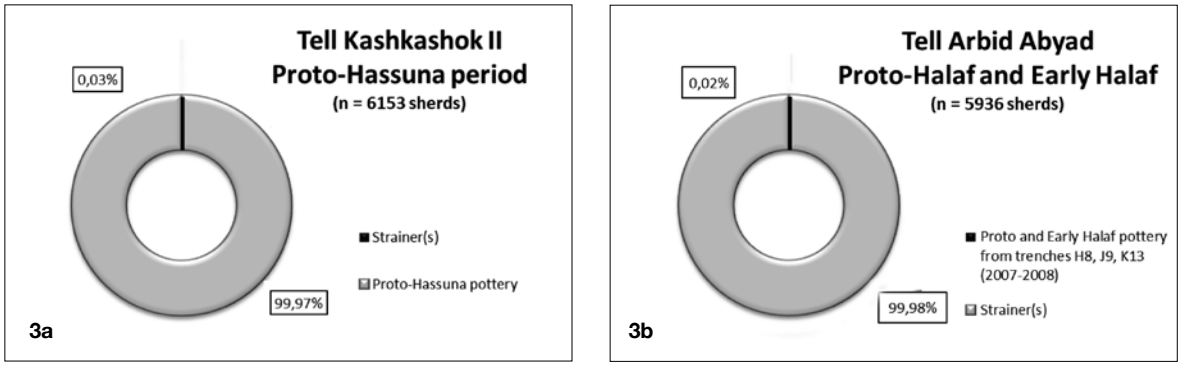

Figure 3. 3a: The amount of comparison sherds and the percentage of ceramic strainers within the Proto-Hassuna pottery assemblage of Layers 3 and 4 at Tell Kashkashok II. 3b:The amount of comparison sherds and the percentage of ceramic strainers within the Proto and Early Halaf pottery assemblages of Tell Arbid Abyad.

was found in 2008 just under the topsoil of Trench K13 (with pottery mostly dated to the Early Halaf period) (Vostrovská *et al.* 2011, Fig. 135:12 Mateiciucová pers. com.). The area of 'Joy's Spring'/KBP K2, with the discovery of one strainer sherd, was surveyed in 1988 by KBP. At Tell Kuran one body sherd was found in 1990 in Area A2 (Ubaid period) (Hole/Kouchoukos in press; Hole *et al*. in press, 5-6). The area of Wadi Khazne/K107 was surveyed in July 1988 and June 1995 within the Khabur Basin Project with the discovery

Region	Site	No. of strainer	Dating of strainer	No. of comparison sherds	Dating of the comparison sherds	Percentage of strainers	References
Upper Khabur Basin	**Kashkashok II**	**2**	**Proto-Hassuna (Layer 1)**	**6 151**	**Hassuna Coarse Ware**	**0,03%**	Matsutani 1991
	B. Lyonnet´s project - Hassuna sites	0		1 485	Hassuna Coarse Ware	0,00%	Le Mière 2000
	B. Lyonnet´s project - Halaf sites	0		1 098	Halaf Fine Ware	0,00%	Nieuwenhuyse 2000
	THS - Hassuna sites	0		88	Hassuna (diagnostic)	-	Ur 2010
	THS - Halaf sites	0		228	Halaf (diagnostic)	-	Ur 2010
	Tell Arbid Abyad	**1**	**Early Halaf (Trench K13)**	**5 936**	**Proto and Early Halaf (trenches H8, J9, K13)**	**0,02%**	Vostrovská et al. 2011; Mateiciucová (pers. com.)
	(Trench K13)			**2 694**	**Early Halaf (K13)**	**0,04%**	Vostrovská et al. 2011; Mateiciucová (pers. com.)
	Tell Halaf	0		-	Late Neolithic, LC3	-	
	TBS - Late Neolithic sites	0		523	Late Neolithic	0,00%	Nieuwenhuyse and Wilkinson 2008
	Chagar Bazar	0		6 077	Late Neolithic (Area E)	0,00%	Cruells 2006
	Joy´s Spring (K2)	**1**	**Late Neolithic**	-	-	-	Hole (KBP)
	Tell Kuran (K93, K125)	**1**	**Northern Ubaid (Area A)**	**381**	**Ubaid (diagnostic from Area A, B, C, D, E)**	**0,26%**	Hole and Kouchoukos in press a; Hole et al. 1990
	Khirbat al-Fakhar	**1**	**LC2 (Area Z)**	**401**	**LC1-2 (diagnostic of central mound)**	**0,25%**	Al Quntar 2010; Ur 2010
	Wadi Khanze (K107)	**1**	**Halaf, Ubaid, LC1-2**	-	-	-	information provided by F. Hole (KBP)
	Tell Brak	**4**	**LC3-5 (Trench CH B, HF)**	-	-	-	Fielden 1981; Matthews 2001
	Tell Hamoukar	0		301	LC3-5 (diagnostic from sampling units)	0,00%	Ur 2010
	THS - Chalcolithic sites	0		1 160	Chalcolithic (diagnostic)	-	Ur 2010
	Nustell			-	LC3-5	-	Schwartz 2001
	Tell Leilain Project	0		947	Late Chalcolithc	0,00%	Brustolon and Rova 2006; 2007
Middle Khabur Valley	Umm Qseir	0		8 200	Halaf	0,00%	Miyake 1998
	Umm Qseir	0		11 596	Halaf	0,00%	Hole and Johnson 1986-87
	Boueid II	0		2 960	Late Neolithic	0,00%	Nieuwenhuyse and Suleiman 2002; Nieuwenhuyse et al. 2002
	Ziyadeh (K135)	**6**	**Northern/Post-Ubaid**	**3 011**	**Northern/Terminal Ubaid (Area J I, J II)**	**0,20%**	Arzt 2001; Hole (pers. com.)
	Mashnaqa	0		461	Ubaid, Post-Ubaid	0,00%	Hole and Kouchoukos in press a; Hole et al. 1990
	Mulla Matar	0		-	Uruk	-	Monchambert 1984
Lower Khabur Valley	**Tell Fadgami (K50)**	**2**	**Uruk**	-	-	-	information provided by F. Hole (KBP)
	Fadgami Area (K59)	**1**	**Uruk**	-	-	-	information provided by F. Hole (KBP)
	Total	**20**					

Figure 4. The Late Neolithic and Chalcolithic ceramic strainers of the Khabur Valley in relation to the comparison sherds.

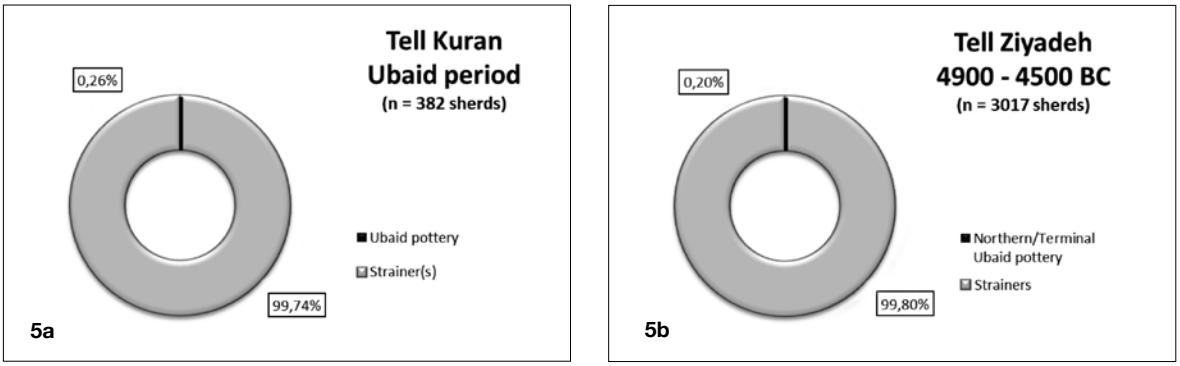

Figure 5. 5a: The amount of comparison sherds and the percentage of ceramic strainers within the Ubaid pottery of Tell Kuran (Area A, B, C, D, E). 5b: The amount of comparison sherds and percentage of ceramic strainers within the Northern and the Terminal Ubaid pottery assemblages of Tell Ziyadeh uncovered since 1997.

of one strainer body sherd. A single body sherd was recognized in the Hamoukar Southern Extension, Area Z, Phase 2 (LC2 period), which was excavated during the seasons 2005-2006 and 2008 (Al Quntar 2010, 50-56, 114 Fig. 3.25; Ur 2010, App. B, 231-240, App. C, 359-360). Three body sherds were found at Tell Brak in the HF spur, units A7020, A7044, A7046 (Late Uruk period) (Matthews 2003, 10-13, 18-19, Fig. 2.7: 23, 20-21, Fig. 2.8: 7, 9) and one strainer body sherd was excavated in Trench CH B, Phase 4 (Fielden 1981, PL 5:23). Furthermore, six strainers were uncovered at the site of Tell Ziyadeh in the Middle Khabur Valley - three of them were found during the Khabur Basin Project and three other strainer sherds were discovered during the salvage excavations in 1995-1997 in Area J, level 2 and 13 (Ubaid and post-Ubaid period) (Arzt 2001, 21-24, 126-127; Hole 2000a; 2000b; Hole/Arzt 1998). The remaining three specimens (dating to the Uruk period) come from Tell Fadgami (K50) and its surroundings (K59), which were located and surveyed in July 1988 during the KBP. Although two of these strainers, the first from Tell Fadgami and the second from its surroundings, have very small holes and do not have a totally typical shape, they are undoubtedly part of this "strainer collection" (Fig. 5b).

DISCUSSION

Even if we consider the above data on the occurrence of Late Neolithic and Chalcolithic age strainers in the Khabur Valley to be incomplete, the results lead to a striking realization: the strainers are reported exclusively in very small numbers - with the percentage of their occurrence in the ceramic materials invariably hovering around '1' (*irrespective of the size, the design or the actual circumstance of the survey or excavation, and irrespective of whether this relates to tangible sherd collections or published information*).

In the case of the Middle Khabur, the number of existing strainers may be kept low by the fact that some of the archaeological sites along the river have become inaccessible after the construction of the Hassake-South dam. Still, it is remarkable that - except for the site Tell Ziyadeh - a whole series of *large and well-studied excavation sites* in the Khabur Valley like Tell Halaf (Lutz 2012; Becker 2015; Tell Halaf, online), Tell Chagar Bazar (McMahon *et al.* 2001; 2005; Cruells/Nieuwenhuyse 2004, 53-56; Cruells 2006; Cruells/Molist 2006), Tell Brak (Oates/Oates/McDonald 1997; 2001; Matthews 2003) and Tell Leilan (Weiss 1983; 1985; Weiss *et al.* 1990; Brustolon/Rova 2007) have produced either very few strainer sherds, or none at all. Equally, none of the other above-mentioned renowned surveys like Jean-Yves Monchambert's Survey (Monchambert, 1984), Bertille Lyonnet's Prospection Survey (Lyonnet 2000; Nieuwenhuyse 2000) the Tell Beydar Survey (Nieuwenhuyse/Wilkinson 2008; Ur/Wilkinson 2008), and the Tell Hamoukar Survey (except THS 25) (Ur 2010) report many strainers (this time dating between the late 7th to 4th millennium) in their respective published sources.

Such observation leads to specific questions: are the lacunae of strainers perhaps just a characteristic of the Khabur Valley? When taking a look now at an adjacent river basin, the Balikh Valley, it turns out that - according to the published data -the well-excavated Late Neolithic site of Tell Sabi Abyad I has likewise brought forward only two strainers among the bulk of 49,974 Late Neolithic potsherds, 89% of which consists of plant-tempered Standard Ware) (Nieuwenhuyse 2007, 53, Table 4.3.1., 111). At another site in the Balikh Valley, Tell Tawila, no strainer sherds were discovered (Becker 2015). Also, one of the first consequences of this persistent trend is that the interpretation of strainers as a 'basic commodity' (e.g. Matthews 2003, 197-199) (which underlies many past and current interpretations of strainers) comes under pressure. Simply said: if clay functional strainers have served mundane

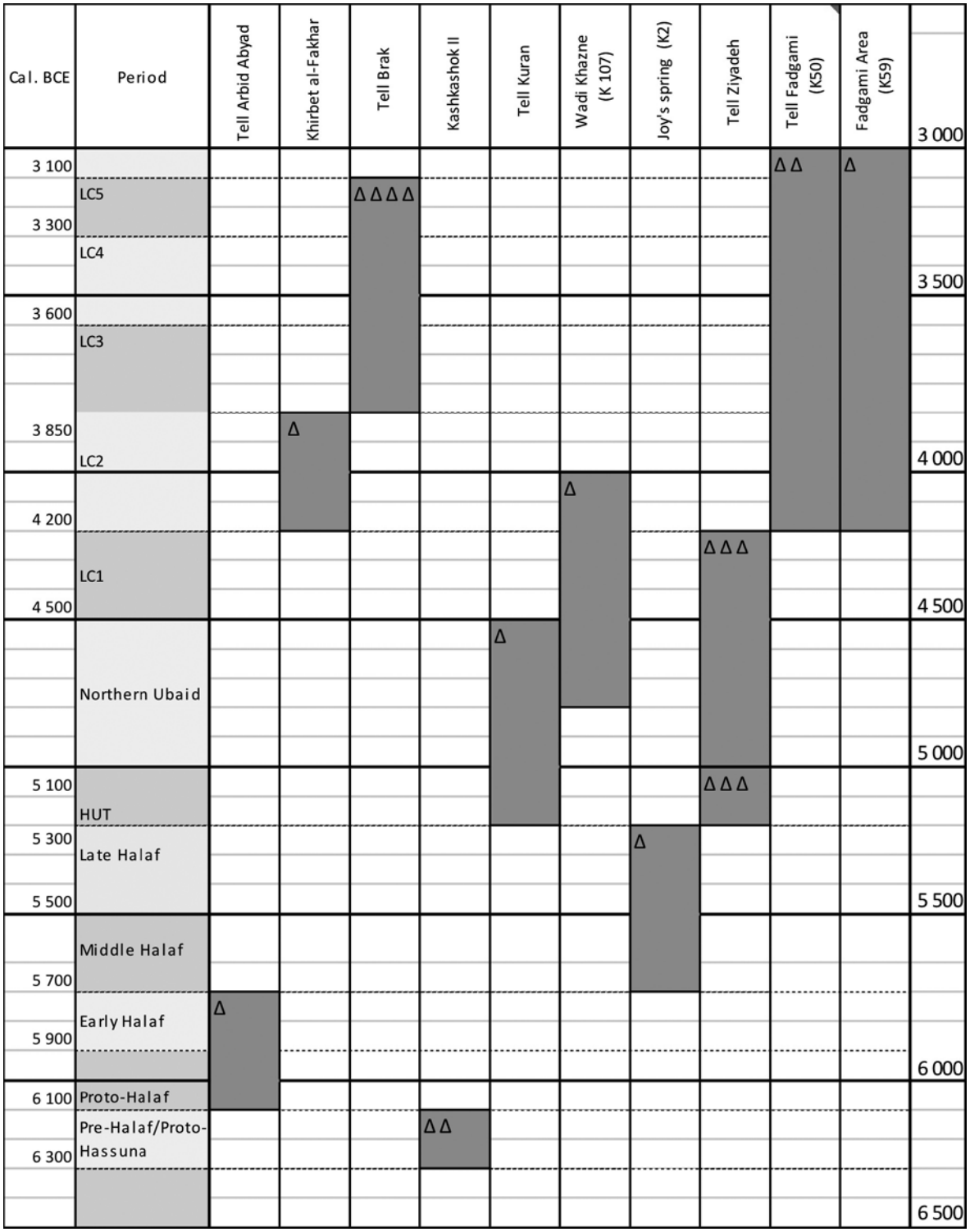

Figure 6. The number of Khabur Valley strainers in relation to the considered archaeological periods (n = 20).

food processing purposes, should we not expect to find remains of them more often in the assemblages of archaeological potsherds? No matter what it remains an enigma why such a *well-defined, easily reproducible and archaeologically highly 'visible' pottery-type* has been, in some instances, expertly produced on the one hand, and on the other hand occurs in very low numbers only in the materials of well-studied and well-preserved sites in Upper Mesopotamia, across a range of archaeological ages. The scope of the present text permits only to briefly touch on three major factors (A, B, C) which could in theory lead to the per-

sistently low number of remains of this artifact type in the archaeological record of the region:

A. 'Cultural factor'. Ceramic strainers *were not produced* in larger numbers. Ceramic strainers (despite their assumed usefulness and ease of making) had *de facto* been items which have been infrequently produced and used by occupants of the Khabur Valley throughout major cultural periods, perhaps on account of the existence of an even better suited alternative that tended not to be preserved (*matted or wickerwork utensils*).

B. Preservation factor. Ceramic strainers *did not survive* in larger numbers. For some yet unknown reason, taphonomical agents affect the strainer sherds more easily over time than plain pottery sherds of the same dimensions.

C. Documentation factor. Ceramic strainers *have not been recorded* in larger numbers. Strainer sherds are somehow misrepresented in field-archaeological and find-administrative records. During find administration they tend to be subsumed in unspecific categories like 'Others' or 'Miscellaneous' (perhaps due to their infrequent appearance?), and thus have an even higher chance to disappear from the published data on ceramics.

It is proposed that novel research on Mesopotamian strainers could aim at ruling out some of the above basic variants by the following rationale.

Turning to the 'cultural' factor first, a plausible explanation seems to be that the mundane filtering-function of ceramic strainers could have been simply fulfilled by an analogous implement in most cases. Indeed, the complete vacuum of any functional substitute for ceramic strainers in the archaeological record makes a strong case for assuming that the inferred objects have been *highly perishable*.

It is tempting to think of some kind of *organic, matted or wickerwork sieving utensil* in this connection (Valentová/ Šumberová 2012, 343). To be specific, basketry products can supposedly be handled with greater ease (notably if one hand is busy with pouring) than flat, flexible mats, or items made out of some sort of canvas. Consequently, basketry products - stable in shape - could have been more in use than ceramic strainers on the account of *their instant availability, serviceability and their higher throughput while sieving.*

The possibility to actually prove the existence of organic strainers is restricted by the preservation problem of wickerwork. If, however, we adopt this view point, then, easy to furnish, light-weighted, unbreakable (plaited) sieving devices (multi-purpose?) should have been widely in use by farming households[3], perhaps in matching forms over millennia. Furthermore, if strainers of organic origin should indeed have been that extensively used, then their faint remains might also appear in the trenches sooner or later in association with storage vessels or food processing areas (a factor to at least consider in the future when coming across remains of plaited material in the trenches[4]).

The caveat of this 'alternative strainers explanation' is that it does not explain the principal occurrence of prehistoric ceramic strainers that look no different from colanders of clay, which are produced and used in many parts of the world today. It is a matter-of-fact that the few specimens that we have from the Khabur (see Fig. 1) all point to a full-fledged, entirely functional vessel-type whose purpose in all likelihood has been to separate a liquid component from the rest of a primary substance.

However, since we are dealing here with earthen products, *temperature* should perhaps be taken into the consideration. Could, for instance, boiling liquids damage basketry strainers out of common organic materials and render them unusable? In the said case (i.e., the straining of boiling liquids) ethnoarchaeological research backed-up by experimental archaeology should be a novel way to approach Khabur Valley type clay strainers[5].

Looking at cause B ('preservation factor'), another factor to explain the low frequency of actual finds of ceramic strainers could be a (yet unknown) structural property of the strainer sherds that limits their capabilities to withstand the effects of artifact aging. This would be a specific quality of strainer vessels that spurs their disintegration, somehow reduces the life-span of strainer sherds in comparison to plain sherds, and lowers their chance of being encountered on the surface and in the trench.

3. A focused ethnographic-ethnoarchaeological investigation in appropriate regions in the vicinity should be staged to verify or reject the matter-of-fact usage of strainers made from perishable (organic) materials.
4. Limited (rounded?) patches of plaited material found during excavating could sometimes represent sieves or spherical baskets rather than square mats.
5. Another *thermal use* of perforated clay vessels needs to be mentioned here too: ceremonial incense-burning. The recent-ethnographic Greek incense burner (καπνιστήρι/*kapnistíri*) e.g., is in some cases likewise made of course clay and perforated (London *et al.* 1990; Ionas 1998; 2000; Demetriou 2001). The perforations, however, are fewer, more widely spaced, and for practical reasons they are never found in the *lowest part* of the implement where usually multiple small supports or a base ring sit for practical reasons (= a characteristic that may help to discern sieving items from incense burners archaeologically).

One notable structural difference with common sherds in this respect is that many tiny holes are punched through the wall of ceramic strainers that, under mechanical stress, may act like the perforations that we know from postage stamps blocks and other applications that possess *predetermined breaking points*. It would not be illogical to assume that, as a consequence of the regularly spaced holes, breaks should spread more easily in strainer sherds than in plain sherds of comparable material, thickness and dimension. Not only this: each of the perforations that are relatively tightly packed allows agents that are detrimental to pottery conservation (humidity, salt, frost etc.) deep access to the sherd's core material, contrary to the case of the ordinary sherd.

Henceforth it would be worthwhile to undertake (comparative) taphonomic experiments with modeled strainer sherds to assess their ability to withstand effects of mechanical stress/physicochemical exposure, in comparison to similar dimensioned plain sherds. Should strainers turn out to be inferior in this regard, it should be taken into account when reflecting on the cultural practice - for example, when making assumptions about how important and widespread ceramic strainers have been in the Khabur region during Late Neolithic and Chalcolithic times.

Finally, when considering cause C (Documentation factor), it does not deserve much elaboration to claim that the effect of not having a separate category for ceramic strainers in routine excavation documentation will twist our perception of the frequency and cultural significance of clay strainers in that region. Once fed to the broad and indeterminate class of 'Others' in field documentation and find administration, this kind of 'odd' sherds would have low chances to resurface during the later analytical stage of knowledge production (cf. Al Quntar 2010, 56; Çilingiroglu 2009; Matsutani 1991, 24; McMahon 2009, 188). However, it can also be assumed that the characteristic perforated sherds will not be easily overlooked by archaeologists or the people employed in sherd-washing. Judging from how, commonly, the main find categories at a new site become assigned over time (usually following a pragmatic 'first come, first serve'-principle), one may assume that perforated strainer sherds do indeed occur in low frequencies only - otherwise this *especially ostentatious, functional ceramic type* would quite likely form an independant find category early on. Still, in order to rule out that a crude sampling error enters artifact interpretation, it makes sense to check the 'Miscellaneous' category at sites with a long-standing research tradition, also with a view of better supporting the fact that perforated clay vessels appear in negligible numbers in the first place.

CONCLUSION

The submitted paper aims to quantify and visualize the rare occurrence of strainers in the pottery assemblages of the major Late Neolithic and Chalcolithic sites in the Khabur Valley region. Two bodies of evidence were considered: (1) actual survey material (from the Yale Khabur Basin Survey Project in the 1980/90ies) and (2) published data from the most proliferous archaeological projects in the region (both surveys and excavations). The visualization aim is supported by using tables and graphs which display the percentages of strainers in relation to representative pottery assemblages that are pertinent to the same time horizon/place to which the ceramic strainer finds belong. (For this purpose the most suited and well-dated comparison samples of plain pottery at a site have been sought for).

Within the scope of the initially defined criteria, only *20 strainer sherds in total* (four dating to the Late Neolithic and 16 belonging to the Chalcolithic period) have been identified in the Khabur Basin Project survey material as well as in the publications of the major projects considered in this contribution[6]. The eleven strainers attested for the Upper Khabur Valley originate from seven individual (surveyed/excavated) sites (see Fig. 4). In the Middle Khabur Valley all six strainer fragments stem from a single site, Tell Ziyadeh (KBP), and they are dating to the Ubaid period. Likewise, in the Lower Khabur Valley the remaining three strainer sherds have come from a single site. The said Uruk sherds have been found when surveying Tell Fadgami and its immediate surroundings (Fig. 6).

The genuine result of the current study is the corroboration of a well-known, yet surprising tendency, considering the fact that clay strainers represent a functional, uniquely identifiable type of undecorated pottery ware: throughout the Khabur Valley, the ceramic strainers appear in negligible numbers only (in most cases below 1%), irrespective of the type, the extent, duration or preferences of the considered research projects (older vs. newer projects; excavation vs. survey; limited vs. vast area; differing research focuses; differing institutional preferences and so forth).

Three *speculative* reasons have been raised here, which may help to understand why research has so infrequently come across ceramic strainers in the Khabur River Valley. (By accident they appear as pre-dig, dig, post-dig factors):

6. Altogether more than 200 Late Neolithic and/or Chalcolithic sites in the Khabur Valley (see Hanzelková 2015).

A. 'Cultural' factor. Predominantly strainers of organic-perishable material (basketry?) were used in the said regions. Besides of milk processing (Tsuneki *et al.* 2000, 36), clay strainers may have been specially used for treating boiling liquids.

B. Preservation factor. The likelihood of sherd preservation is significantly lower for strainers than for the common (plain) vessels types as a consequence of the multiple perforations forming 'built-in breaking points' and allowing in-depth access of agents of degradation to the interior clay substance of strainer sherds.

C. Documentation factor. Occurring infrequently, strainer sherds may not always constitute a distinct potsherd class within the find registration of a site. Together with a range of other specimens which defy routine classification, they may occasionally end up in the amorphous class of 'Other' or 'Miscellaneous' items, with a fair chance of being accidentally by-passed in the subsequent pottery analysis.

All three effects together may have turned simple clay strainers into a rare pottery category in the Khabur region. Besides drawing up three theoretical causes, no further effort is made here to rationalize the lack. However, reasoning (see 'Discussion') implies that reason A is more likely instrumental in strainer paucity than B (even small strainer pieces would stick out via their boreholes), and that cause B in turn is supposedly more decisive than reason C.

On the basis of these three causes, a verification-falsification procedure can be launched to ultimately shed more light on the peculiar lack of strainers of clay in the archaeological record of the Khabur Valley. The authors suggest a *multipronged research process* that combines:

(1) an exemplary re-study of the 'Others' pottery class at the most proliferous Khabur projects (documentation perusal; checking of specific assemblages)

(2) systematic taphonomical trials with experimental strainers (interplay with laboratory material analysis) and

(3) an ethnoarchaeological project designed to elucidate the actual use of traditional strainer implements made of differing materials which will be a stimulus for the further study of Khabur strainers.

Beyond these issues, there are some other questions which could be successfully addressed by future ventures:

Does the same situation prevail in other regions in Mesopotamia as well, or is the remarkable paucity of strainers an idiosyncrasy of the Khabur Valley and the neighboring Balikh?

What does it mean that the sites in the northern part of the Khabur Valley have more strainers in comparison to the sites in the south (i.e. below the Hassake dam)?

Even if this paper has presented only some fraction of the total information on the strainers, there is little doubt that their numbers in the ceramic assemblages is exceedingly low in the region's archaeological record.

Currently, no straightforward explanation can be given for the remarkable 'void' of sherds of this basic, highly functional vessel-type in the most important pottery assemblages of the Khabur region during prehistoric times.

Despite being undecorated and 'obvious', perforated vessels sherds still should get some extra attention by pottery science. There are good indications that the unimposing sherds have a more complex story to tell than so far assumed.

REFERENCES

AL QUNTAR, S. 2010, The Role of Craft Specialisation and Exchange in the Emergence of Early Mesopotamian Urbanism, Doctoral Paper, Cambridge, University of Cambridge.

AL QUNTAR, S., KHALDI, L., UR, J. 2011, Proto-Urbanism in the Late 5th Millennium BC: Survey and Excavations at Khirbat al-Fakhar (Hamoukar), Northeast Syria, Paléorient 37/2, 151-175, retrieved 17th June 2016 on Harvard University's DASH repository <http://dash.harvard.edu/handle/1/10873239>.

ARZT, J.M. 2001, Excavations at Tell Ziyadeh, Syria: The Northern Ubaid Reconsidered, Doctoral Paper, New Haven, Yale University.

BECKER, J. 2015, *Tell Tawila, Tell Halaf und Wadi Hamar: Halaf- und ‚Obed-Zeit in Nordost-Syrien.: Regionale Entwicklungen, Gemeinsamkeiten und Unterschiede, 2 Parts,* Berlin, Ex oriente.

BOGUCKI, P.I. 1984, Ceramic Sieves of the Linear Pottery Culture and their Economic Implications, Oxford Journal of Archaeology 3/1, 15-30.

BRUSTOLON, A., ROVA, E. 2006, The Late Chalcolithic settlement in the Tell Leilan region of Northeastern Syria: A preliminary assessment, Proceedings of the 5th International Congress on the Archaeology of the Ancient Near East, Vol. 1 (Madrid, April – 8 April 2006), Universidad Autónoma de Madrid), UAM Ediciones, 357-381.

BRUSTOLON, A., ROVA, E. 2007, The Late Chalcolithic Period in the Tell Leilan Region: a Report on the Ceramic Material of the 1995 Survey, Kaskal 4, 1-42.

CRUELLS, W. 2006, Chagar Bazar Préhistorique. Es-

quisse de la Séquence d'Évolution et la Périodisation, in Tunca, Ö. and Baghdo, A. (Eds.) Chagar Bazar (Syria) I. Les Sondages Préhistoriques (1999-2001), Louvain-Paris-Dudley (MA), Peeters, 121-142.

CRUELLS, W., MOLIST, M. 2006, Au Sein de la Préhistorique du Bassin du Khabur. in Tunca, Ö. and Baghdo, A. (Eds.) Chagar Bazar (Syrie) I. Les Sondages Préhistoriques (1999-2001), Louvain-Paris-Dudley (MA), Peeters, 143-154.

CRUELLS, W., NIEUWENHUYSE, O.P. 2004, The Proto-Halaf period in Syria: New sites, new data, Paléorient 30/1, 47-68.

ÇILINGIROGLU, Ç. 2009, Central-West Anatolia at the End of 7th and Beginning of 6th Millennium BCE, in the Light of Pottery from Ulucak (İzmir), PhD. Dissertation, Tübingen, Eberhard-Karls-University Tübingen.

DEMETRIOU, M. 2001, Traditional pottery in Cyprus, Nikosia: Ethnographiko Mouseio Kyprou.

FIELDEN, K.J. 1981, The Chronology of Settlement in Northeast Syria During the Later Fourth and Third Millennia B.C. in the Light of Ceramic Evidence from Tell Brak, Doctoral Paper, Oxford, Faculty of Oriental Studies, Corpus Christi College.

GOUIN, P. 1990, Rapes, jarres et faiselles. La production et l'exportation des produits laitiers dans l'Indus du 3e millénaire, Paléorient 16/2, 37-54.

HANZELKOVÁ, A. 2015, Strainers: Observations on a Distinct Type of Neolithic and Chalcolithic pottery in the Khabur Valley (Northeastern Syria), unpublished Bachelor Thesis, Brno, Masaryk University.

HOLE, F. 1993/1994, The Habur Basin Project, Archiv für Orientforschung 45/46, 289-298.

HOLE, F. 2000a, Tell Ziyadeh on the Middle Khabur, Syria, 1st International Congress on the Archaeology of the Ancient Near East (Rome, 18-23 May 1998), Rome, Universitá degli Studi di Roma "La Sapienza".

HOLE, F. 2000b, The Prehistory of the Khabur, *In* O. Rouault and M. Wäfler (Eds.) La Djéziré et l´Euphrate syriens de la protohistoire á la fin du IIe millénaire av. J.-C.: tendances dans l´interpretation historique des données nouvelles, Turnhout, Brepols, Subartu, vol. 7, 16-27.

HOLE, F., ARZT, J. 1998, Excavations at Tell Ziyadeh, 1996-97, Orient-Express 1998/3, 64-66.

HOLE, F., JOHNSON, G.A. 1986-87, Umm Qseir On The Khabur: Preliminary Report on the 1986 excavation. Annales Archaéologiques Arabes Syriennes 36/37, 172-220.

HOLE, F., JOHNSON, G.A., KOUCHOUKOS, N. *et. al.* (in press), Preliminary Report on the Joint American-Danish Archaeobiological Sampling of Sites in the Khabur Basin (1990), Unpublished manuscript.

HOLE, F., KOUCHOUKOS, N. (in press a), Stratigraphic Soundings at Tell Mashnaqa on the Khabur River, 1991, Unpublished manuscript.

HOLE, F., KOUCHOUKOS, N. (in press b), Preliminary report on an Archaeological Survey in the Western Khabur Basin, 1994, Unpublished manuscript.

HOLE, F., KOUCHOUKOS, N. (in press c), Preliminary report on an Archaeological Survey in the Western Khabur Basin, 1995, Unpublished manuscript.

HOLE, F., TONOIKE, Y. 2016, Geography and Environment of the Khabur Basin, in F. Hole and Y. Tonoike (Eds), Homesteads on the Khabur: Tell Ziyadeh and Other Settlements, Oxford, BAR International Series 2827: 13-38.

IONAS, I. 1998, Pottery in the Cyprus Tradition, Nicosia, Cyprus Research Centre, Publications of the Cyprus Research Centre, 23.

IONAS, I. 2000, Traditional pottery and potters in Cyprus: The disappearance of an ancient craft industry in the 19th and 20th centuries, Aldershot: Ashgate, Birmingham Byzantine and Ottoman Monographs, 6.

KOIZUMI, T. 1993, Ubaid Pottery from Kashkashok II: Typology and Chronology, Al-Rafidan 14, 19-67.

LE MIÉRE, M. 2000, L'occupation proto-Hassuna du Haut-Khabur occidental d'après la céramique, in Lyonnet, B. (Eds), Prospection archéologique du Haut Khabur occidental (Syrie du N.E.), Vol. I., Beyrouth, Institute Français du Proche-Orient, 127-149.

LE MIÉRE, M. 2013, Neolithic pottery from the Khabur basin: A reassessment in the light of recent discoveries, in Nishiaki, Y., Kashima, K., Verhoeven, M. (Eds), Neolithic Archaeology in the Khabur Valley, Upper Mesopotamia and Beyond: Studies in early Near Eastern production, subsistence and environment no. 15., Berlin, ex oriente, 96-109.

LONDON, G., EGOUMENIDOU, F., KARAGEORGHIS, V. 1990, Töpferei auf Zypern damals - heute. Traditional pottery in Cyprus, Mainz am Rhein: von Zabern.

LYONNET, B. 2000, Prospection archéologique du Haut-Khabur occidental (Syrie du N.E.), Vol. I., Beyrouth, Institute Français d´Archéologie du Proche-Orient.

LUTZ, M. 2012, Research history of Tell Halaf, retrieved 17th June 2016 on, <http://www.grabung-halaf.de/pdfs/ResearchResearchHistory_eng.pdf>.

MALLOWAN, M. 1936, The Excavations at Tall Chagar Bazar, and an Archaeological Survey of the Habur Region, 1934-5, Iraq 3/1, 1-85.

MATEICIUCOVÁ, I. 2010, Tell Arbid Abyad – A New Late Neolithic Site in the Upper Khabur Basin, NE Syria: The First Preliminary Report, in P. Matthiae, F. Pinnock, L. Nigro and N. Marchetti (Eds), *Proceedings of the 6th International Congress on the Archaeology of the Ancient Near East (ICAANE)*, 5–10 May 2008, 'Sapienza' - Università di Roma, Vol. 3, 411–422, Wiesbaden, Harrassowitz Verlag.

MATEICIUCOVÁ, I., WILDING, M. 2010, Final Report of the Excavation Project of the Masaryk University Brno at Tell Arbid Abyad, unpublished final report (pdf version).

MATEICIUCOVÁ, I., VLACH, M., MATOUŠEK, J., MILO, P., TENCER, T. 2012, A Preliminary Report of Surface Survey and Geophysical Prospection in the Micro-region of Tell Arbid, NE Syria, in Matthews, R., Curtis, J. (Eds), Proceedings of the 7th International Congress on the Archaeology of the Ancient Near East, 12 April – 16 April 2010, the British Museum and UCL, London, Vol. 3: Fieldwork & Recent Research Posters. Wiesbaden, Harrassowitz Verlag, 17-32.

MATSUTANI, T. 1991, Tell Kashkashok: Excavations at Tell No. II., Japan, The University of Tokyo, The Institute of Oriental Culture.

MATTHEWS, R. 2003, Excavations at Tell Brak, Vol. 4: Exploring an Upper Mesopotamian Regional Centre, 1994–1996, Cambridge, McDonald Institute for Archaeological Research.

McMAHON, A., COLANTONI, C., SEMPLE, M. 2005, British Excavations at Chagar Bazar, 2001-2002. Iraq 67/2, 1-16.

McMAHON, A., COLANTONI, C., FRANE, J., SOLTYSIAK, A. 2009, Once There Was a Place: Settlement Archaeology at Chagar Bazar 1999-2002, Exeter, Short Run Press.

McMAHON, A., TUNCA, Ö., BAGDO, A.-M. 2001, New Excavations at Chagar Bazar, 1999-2000, Iraq 63, 201-222.

MIYAKE, Y. 1998, Halaf Pottery, in Tsuneki, A. and Miyake, Y. (Eds.) Excavations at Tell Umm Qseir in Middle Khabur Valley, North Syria: Report of the 1996 Season, Tsukuba, University of Tsukuba, Department of Archaeology, 41-85.

MONCHAMBERT, J.-Y. 1984, Le Futur lac du Moyen Khabour: rapport sur la prospection archéologique menée en 1983, Syria 61/3-4, 181-218.

NIEUWENHUYSE, O.P. 2000, Halaf Settlement in the Khabur Headwaters, in Lyonnet, B. (Eds), Prospection archéologique du Haut-Khabur occidental (Syrie du N.E.), Vol. I, Beyrouth, Institute Français d´Archéologie du Proche-Orient, 151-198.

NIEUWENHUYSE, O.P. 2007, Plain and Painted Pottery: The Rise of Late Neolithic Ceramic Styles on the Syrian Plains and the Northern Mesopotamian Plains, Papers on Archaeology of the Leiden Museum of Antiquities 3, Turnhout, Brepols Publishers.

NIEUWENHUYSE, O.P., JACOBS, L., VAN AS, B. 2002, Chapter 4: The ceramics, in Nieuwenhuyse, O.P. and Suleiman, A. (Eds), Tell Boueid II: A Late Neolithic village on the Middle-Khabur (Syria), Brussel, Brepols, 35-123.

NIEUWENHUYSE, O.P., SULEIMAN, A. 2002, Tell Boueid II. A Late Neolithic village on the Middle-Khabur (Syria), Brussel, Brepols.

NIEUWENHUYSE, O.P., WILKINSON, T.J.W. 2008, Late Neolithic settlement in the area of Tell Beydar, (NE Syria), in Lebeau, M., Suleiman, A. (Eds), Beydar Studies I, Subartu XXI., Turnhout, Brepols, 268-303.

NISHIAKI, Y., LE MIÉRE, M. 2005, The Oldest Pottery Neolithic of Upper Mesopotamia: New Evidence from Tell Seker Al-Aheimar, the Khabur, Northeast Syria, Paléorient 31/2, 55-68.

OATES, D., OATES, J., McDONALD, H. 1997, The Excavations at Tell Brak 1: The Mitanni and Old Babylonian Periods, Cambridge, McDonald Institute for Archaeological Research.

OATES, D., OATES, J., McDONALD, H. 2001, Excavations at Tell Brak - Vol. 2: Nagar in the Third millennium, Cambridge, McDonald Institute for Archaeological Research.

PFÄLZNER, P., BECKER, C., DOHMANN, H., KULEMANN, S. 1988, Tell Bderi 1985, Bericht über die erste Kampagne, Damaszener Mitteilungen 3, 223-386.

POIDEBARD, A. 1928, Mission archéologique en Haute Djezireh (Autumne 1927), Syria 9/3, 216-223.

RÖLLIG, W., KÜHNE, H. 1977/78, The Lower Habur: A Preliminary Report on a Survey Conducted by the Tübinger Atlas des Vorderen Orients in 1975, Les Annales Archéologiques Arabes Syriennes 27/28, 115-140.

RÖLLIG, W., KÜHNE, H. 1983, The Lower Habur: Second Preliminary Report on a Survey in 1977, Les Annales Archéologiques Arabes Syriennes 33/2, 197-199.

SCHWARTZ, G.M. 2001, Syria and the Uruk expansion, in Rotman M. (Ed), Uruk Mesopotamia and Its Neighbors: Cross-Cultural Interactions in the Era of State Formation, Santa Fe, SAR Press, 233-264.

TOMITA, T. 1998, Pottery from Later phases, in Tsuneki, A. and Miyake, Y. (Eds), Excavations at Tell Umm Qseir in Middle Khabur Valley, North Syria: Report of the 1996 Season, Tsukuba, University of Tsukuba, Department of

Archaeology, 141-160.

TSUNEKI, A., HYDAR, J., MIYAKE, Y. *et al.* 2000, Fourth preliminary report of the excavations at Tell el-Kerkh (2000), Northwestern Syria, Bulletin of the Ancient Orient Museum 21, 1-36.

TSUNEKI, A., MIYAKE, Y. 1998, Excavations at Tell Umm Qseir in Middle Khabur Valley, North Syria: Report of the 1996 Season, Tsukuba, University of Tsukuba, Department of Archaeology.

UR, J.A. 2002a, Settlement and Landscape in Northern Mesopotamia: The Tell Hamoukar Survey 2000-2001, Akkadica, 123/1, 57-88.

UR, J.A. 2002b, Surface Collection and Offsite Studies at Tell Hamoukar, 1999, Iraq 64, 15-44.

UR, J.A. 2004, Urbanism and Society in the Third Millennium Upper Khabur Basin, Doctoral Paper, Chicago, the University of Chicago, retrieved 17th June 2016 on <http://oi.uchicago.edu/sites/oi.uchicago.edu/files/uploads/shared/docs/urj.pdf>.

UR, J.A. 2010, Urbanism and Cultural Landscapes in Northeastern Syria: The Tell Hamoukar Survey, 1999-2001, Chicago, Oriental Institute of the University of Chicago, Oriental Institute Publications 137.

UR, J. A., WILKINSON, T. J. 2008, Settlement and Economic Landscapes of Tell Beydar and its Hinterland, in Lebeau, M., Suleiman, A. (Eds), Beydar Studies I., Turnhout, Brepols, 305-327, retrieved 17th June 2016 on <http://www.people.fas.harvard.edu/~jasonur/pdf/Ur_Wilkinson_2008_Subartu.pdf>

VALENTOVÁ, J., ŠUMBEROVÁ, R. 2012, Keramické cedníky, poklopy a trychtýře z oppida Stradonice, Archeologické rozhledy 64, 333-346.

VOSTROVSKÁ, I., FILIPOVÁ, M., MATEICIUCOVÁ, I., SALVETOVÁ, SEDLÁKOVÁ, R., TÓTH, P., TRÁVNÍČKOVÁ, Š., UCHYTILOVÁ, J., ZAHRÁDKOVÁ, L., 2011, Late Neolithic Pottery from the Tell Arbid Abyad: Catalogue from seasons 2007-2008, unpublished pottery catalogue (pdf version).

WEISS, H. 1983, Excavations at Tell Leilan and the Origins of North Mesopotamian cities in the Third Millennium B.C., Paléorient 9/2, 39 – 52.

WEISS, H. 1985, Rediscovering: Tell Leilan on the Habur Plains of Syria, The Biblical Archaeologist 48/1, 5-34.

WEISS, H., AKKERMANS, P.A., STEIN, G., PARAYRE, D., WHITING, R. 1990, 1985 Excavations at Tell Leilan, Syria, American Journal of Archaeology 94/4, 529-581.

WEB SITES

Tell Halaf. Tell Halaf Excavation Project, 2015 [online], retrieved 17th June 2016 on <http://www.grabung-halaf.de/index.php?l=eng>.

Tell Brak. Tell Brak Project, 2013 [online], retrieved 17th 2016 June on <http://www.tellbrak.mcdonald.cam.ac.uk/home.html>.

Tell Beydar. Tell Beydar, 2015 [online], retrieved 17th 2016 June on <http://www.beydar.org/index.php?lg=16&index=2#content>.

Tell Beydar (Syria). Jason Ur, Harvard University, Open Scholar [online], retrieved 17th June 2016 on <http://scholar.harvard.edu/jasonur/pages/tell-beydar>.

Tell Hamoukar (Syria). Jason Ur, Harvard University, Open Scholar [online], retrieved 17th June 2016 on <http://scholar.harvard.edu/jasonur/pages/hamoukar>

Tell Leilan Project. Harvey Weiss, Yale University, 2007 [online], retrieved 17th June 2016 on <http://www.leilan.yale.edu/about/index.html> .

OTHER SOURCES

Tell Arbid Abyad field documentation (MU-ARBA Project, seasons 2007-2010).

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Monografies del MAC 1, Barcelona 2018,
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VII MILLENNIUM POTTERY SEQUENCE AT TELL HALULA: NEW LIGHTS FOCUSED ON STRATIGRAPHICAL AND CHRONOLOGICAL ASPECTS OF SECTOR 30.

Josep Miquel Faura*, Miquel Molist**

Este artículo presenta el análisis pormenorizado del material cerámico del sector 30 de Tell Halula (Valle del Éufrates, Siria), datado de a primera mitad de VII milenio aC. Con el objetivo de caracterizar las primeras producciones cerámicas en relación a la arquitectura y así contribuir a las precisiones estratigráficas y cronológicas de la amplia superficie excavada.

Tell Halula, Cerámica, Arquitectura, Neolítico Final, Siria.

This paper presents the detailed analysis of the ceramic material of sector 30 of Tell Halula (Euphrates valley, Syria), dated from the first half of VII millennium BC. With the aim of characterizing first pottery productions in relation to the architecture and thus contribute to the stratigraphic and chronological precisions of the recovered surface.

Tell Halula, Pottery, architecture, Late Neolithic, Syria.

INTRODUCTION

The VIIth millennia, known with the generic name of the Late Neolithic Period and also known as the Pre-Halaf period is one of the more interesting and less traditionally studied chronological phases. The archaeological activity in the last 20 years has expanded significantly the amount of available data coming from archaeological sites with high precision and documental richness. One of these sites is Tell Halula, which was continuously excavated over many years. This allowed a complete documentation of this temporal phase by recording new data.

The excavation at sector 30 between 1992 and 1997 answered the necessity of incrementing the knowledge from the Late Neolithic occupation phases at Tell Halula, which documents the appearance and consolidation of the first's ceramic productions. The sector's place in the tell was very interesting from a strategic point of view given that it was at the central and flat area of the site and near the sectors where archaeological layers from the same horizon had also been located, both in the southern slope (Sectors 2/4), the oriental slope (Sector 7), and the occidental slope (Sector 1). Therefore, an extensive excavation documented the habitats and the structures, and the material culture from the period was characterised (Fig. 1).

The advance of the excavation, the stratigraphic analyses, the absolute dates and the archaeological materials (mainly pottery), allowed to gain knowledge and study the general characteristics of a habitat area in the 6600-6300 cal BC (approximately) (Molist ed. 1996; Molist 1998; Molist coord. 2013). The preliminary study from the pottery in this chronological horizon (Faura 2013,

* MNAC, Palau Nacional, Parc de Montjuïc, s/n, 08038 Barcelona – SAPPO, Department of Prehistory, Autonomous University of Barcelona, Edifici Mòdul de Recerca A, Pl. del Coneixement, Campus de la UAB 08193 Bellaterra, Barcelona, jfauravendrell@gmail.com
** SAPPO/GRAMPO, Department of Prehistory, Autonomous University of Barcelona, Edifici Mòdul de Recerca A, Pl. del Coneixement, Campus de la UAB 08193 Bellaterra, Barcelona,, miquel.molist@uab.cat

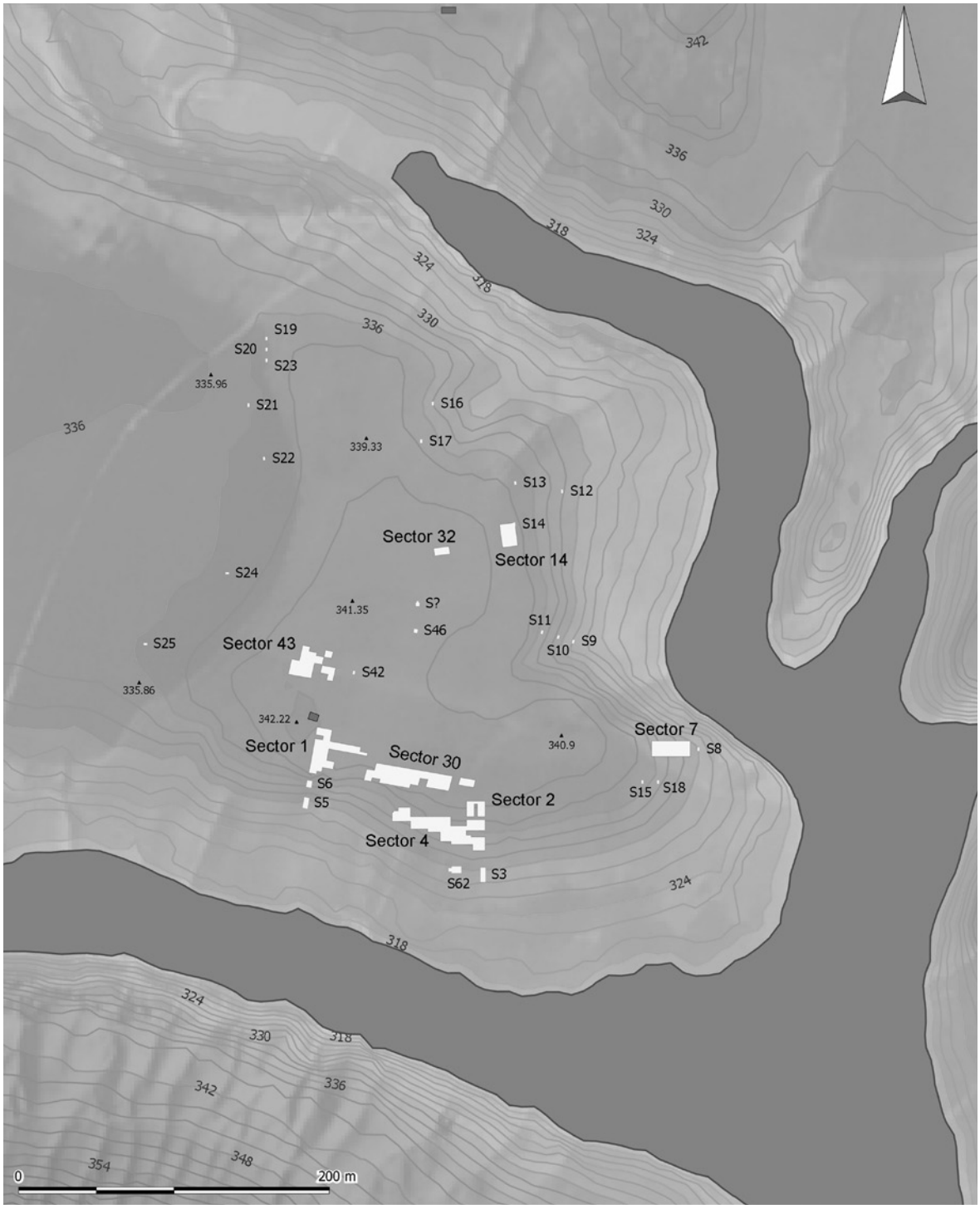

Figure 1. Sectors location at Tell Halula (Euphrates valley, Syria) (SAPPO, UAB).

2016, Faura/Molist 2017) was specifically important because it used a morphotypological approach, which, in association with the stratigraphic characteristics of this sector, provided a set of guidelines for a sub-sector division based on its chrono-cultural[1] attribution. This is the idea which will be developed in this brief paper:

1. Results from higher layers corresponding with the Halaf period are not presented here. For general information regarding the layers from this period refers to: Gómez-Bach 2011, Cruells, 1996, 2013, Molist /Vicente 2013.

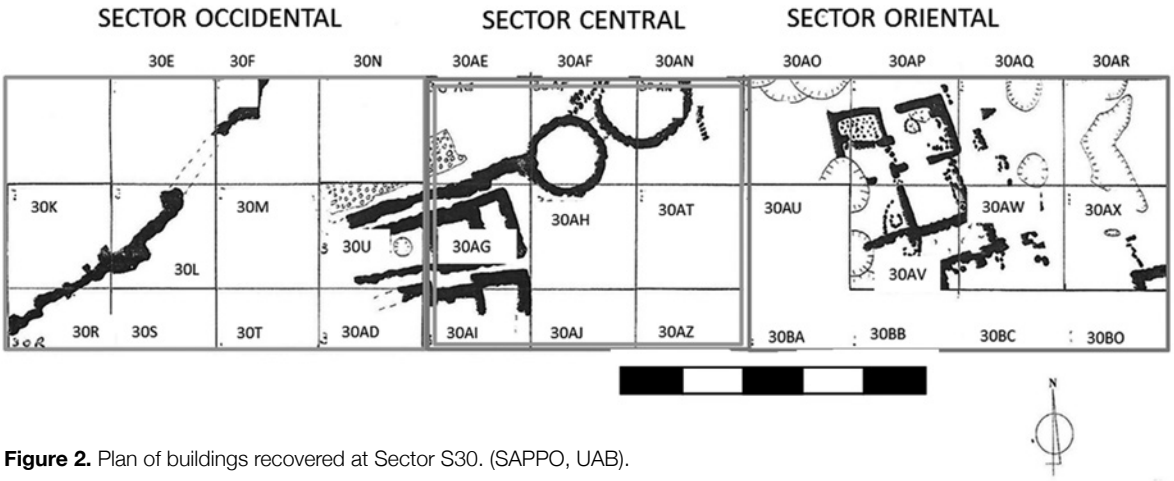

Figure 2. Plan of buildings recovered at Sector S30. (SAPPO, UAB).

a more complete analysis centred on the first ceramic products in the occupations belonging to the first half of the VII millennia both at the morphotipological and stratigraphic level which will yield a more precise approach to the first ceramic productions in the site and the definition of its chronological sequence.

BRIEF DESCRIPTION OF THE STRUCTURES AND SECTOR 30 STRATIGRAPHY

It should be remembered that the overall excavated surface in sector 30 comprised a total of 524m^2 and the sedimentary depth was explored up to 1.3 m, below which the preceramic layers were located. The stratigraphic and ceramic analyses performed today have distinguished two contiguous spatial units with a variable surface and with specific stratigraphic characteristics: in the first place, the "Occidental area" covers squares E, F, N, K, L, M, U, R, S, T, AD AI, AJ, AZ, AG. AH, AT, AE, AF and AN, which add up to 455 m^2; in the second place, the Oriental sector covers squares AO, AP, AQ, AR, AT, AU, AV, AW, AX up to a surface of 260 m^2. In the easternmost part of the "Occidental area" a wide space close to also 260m^2 has been named "Central area". The best preserved habitat structures which will be analysed in this paper are located in this third sector (Central area: squares U, AE, AF, AN, AG, AH, AT, AI, AJ).

Regarding the stratigraphy, five successive occupation layers were detected in sector 30. The stratigraphic sequence is complex and diversely excavated and analysed. Partially published archaeological structures are of high importance: they consist of several square and round (tholos) buildings, as well as some constructions with a collective use maybe associated to those also located in sector 1, specifically structure 101, the wide terracing wall (Molist/Vicente 2013; Molist *et al.* 2014).(Fig. 2).

WEST AREA

The west area of the excavation is where the five differentiated layers (S30-I to S30-V) can be detected with the highest degree of detail. S30-I names the most recent one and S30-V the oldest (Molist/Vicente 2013;

S30-I AND S30-II

The first two layers, S30-I and S30-II, were assigned to the Middle and Final Halaf periods and presented the remains of a mudbrick wall, its associated occupation and destruction layers, and partial remains of a probable tholos with a partially preserved stone wall. The layers also present some excavated ditches with abundant archaeological materials (ceramics, lithic industry, etc.).

S30-III AND S30-IV

The two following layers are the ones corresponding with the VII millennia horizon (Pre-Halaf). Therefore, below the previous layers, a third level called S30-III is characterized by the construction, use and abandonment of some structures from a domestic habitat. The set of excavated and studied buildings are in the eastern part of the sector, which is composed of circular constructions (*tholoi*) which are contiguous to two rectangular buildings with a multicellular plan (Fig. 2).

This structures, although only partially preserved, are composed by four rooms (a mean of 1x 2,40 meters) in each house, all of them with interior beaten earth floors. The preserved wall basement indicates that it was built in stone with construction earth and was plastered with clay in the internal side and limestone in the external side. The domestic structures (hearths) are outside, were a succession of occupation floors have been located. The detection of two burials located in two pits excavated below the floor in two small rooms (one in each house) should be noted. They are two child burials

where the corpse is located inside a big jar in one case and a ceramic vase covered by another one in the other case.

Layer S30-IV was excavated exclusively in the most occidental side of the sector, therefore leaving the aforementioned architecture "in situ". Then, this lower layer is composed by a set of strata associated to a wide stone wall measuring at least 10,5m in length and 0,5m in height which presents a SW-NE orientation and has been interpreted as a more recent reconstruction of the terracing wall E101 from sector 1. Finally, in the last documented layer (with a PPNB chronology) the extension of the wall in sector 1 effectively continues into sector 30.

EAST AREAS

In the eastern area, the stratigraphic sequence is less abundant given that, when the superficial layers are not considered, only one layer has been detected. This one is composed of a set of strata associated with the construction, use and abandonment of a habitat area which presents a big exterior space where an important number of excavated ditches were found associated to domestic multicellular buildings built with mudbrick over a stone basement. The building is an almost complete house which occupies a global surface of 45m^2. It presents a multicellular plan with five ordered rooms and variable measures: from 6.5 to 2.3 m^2. The construction presents a complex "life" comprising 4 subphases, which generate a certain degree of variation in the building's structures and the amortization or redistribution of the spaces (blocked corridors, room construction, etc.). In the most recent phase, an extra room was added to the southern side. The room also presents a rectangular plan and stone walls limiting a surface of 4m^2. In general, its floor was made from beaten earth defective in quality. Two combustion structures were also detected, one inside and the other outside.

The correlation between layers S30-III in the central sector and S30-IV was performed firstly using stratigraphic data and secondly through the preliminary analysis of the ceramic productions. The existence of two different layers, the oldest being the one in the east where remains of the S30-III layer were not detected, was verified using the pottery characteristics and it composes a significant part of the analysis that will be presented below.

POTTERY SECTOR 30		
Temper	Sherds	%
Plant temper	3.885	57
Mineral temper	2.887	43
Plant and mineral	2	0
Total	**6.774**	
POTTERY SECTOR 30 EAST		
Temper	Sherds	%
Plant temper	1.961	68
Mineral temper	885	32
Plant and mineral	2	0
Total	**2.848**	
POTTERY SECTOR 30 CENTRAL		
Temper	Sherds	%
Plant temper	2.060	51
Mineral temper	1.967	49
Total	**4.027**	

Figure 3. Number of pottery sherds belonging to the Pre-Halaf horizon. Total number of Pre-Halaf sherds from the central area of Sector 30. Number of Pre-Halaf ceramic sherds in the oriental area of Sector 30.

In fact, a recent extensive analysis has been performed on the ceramic characteristics in these two sectors (Faura 2016). The methodological priority has been the study of its morphological, typological and metric characteristics using the data registered in an intense fieldwork study performed before the year 2000[2].

POTTERY PRODUCTIONS FROM SECTOR 30

As a result of the first excavation campaigns in this sector, a total amount of 6774 fragments of pottery belonging to the Pre-Halaf and Halaf horizons in coherence with the recovered structures have been found[3]. The high quantity of pottery that this sector yielded motivated a meticulous study looking at the pottery assemblage layer by layer given that such a detailed study will help better understand not only the ceramic productions but also the occupation model and their spatial/temporal characteristics.

The methodology used in this study has been the same

2. The political and military crisis since 2011 has prevented a new verification of the archaeological material given that this has been distributed between the National Museum of Aleppo and the storage rooms located at the archaeological site.
3. As previously indicated in this work, analysis of ceramic materials is performed on the potsherds from the 1992-1997 fieldwork seasons.

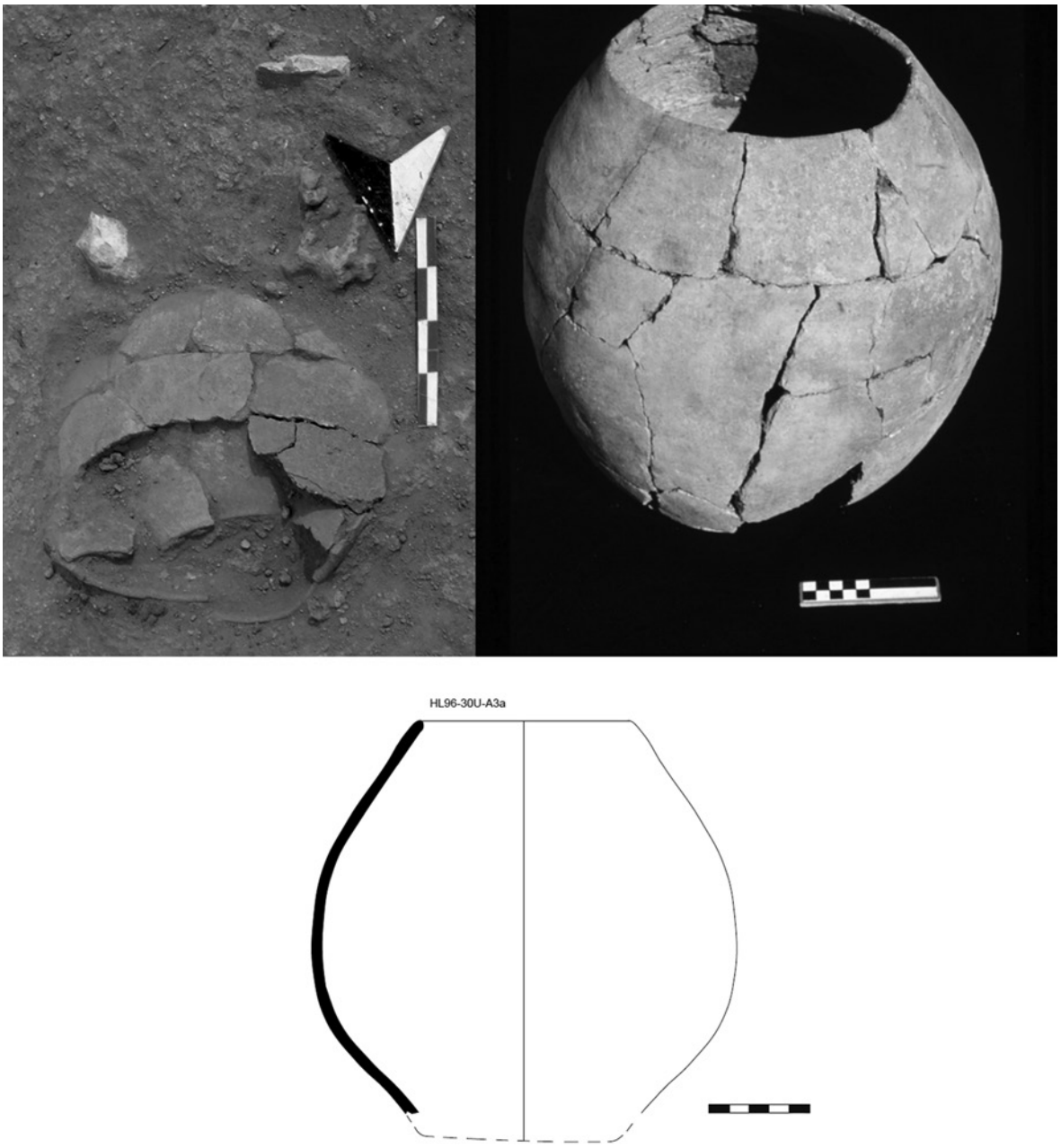

Figure 4. Globular shaped ceramic with a child burial, HL96 S30 U A3a (E15- E16). (SAPPO, UAB).

used for the ceramic productions in the Pre-Halaf period in this site (Faura 1996; Faura/Le Mière 1999; Faura 2013). Briefly, pottery has been classified macroscopically based on temper type (mineral, plant or both). This methodology has been applied to all the excavated sectors which, by material and structural coherence, might belong to the same horizon. Other used parameters are the type of surface finishing, the recovered morphology, the decoration and plastic application presence or absence and the cooking atmosphere.

In the clearly Pre-Halaf subsector, Halaf pottery has been barley detected aside from some sparse intrusions, which yielded a high quantity of material properly isolated and explained in the context of the excavation.

Regarding the study of the Pre-Halaf ceramic productions themselves, a global analysis indicates that, in the first place, the most abundant series is the one with plant temper, which corresponds to 57% (3885 sherds) of the assemblage, followed by the mineral temper series, which represents 43% of the assemblage (2887 sherds) (Fig.3).

Although these are global numbers, they provide an

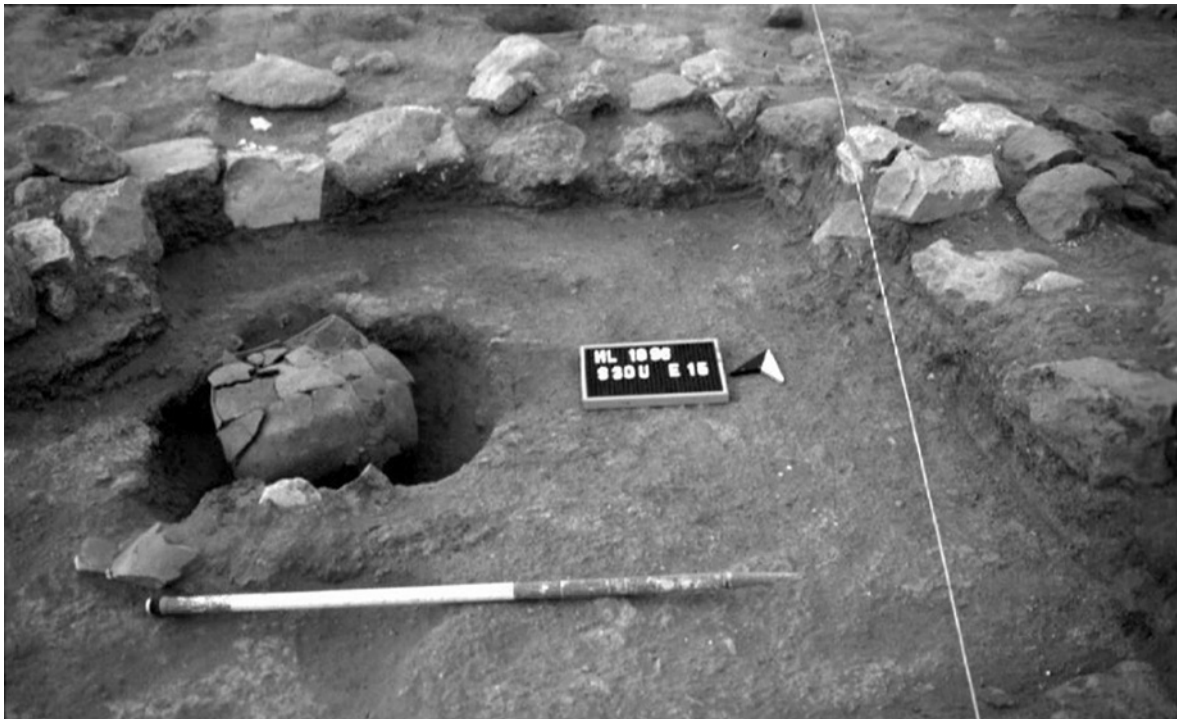

Figure 5. Open ceramic vase containing the remains of a child burial, HL96 S30 AE 7bis.(SAPPO, UAB).

equally global idea of the horizons and ceramic phases where they are ascribed. When separated by excavation area and stratigraphy, the resulting image is more precise and the diversity of the ceramic assemblage can be better understood. As previously stated, three phases in the technological and morphological evolution of the Pre-Halaf pottery have been detected and this is one of the arguments this paper is based on.

POTTERY PRODUCTIONS FROM THE WEST AND CENTRAL SECTORS.

The analysis from the ceramic productions from layer S30-III is presented here. This corresponds to mainly the zone with well-preserved architecture in the Central area (when observing the excavation space), which consists of the materials in squares AE, AF, AN, AG, AH, AT, AY and AJ. As indicated before, this space presents a complex stratigraphy but the analysis has been limited to the strata and layers associated with the structures and, therefore, related with the superior layers. The analysis from the ceramic assemblage in the constructive phase S30-IV was not possible given that the archaeological remains are kept in the inaccessible storage rooms in the National Museum of Aleppo.

After analysing the fragments with diagnostic shapes from square AN (which acted as a sample) the following description can be made: the base shapes can be simple or composed, with convex bases, flat bases with no intersection point (rounded), flat with an intersection point (angular), with vertical or open walls and the presence of a softly marked carination and a closed rim (closed vessels), with vertical necks. The lips are mainly rounded or slightly bevelled in the inside. No plastic decorations have been detected except from a non-perforated nipple.

Furthermore, a child burial container in this sector should also be commented. This is a globular shaped vase with medium dimensions. The vase belongs to the Black Series, a clearly Pre-Halaf typology (Fig. 4 and 5).

A second burial was contained also by another vase, this time an open shape which could be classified as a dish/tray (Fig. 6).

Regarding measurements, the analysis indicates that the width oscillates between 4 and 15mm but vases between 7 and 10mm are the most abundant. The diameter at the lip varies between 10 and 20cm (Fig. 6).

Small inclusions are present in the pottery without plant temper and pottery with it shows small or medium sized inclusions. The clay is compact and brown colours predominate (clear brown, beige and orange). The finishing in coarse ware with plant material is basically a smoothed treatment (38%), which is the same type of treatment practiced in the mineral tempered pottery (34%). The firing atmosphere is mainly oxidant, but reducing and mixed atmospheres have also been detected.

The decorations, which are scarce, can be either impressions in the body or the lip, incisions in the body of the vase, a plastic application in one sample, and also Pattern Burnished Ware (polished decorative motives on pottery always with a mineral temper) has been detected.

Although the percentile difference is small, the typological diversity, both in the plant tempered ware and the mineral tempered ware, this indicates, by analogy with sector 1, that this is a recent phase in the Pre-Halaf horizon.

The presence of slipped fragments, some impressed or painted fragments, polished decorations (Pattern Burnished), Dark Faced Burnished Ware, some Grey Black Ware potsherds and also the small presence of the Black Series certifies the attribution of this assemblage to the Pre-Halaf 2 horizon (Faura/Molist 2017; Cruells *et al*. 2017).

sherds) of the assemblage against 31% of pottery with a mineral temper (885 sherds) (Fig.7). The quantity of pottery assigned to the Black Series (11,41%) regardless of the medium or small inclusions they present should be also noted. Apart from these series, the assemblage presents other already known types which are associated with the same period. These are Coarse Ware with impressed, incised, painted motives or with more neat or slipped decorative motives (Pattern Burnished). In the series with mineral temper, the presence of slips is also documented (DFBW) along with some impressed and incised decorations.

In terms of the most representative shape, bowls, pots and small cups in a simple or composed form present flat bases with no inflexion point (rounded), flat bases with an inflection point or slightly elevated flat bases.

In a general sense, these are closed or straight vessels with no neck or an incipient one. The lips might be round, straight, with an internal bevel or an external one. Although applied cords have been detected, their presence is scarce, which also appears to be the

Figure 6. View with ceramic vase containing the remains of a child burial located in the corner of the room, HL96 S30 U A3a (E15- E16).(SAPPO, UAB).

POTTERY PRODUCTIONS FROM THE EAST AREA

In this sector, the excavation was performed exclusively in extension. Only one occupation layer in an average conservation state was detected. The observed stratigraphy presents a westward slope and, therefore, it is difficult to detect its stratigraphic correlation given the wide extension excavated and the proximity to the surface. This is why, in this work, the analysis of ceramic productions has been used to better determine correlations between themselves, their morpho-typological composition and their relative chronology.

In the pottery from this area, ceramic remains with plant temper are the most abundant, being 68% (1961

case with handling systems, barely detected and only present with vertical handles and nipples with or without perforation.

The width of the walls oscillates between 4mm and 20mm but there is a major presence of vases with walls around 10mm thick. The rim diameters vary between 10cm and 24cm. These measures indicate that, probably, apart from these closed and more standard vessels, trays with low and open walls were available too.

The inclusion size in both mineral and plant tempers is very thin, measuring equal or less than 0.5mm. In the case of mineral temper, calcite has been detected. Ceramic pastes are compact in most of the cases. The firing is mainly oxidant although fragments with a reducing atmosphere are frequently documented. The

Figure 7. General view from sector 30 with tholoi. (SAPPO, UAB).

surface colours tend to be clear, clear browns, beige or orange. The surface treatments are mainly smoothed but also some polished surfaces in pattern burnished wares (scarcely represented) and the use of polished and non-polished slips has also been detected.

Decorations are scarce with incrusted incisions, polished motives, some painted fragments and plastic applications. Incisions and impressions are located in the rims or the walls of the vase.

The typological and morphological study in this Oriental area in sector 30 has helped performing a chronological approach, situating the ceramic assemblage in a Pre-Halaf horizon clearly ascribed to the ceramic phase 2 in the site sequence, which is comparable to the upper part of sector 7, 14 and 1 in the external part of layer III.

Inside the series with plant temper, the best represented category is pottery with smoothed surfaces and big sized plant temper (Coarse ware) (75%). In this group, other categories are present with lower frequencies and consist of a few pottery fragments with polished surfaces, polished decorative motives (Pattern Burnished) and impressed and incised decorations with a surface treated with paint or slip. The shapes and decorations correspond to open or closed vases with globular shapes and usually elevated flat bases.

In the mineral temper series, the best represented category is pottery with smoothed surfaces (48%) which, along with fine polished surfaces (14%,) add up to 62% of the total assemblage. The black series in Halula accounts for 21% of the total amount of pottery. The categories with polished decorative motives, red slips, impressed or incised decorations as well as scarce fragments of DFBW are equivalent to 18% of the total. The shapes correspond to open or closed vessels with no neck and flat or slightly elevated bases (Fig. 5.2).

SYNTHESIS AND DISCUSSION

The architectonic contributions from the site are significantly important. A type of innovative habitat distribution when compared with previous phases has been detected. Now, the domestic units are located in a disperse way with wide open spaces around them where the domestic areas are located (hearts, waste areas, etc.). This new spatial distribution matches with the detection of technological changes in the wall and floor construction, amongst others. This technological variation can be defined as presenting a lower technological investment, mainly in the finishing side (burnished floors, room morphology, etc.) Nevertheless, the most significant innovation is the appearance of a new type of building with a circular plan which was known as *tholoi*. This innovative morphology is recovered at Tell Halula next to or connected with other buildings with rectangular multicellular plan. This phenomenon is not unique from Tell Halula and it is also found in other sites in the Balikh region such as Sabi Abyad (Akkermans ed. 1996; Akkermans *et al.* ed. 2014).

Out of the different *tholoi* type buildings found at Tell Halula in the Pre-Halaf period, the ones from sector 30 are the best defined thanks to its location and the fact that they were fully excavated in extension (Fig. 7).

The relationship between buildings and the ceramic material is interesting because it can shed new light into the temporal and stratigraphic relationship between the discovered dwellings. Through these lens, it can be said that the ceramic materials originating from the archaeological layers at sector 30 are highly homogenous, which clearly locates them in a horizon contemporary to the pottery observed over occidental northern Syria: Amuq (Braidwood/Braidwood 1960) and Ras Shamra (Contenson 1992) and shows contact with that one without losing an specificity unique to the Euphrates region.

Nevertheless, S30 study show that the percentages of pottery with mineral and plant temper are quite different and correspond to pottery phases 2 and 3. This is the main marker which defines the ceramic phases in the site. Therefore, the greater proportion of pottery with plant temper in the oriental sector indicates that, possibly, there might have been a previous habitat sequence recovered in the central sector (Fig. 8: 8.1, 8.2, 8.3).

This research proposal, which stands out from the presented morphological and typological analysis, will need a wider verification through ^{14}C dates (currently underway) and a deeper analysis of the recovered stratigraphic units. This is a line of further research that will certainly help improve the knowledge of the ceramic productions form the first half of the VII millennia cal BC.

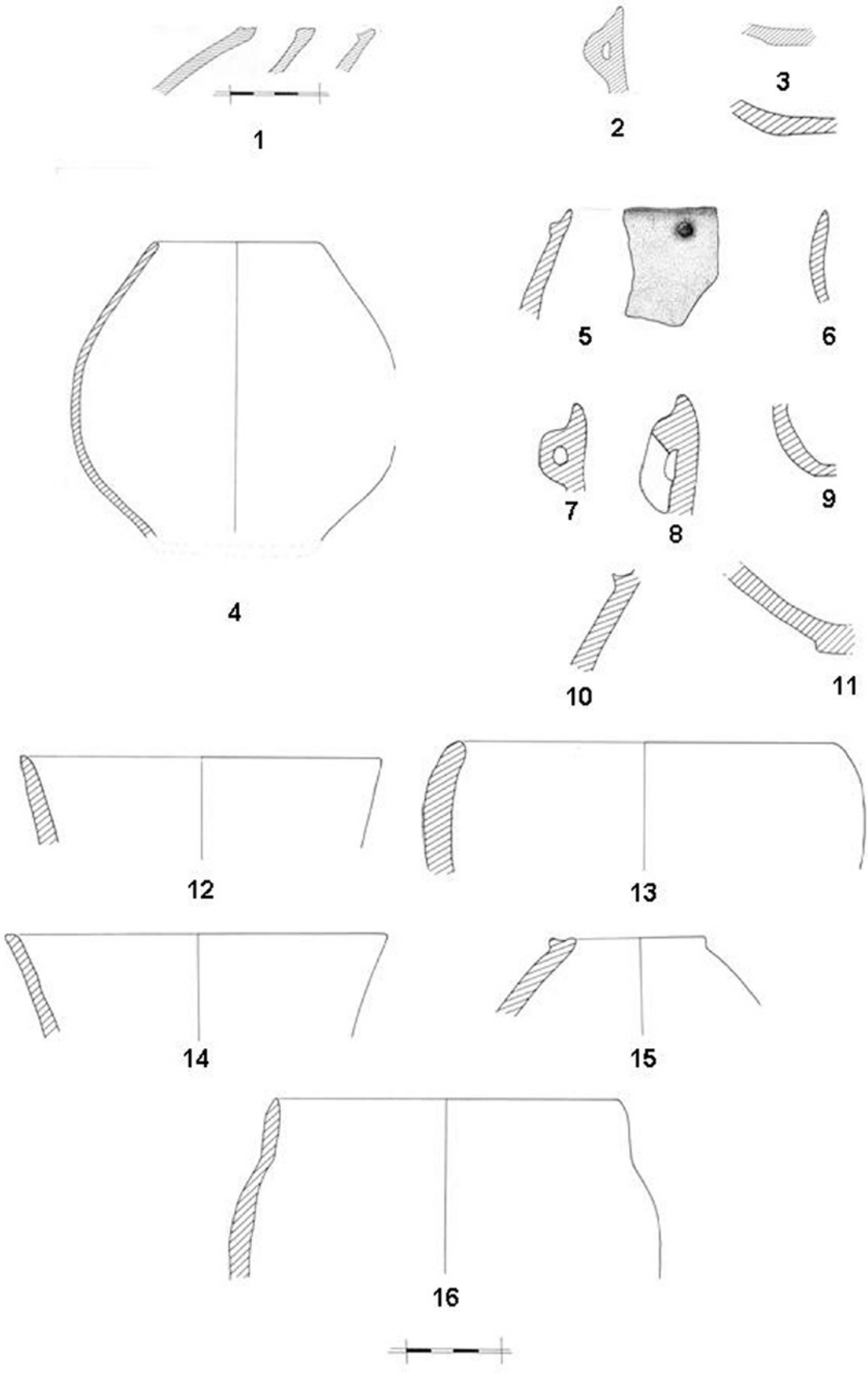

Figure 8.1. Main shapes and pottery decorations of Sector 30 (tell Halula): open and closed bowls.

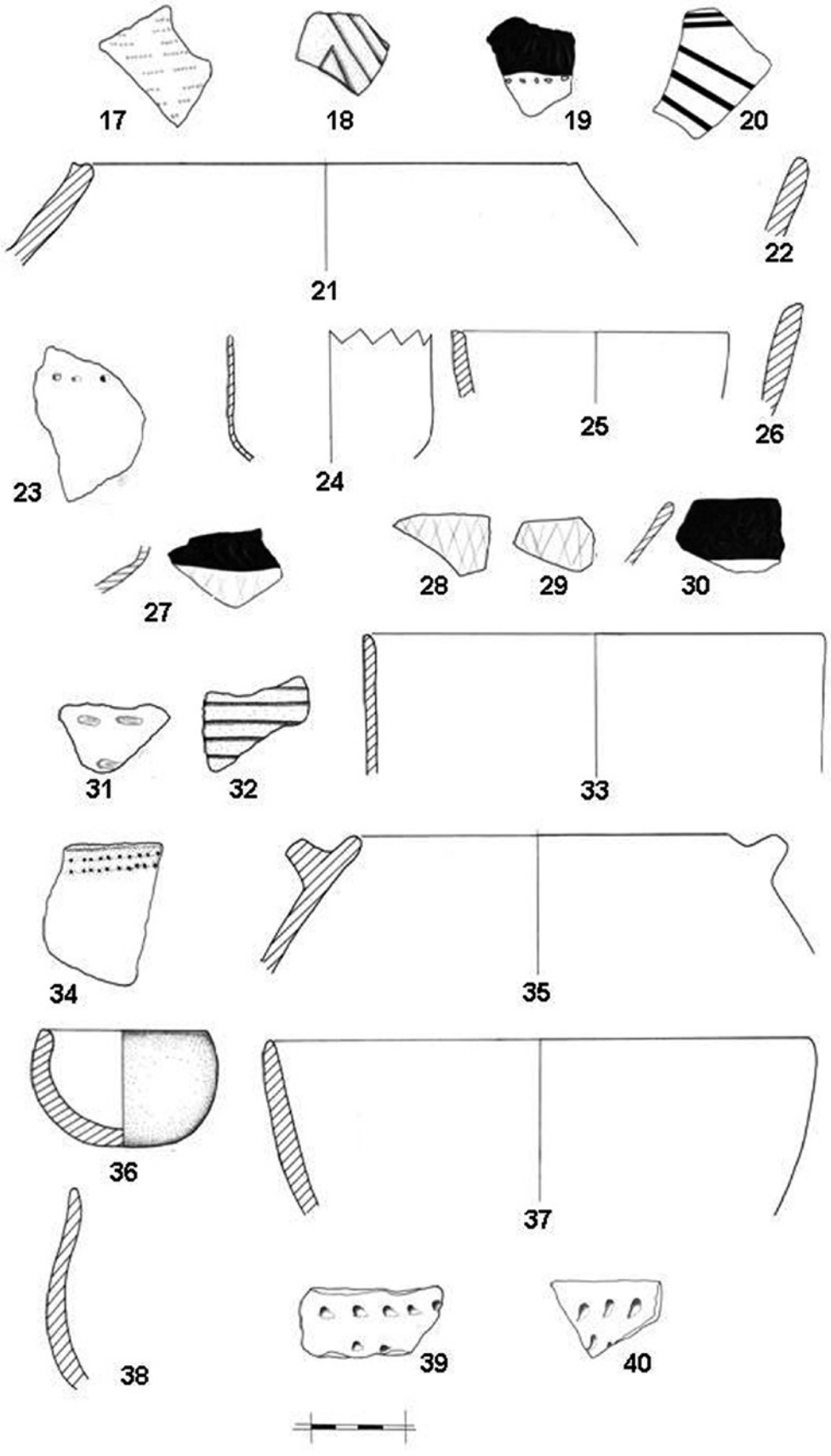

Figure 8.2. Main shapes and pottery decorations of Sector 30 (tell Halula): Set of decorated sherds and related shapes.

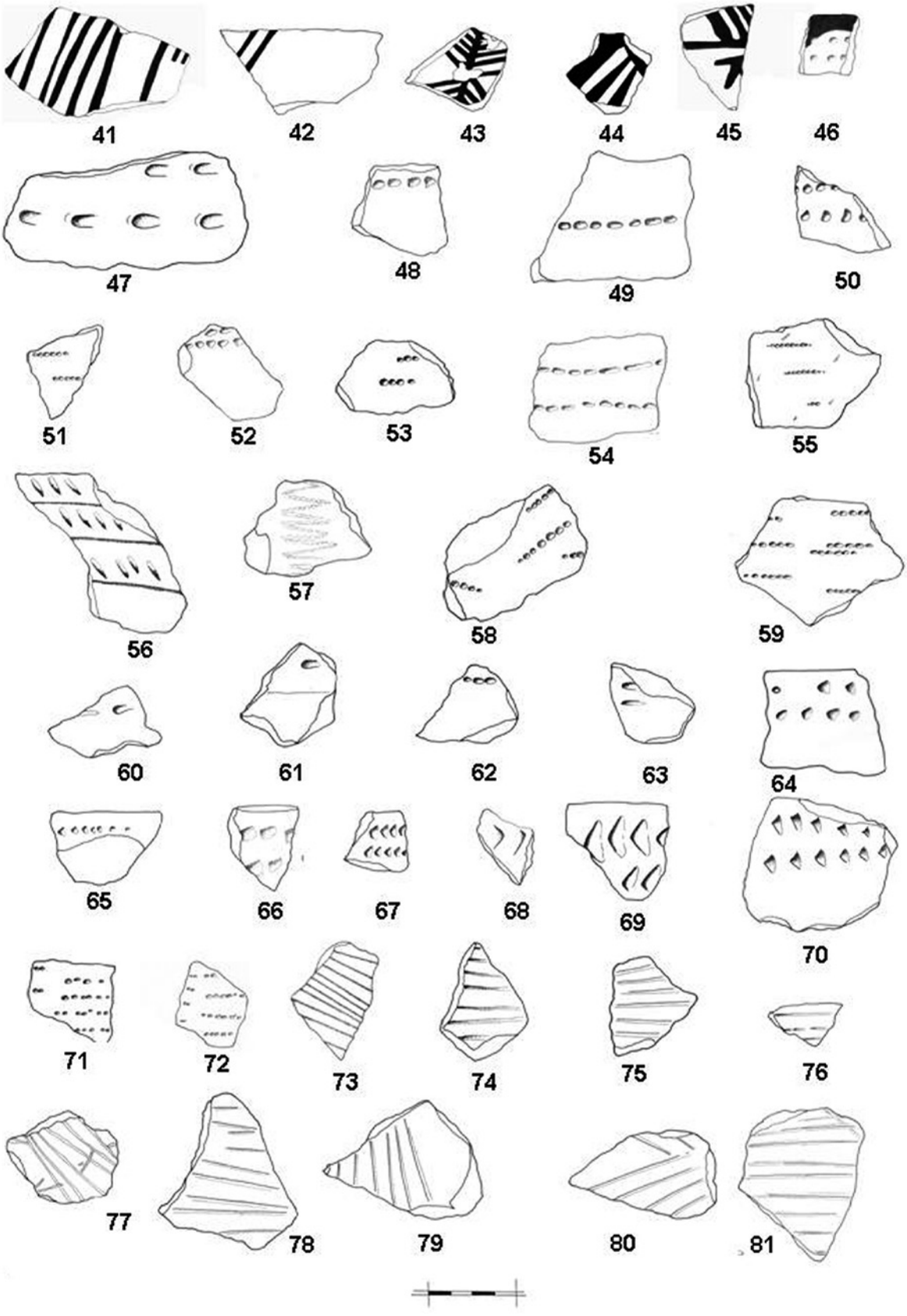

Figure 8.3. Main shapes and pottery decorations of Sector 30 (tell Halula): Impressed and painted sherds.

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BIBLIOGRAPHY

AKKERMANS, P. M. M. G. (ed.) 1996, *Tell Sabi Abyad: The Late Neolithic Settlement.* Leiden/Istanbul, Nederlands Historisch-Archaeologisch Instituut.

AKKERMANS, P.M.M.G., BRÜNING, M., HUIGENS, H., NIEUWENHUYSE, O. (ed.) 2014, *Excavations at Late Neolithic Tell Sabi Abyad, Syria*, PALMA Near Eastern Archaeology, Papers on Archaeology from the Leiden Museum of Antiquities, n. 11.

BRAIDWOOD, R.J., BRAIDWOOD, L.S. 1960, *Excavations in the Plain of Antioch. The Earliest assemblages Phases A-J,* Oriental Institute Publications, vol. 32, The University of Chicago.

CONTENSON, H. 1992, *Ras Shamra, Ougarit VIII, Préhistoire de Ras Shamra. Les sondages stratigraphiques de 1955 à 1976,* Éditions Recherche sur les Civilisations, París. 2 Vol.

CRUELLS, W. 1996, La cerámica pintada Halaf, *in* Molist, M. (ed.)Tell Halula (Siria). *Un yacimiento Neolítico del Valle Medio del Éufrates. Campañas de 1991 y 1992*, Ministerio de Educación y Cultura, Madrid, 99 – 114.

CRUELLS, W. 2013, La cerámica Halaf en Tell Halula VII y Vi milenios cal BC. Orígenes y desarrollo, *in* Molist, M. (ed), *Tell Halula: un poblado de los primeros agricultores en el valle del Éufrates, Siria*. Ministerio de Educación y Ciencia, Tomo II, 212-231.

CRUELLS, W., FAURA, J.M., MOLIST, M. 2017, Akarçay Tepe and Tell Halula in the Context of the Earliest Productions of Ceramics in West Asia, *in* Tsukeni, A. /Nieuwenhuyse, O. /Campbell, S., *The emergence of pottery in West Asia*, Oxbow Books, 43-54.

FAURA J.M. 1996, La cerámica Pre-Halaf, *in* M. Molist (ed), *Tell Halula (Siria). Un yacimiento Neolítico del Valle Medio del Éufrates. Campañas de 1991 y 1992*, Ministerio de Educación y Cultura, Madrid, 91-97.

FAURA, J.M., LE MIÈRE, M. 1999, La céramique neolithique du Haut Euphrate Syrien, *in* OLMO, G. / MONTERO, J.L. (Eds). *Archaeology of The Upper Syrian Euphrate The Tishrin Dam Area, Aula Orientalis-Suppplementa* 15, 281-299.

FAURA J.M. 2013, Las primeras cerámicas neolíticas de Tell Halula, *in* Molist M. (coord), *Tell Halula: un poblado de los primeros agricultores en el valle del Éufrates, Siria. Memoria científica 1995-2005.* Edición del Ministerio de Cultura, Dirección General de Bienes Culturales, Instituto Patrimonio Histórico Español, 2 vols, Tomo II, 8-14.

FAURA, J.M. 2016, *El conjunt ceràmic del VII mil·lenni cal bc de Tell Halula (Síria). Una evidència dels processos de canvi socioeconòmic,* Phd, Departament de Prehistòria, Universitat Autòma de Barcelona. http://www.tesisenred.net/handle/10803/399329.

FAURA J. M., MOLIST M. 2017, The Appearance and Development of Painted Ceramics at Seventh Millennium Tell Halula (Syria), *in* Cruells, W., Mateiciucová, I., Nieuwenhuyse, O. (eds), *Painting Pots, Painting People*. Late Neolithic Ceramics in Ancient Mesopotamia, Oxbow editors, 70-82.

GÓMEZ-BACH, A. 2011, *Caracterización del producto cerámico en las comunidades neolíticas de mediados del VI milenio Cal BC: El valle del Éufrates y el valle del Khabur en el Halaf final (Siria).* Thèse de doctorat. Université de Liège. Manuscrit.

MOLIST, M. (ed), 1996, *Tell Halula (Síria): un yacimiento neolítico del valle medio del Éufrates: campañas de 1991 y 1992,* Ministerio de Educación y Cultura. Dirección General de Bellas Artes y Bienes Culturales, Instituto del Patrimonio Histórico Español.

MOLIST M. 1998, Espace collectif et domestique dans le néolithique des IX éme et VIII éme millénaires B.P. au nord de la Syrie: apports du site de Tell Halula (Vallée de l'Euphrate) *in* Aurenche, O. / Fortin, M., *Espace Naturel, Espace Habité en Syrie du Nord. (10-2 ¼ millenaires av. J. C.),* Université de Labal -Quebec y Gremo (Lyon, Francia), Quebec, (Canada).

MOLIST, M. (coord) 2013, *Tell Halula: un poblado de los primeros agricultores en el valle del Éufrates, Siria,* Memoria Científica – Tomo I y II. Ministerio de Educación, Cultura y Deporte, Secretaria General Técnica. Subdirección General de Documentación y Publicaciones, Madrid.

MOLIST, M., VICENTE, O. 2013, Tell Halula 1995 – 2005. Análisis estratigráfico y arquitectónico de los diferentes horizontes históricos de Tell Halula, *in* Molist, M. (coord.), *Tell Halula: un poblado de los primeros agricultores en el valle del Éufrates, Siria. Memoria Científica – Tomo I y II*, Ministerio de Educación, Cultura y Deporte.

Secretaria General Técnica. Subdirección General de Documentación y Publicaciones, Madrid, 31-86.

MOLIST, M., GÓMEZ, A., BOFILL, M., CRUELLS, W., FAURA, J.M., MARCHIORI, C., MARTÍN, J. 2014, Maisons et constructions d'habitation dans le Néolithique. Une approche de l'évolution des unités d'habitat domestique à partir des documents de Tell Halula (Vallée de l'Éuphrate, Syrie), *in* Montero, J-L. (ed), *Redonner vie aux mésopotamiens: Mélanges offerts à Jean-Claude Margueron à l'occasion de son 80e anniversaire*, Publicaciones de la Universidad de la Coruña, 97-116.

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