Bridging the Gap:
Disciplines, Times, and Spaces in Dialogue

Volume 1

Sessions 1, 2, and 5 from the Conference Broadening Horizons 6 Held at the Freie Universität Berlin, 24–28 June 2019

Edited by
Christian W. Hess and Federico Manuelli

BROADENING HORIZONS 6

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Archaeopress Publishing Ltd
Summertown Pavilion
18-24 Middle Way
Summertown
Oxford OX2 7LG
www.archaeopress.com

ISBN 978-1-80327-094-4
ISBN 978-1-80327-095-1 (e-Pdf)

Cover: Broadening Horizons 6 conference logo, designed by Rana Zaher.

This book is available direct from Archaeopress or from our website www.archaeopress.com

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Foreword

These volumes represent the proceedings of the conference Broadening Horizons 6, hosted by the Institute for Ancient Near Eastern Studies and the Institute for Near Eastern Archaeology at the Freie Universität Berlin from 24–28 June 2019. Taking the long-standing partnership of the two institutes and the multidisciplinary tradition of Ancient Studies in Berlin as inspiration, the general theme of 'Bridging the Gap' was chosen to encourage approaches to the study of the Ancient Near East which transcend traditional disciplinary boundaries in bringing a range of evidence and methods into dialogue.

The Berlin conference was fortunate to include over 100 papers presented by participants from over 22 countries and 70 universities. These were divided into eight thematic sessions, each framed by an introductory keynote. Since its first incarnation at the University of Ghent in 2006, Broadening Horizons has developed into a regular venue for young scholars in the field. In many respects, it remains the only conference of its kind, taking both 'ancient' and 'Near East' in the broadest sense possible, from the prehistoric to the Islamic periods. It is a particular point of pride that the conference is not confined by field, but remains open to any philological, archaeological, and methodological approaches to the material. As a conference for and organized by young scholars, it thus provides a uniquely wide snapshot of current work.

Berlin was chosen as a venue for Broadening Horizons 6 by the members of the Organizing Committee of the previous conference that took place in Udine in 2017, and to whom we are grateful. In agreement between the two committees and in the spirit of international cooperation, the organization of the conference in Berlin also included members of the preceding one. We are happy to express our enormous thanks to the institutions and persons without whose support the conference, and these proceedings, would not have been possible. Funding for the conference was provided by the German Research Foundation (DFG), the Office of International affairs of the Freie Universität Berlin, and the Ernst-Reuter Gesellschaft. The university's administration and staff, the Department of History and Cultural Studies, Prof. Dominik Bonatz (Institute for Near Eastern Archaeology), and Prof. Jörg Klinger (Institute for Ancient Near Eastern Studies) all provided generous logistic and administrative support during the organization and the conference itself. Rana Zaher designed our brilliant logo, which contributed greatly both to conference identity and now the cover of these volumes. Members of our Scientific Committee, some of whom joined us during the conference, provided generous advice and encouragement.

The smooth and timely flow of the individual sessions was largely due to the tireless efforts of the numerous student assistants and session chairs. It is only fitting that we mention here explicitly the catering and hosting offered by Cosimo Dalessandro and the Ristorante Galileo, which has long since become an institution of its own within the Freie Universität Berlin, and which kept the breaks of the conference amply supplied with coffee and refreshments. The conference's opening and closing events hosted at the Museum Europäischer Kulturen (MEK) by EßKultur provided the ideal setting for social interaction and exchange.

These volumes were only possible due to the perseverance of the participants who submitted their contributions despite the closure of libraries, difficulties in accessing resources, and the many hardships

the pandemic imposed on our lives in 2020 and 2021. Our thanks are due especially for their heroic efforts in the timely submission of their papers during a most difficult year. We also express our sympathy and understanding to those who decided to withdraw their papers as a result of the imposed limitations. Finally, we are especially grateful to the many referees who graciously agreed to donate their time and efforts to the reviews, even as their crucial contributions remain anonymous.

Costanza Coppini
Georg Cyrus
Hamaseh Golestaneh
Christian W. Hess
Nathalie Kallas
Federico Manuelli
Rocco Palermo

Berlin, 18 July 2021

Introduction

Christian W. Hess and Federico Manuelli

The first volume of the proceedings of the conference 'Broadening Horizons 6 — Bridging the Gap: Disciplines, Times, and Space in Dialogue' gathers the papers presented in three sessions: Session 1 — Entanglement. Material Culture and Written Sources in Dialogue; Session 2 — Integrating Sciences in Historical and Archaeological Research; Session 5 — Which Continuity? Evaluating Stability, Transformation, and Change in Transitional Periods. The range of topics covered here is certainly bewildering, and leaves us shuttling across vast periods and regions, from Neolithic Göbekli Tepe to the ink recipes of medieval Arabic manuscripts. At the core of each session and paper, however, is not only the overt confrontation with methodology in dealing with the evidence, but the need for multiple, intersecting methodologies in order to interpret that evidence in any meaningful sense.

The 'entanglement' of Session 1 takes as its starting point the complicated dependences and dependencies of things, most famously brought to the fore again by Ian Hodder.[1] More concretely, the papers in the session all to some degree address how and whether the 'thinginess' of objects and of texts relate. Augusta McMahon's keynote ('Tamed Violence: Inscribed Weapons in Mesopotamia') moves beyond Hodder's entanglement to design-theory and Malafouris' material-engagement theory to analyze how inscription and figurative imagery might serve to change the affordances of an object.[2] Both contribute to a shift from brutally violent practicality to tamed symbolic piety.

While McMahon's keynote advances our understanding of text-and-object, two papers of the session focus on text-and-architecture. Juan Álvarez Garcia ('*La Maison d'Urtenu*. A Functional Study of a "Great House" from Ugarit') gives a brief overview of how the architecture and archives of the 'House of Urtenu' at Ugarit might contribute to a better understanding of the archives within the context of Late Bronze Age political and mercantile networks. Giampiero Tursi's 'Protecting the Residence' also adds color into the mix. Despite the hybrid Egyptian-Canaanite nature of the architecture at Beth-Shean, inscription, blue pigmentation, and imagery combine to turn an administrative complex into a powerful symbol of Egyptian rule. Texts and objects also combine to show how art is produced by and circulates within ('art of' vs. 'art in') the Achaemenid Empire in Zohreh Zehbari's 'On the Participation of Egyptian Artists in Achaemenid Art'. In side-stepping the thorny correlation of ethnic affiliation and stylistic traits, Zehbari combines evidence from objects and inscriptions to demonstrate the major role played by Egyptian craftsmen in the 'performance' of art in the Achaemenid heartland.

Session 2 reflects Ancient Near Eastern Studies' ever-expanding toolkit to include both the digital and natural sciences. There is no doubt that in all fields of study, the scale of hard data available has become overwhelming. In Jerome McGann's apt formulation, we have long since come to the point of 'drinking information from a fire hose'.[3] Nowhere is this more apparent than in Caroline Waerzegger's review of the history of prosopography in her keynote address on 'Digital Prosopography of Babylonia.' Both

[1] Hodder 2012.
[2] Malafouris 2013.
[3] McGann 2014, 15.

the philological tyro and the experienced scholar reading through the thousands of texts available inevitably come back to the basic question: 'Who are all those people?'[4] Waerzegger's use of network analysis neatly joins the individual to the collective, showing along the way how we might finally move away from lists of names and persons towards a robust integration of prosopographical data into socio-economic research.[5]

Some of the most innovative work today is being carried out in graduate and post-doctoral projects. Both Hassan el-Hajj and Felix Wolter argue for the use of digital imagery at various scales to deal with information either inaccessible or invisible to other methods. The methods of el-Hajj's 'Monitoring Damage to Cultural Heritage Sites Using Open Source Sentinel-1 and Sentinel-2 Data' employ Very High Resolution (VHR) satellite imagery as a monitoring tool for the urgent problem of site disturbances and destruction. While destructive events have an obviously major impact on heritage sites, the effect of other natural and anthropogenic processes can be more subtle, and easily slip under the radar. Both the well-known, tragic destruction of Palmyra, which has rightly been the focus of so much attention, and the lesser known site of Qornet ed-Deir in Lebanon serve as test cases for the method. Felix Wolter, in turn, uses 3D photogrammetry ('3D Imagery for On-Site Assessment of Mud Brick Architecture') at the site of Girdi Shamlu, not only as a product of final documentation, but as a constant tool for site evaluation during the excavation process. The camera takes its place alongside the trowel in the excavator's toolbox.

Ghias Klesly's paleobotanic comparison ('Ancient Agriculture in Early Bronze Age Northern Mesopotamia Reconstructed from Archaeobotanical Remains') brings us back to the laboratory microscope for a reconstruction of natural and agricultural environments of three Early Bronze Age sites in Syria. Carolin Dittrich and Eva Götting-Martin's paper ('Green Frog in the Water. A herpetological approach to the magico-medical use of frogs and frog-amulets in Mesopotamia') successfully integrates textual and figurative representations of frogs in order to bring fresh light on their manifold use in ancient Mesopotamian medicine and rituals. Chemical analysis is the focus of both Negar Abdali's ('An Overview of the Achaemenid Glazed Architectural Decoration') overview of colors and glazing techniques in the Achaemenid period and of Claudia Colini's 'Ink Recipes from the Islamic Era,' which puts the ink recipes found in Arabic manuscripts to a rigorous scientific test. Where the recipes or glazes feed into discussions of social and historical movement, as in the posited Babylonian influences on glaze production at Tol-e Ajori or of common manuscript practices in the Islamic world, both papers highlight that not all glazes and inks are equal. The details of chemical composition and production are directly relevant. Together, the papers of the session give a real sense that the integration of the sciences, both digital and natural, is no longer a scholarly outlier, but has fast become an integral part of the field.

Marcella Frangipane's keynote address to Session 5 elegantly frames one of the core issues of Ancient Near Eastern historiography. Long-term evolutionary narratives tend to lurch from immutable period to period, separated by 'transitional phases' where everything is in flux. But not all changes are equal. As Frangipane argues, historical and cultural breaks so often remain elusive because abrupt shifts themselves are the exception and not the rule. The keynote equally serves as a call to arms for a rigorous identification and documentation of contexts in stratigraphic succession in order to re-evaluate these shifts.

These conclusions are nicely reflected in Jesse Millek's overview ('Dual Narratives: Collapse and Transition at the End of the Late Bronze Age') of how much of the evidence from the Late Bronze Age in

[4] Renger 1973.

[5] Every researcher is invited to apply the method herself: Seire 2020 provides a basic introduction to constructing datasets for the technologically unitiated, using the open data provided by the project.

Syria and the Levant defies a clean historical narrative of catastrophic collapse, or in Lodeiro's summary of the historical development of Tarḫuntašša as a center within the Hittite Empire ('Tarḫuntašša: Rise and Fall of the New Capital for the Hittite Empire'). Moreover, the article by Mariacarmela Montesanto ('Do Not Fear the Dark: Change and Continuity in the Amuq Valley') offers further insights into the Late Bronze-Iron Age transition at the sites of Alalakh and Sabuniye through an overview of their pottery repertoires.

Even in periods of considerable change, as in the Hellenistic period, where Ancient Near Eastern Studies has traditionally resigned its purview, transitions rarely mean a break. Stefanos Karampekos' study of house forms attested in Hellenstic settlements ('A Possible Neo-Babylonian House-Type for the New Seleucid Foundations?') highlights their debt to older prototypes. The paper by Julia Schönicke ('There and Back Again — Towards a New Understanding of Abandonment Practices at the Neolithic Settlement of Göbekli Tepe') also leads us back to the themes of Session 1. Even as 'entanglement' remains a theme, what about 'disentanglement', the long divorce of occupation from site? Exactly the sort of rigorous attention to stratigraphic context called for by Frangipane here provides conclusive evidence against a sudden 'ritual back-filling' during abandonment and for a continuous re-building of structures.

So much for the overview, which can hardly due justice to the variety and depth promised by the keynotes and the contributions by so many young scholars in the field. Here, the reader is invited to peruse the papers herself.

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Session 1 — Entanglement.
Material Culture and Written Sources in Dialogue

Tamed Violence: Inscribed Weapons in Mesopotamia

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Abstract

Mesopotamian weapons are paradoxical; they were invented for violent conflict, but their depositional contexts are usually symbolic or ceremonial. This tension between practical and symbolic functions is heightened when weapons are inscribed — inscriptions usually amplify the weapon's depositional context and its symbolic use over its practical one. In addition, imagery of heraldic animals may further separate a weapon from the world of battle and move it into the ideological sphere. The mace is particularly relevant in this regard. It has a long history in Mesopotamia, from at least the 5th through the 1st millennium BC. Across these millennia, the mace changed from a practical weapon with a secondary votive function to an entirely ceremonial gift or symbol, marked by the addition of images and inscriptions. I argue here that addition of text and imagery specifically changed weapons' affordances, effectively taming the mace's capacity for violence.

Keywords

Textuality, Affordance, Weapons, Mesopotamia, Mace

Introduction

Texts in Mesopotamia are a blessing and a curse. Texts give us details about historical events, religious beliefs, economic practices, and social organisation. Yet the literacy rate in Mesopotamia was often low and always limited. Texts were written by and for social and political elites, and their contents cover a restricted range of actions and activities. In contrast, material culture fills in details on lifeways of non-elites, everyday events, informal beliefs, and non-state modes of production and consumption. But material culture presents biases through varying preservation and discard. The study of Mesopotamia has at times been divided between Assyriologists and archaeologists, each with strong views on the value of their data,[1] and although this separation is often broken down,[2] there is still a need for continued critical assessment of biases and for concentrated work to bring these datasets together.

Historical inscriptions in particular may contradict or complement the archaeological record. During the mid-3rd millennium BC Early Dynastic III period in Southern Mesopotamia, royal inscriptions described a turbulent, violent political history, but the archaeological record presents a situation of

1 Zettler 1996; 2003; Zimansky 2005.

2 Calderbank 2021; Charpin 1990; Ellis 1983; M. Gibson 1972; Lecompte and Benati 2017; Ristvet 2008; Stone 1987; Zarins 2020.

near-seamless continuity and inter-city cultural connections. Inscriptions were intrinsic to many monumental artworks, developing historical narratives and adding detail to depictions of battle (e.g., the Vulture Stele from Tello) or temple dedication (e.g., the Ur-Nanshe plaque from Tello).[3] Inscriptions on votive statues identified the donor and give us access to lineages and professional networks. But other inscriptions had the capacity to change the nature of objects, such as weapons.

Mesopotamian weapons present a paradox; their forms imply use in violent conflict, but their depositional contexts (usually temples or burials) suggest symbolic or ceremonial use. Maces are particularly complicated, as they were often closely associated with gods, such as the fifty-headed mace that was an emblem of Ninurta.[4] This tension between practical and symbolic is further heightened when weapons have been inscribed — such inscriptions usually amplify the weapon's depositional context and its symbolic use over its practical one. In addition, imagery on weapons — such as heraldic animals — may further separate a weapon from the world of battle and shift it into the ideological sphere. Text and image thus create challenges for categorising inscribed weapons and thinking through their complete cultural biographies. I argue that addition of text and imagery changes weapons' affordances and functions, and together these effectively tamed a weapon's capacity for violence.

Materiality of text

The 'materiality of text' approach connects the medium and message of texts and reflects on their mutual constitution and participation in the conceptualisation of knowledge and prestige.[5] The colour and shape of clay tablets and the physical process of forming signs can inform us about the scribe and their preferences, choices and skills, and about the document's intended purpose.[6] The shining darkness of haematite or diorite evokes concepts of weight and justice, through connection to the Sun God, Shamash, as reflected in the *Lugal-e* myth.[7] These dark, shining stones thus materially express the legitimacy of the texts they carry, such as on Gudea's statues or Hammurabi's law code stele.

The materiality of text approach raises many questions: What do materials chosen for inscriptions tell us about the value of information? Are the power of text and authority of its author enhanced if inscriptions are in permanent materials, such as stone?[8] Did an inscription increase an object's economic or symbolic value?[9] What does the scale of inscriptions tell us about their intended audiences? Given the low literacy in Mesopotamia in most periods, were all inscriptions intended to be read or were some aimed to inspire admiration?

Mesopotamian inscriptions can be beautiful and awe-inspiring, such as the clear, elegant signs on Sennacherib's aqueduct at Jerwan, or express solid authority, such as Naram-Sin's brick stamps. But inscriptions can also be awkward and mis-matched to their object, inappropriately sized for the space allotted — numerous cylinder seal examples attest to this. They can obscure or cover imagery, such as Ashurnasirpal's Standard Inscription carved over the reliefs of the Northwest Palace at Nimrud. These

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[3] For the Vulture Stele (AO [= Antiquités orientales, Musée du Louvre] 16109, AO 50, AO 2346, AO 2437, AO 2348) see Frayne 2007, RIME 1.09.03.01, ex. 01; Renn *et al.* 2021, CDLI no. P222399. For the Ur-Nanshe plaque (Louvre AO 2344) Frayne 2007, RIME 1.09.01.02, ex. 01; Renn *et al.* 2021, CDLI no. P222359.

[4] *Return of Ninurta to Nibru*: 140–151; Cooper 1978.

[5] Charpin 2010; Matthews 2013; Pearce 2010; Petrovic 2019.

[6] Eidem 2002; Taylor 2011; Taylor and Cartwright 2011.

[7] Jacobsen 1987, 233–272; Van Dijk 1983; Black *et al.* 1998–2006, ETCSL t.1.6.2, 466–478, 497–511.

[8] Lau 2016.

[9] Tsouparopoulou 2016; Wengrow 2004.

aspects of scale and the process and timing of the act of inscription make us ask how an inscription changes an object. What characteristics of an object meant that it was categorised as inscribable? To supplement materiality of texts, we should examine the textuality of objects.

Proper and system functions

Mesopotamian weapons' practical and symbolic uses are suggested by shapes, materials and contexts. For the Early Dynastic period, weapons of precious metal in graves within the Ur Cemetery express the symbolic half of this distinction. The gold daggers and gold-plated spears from Meskalamdug's grave,[10] for example, are markers of status and identity, which may have been displayed in ritual events but had no practical use in violent conflict. However, most precious metal weapons from the Ur Cemetery are matched in poorer graves or other contexts by practical versions, identical in form but in copper or bronze. Thus, there were at least two types of weapons in mid-3rd millennium BC Mesopotamia, practical and symbolic. But a third category of weapons exists, which transitioned from practical to symbolic. These are weapons that began with a practical use but ended up in symbolic contexts, particularly dedicated in temples after battle. These weapons became suitable as gifts to the gods due to their history, such as use in victory or ownership by a successful individual.[11] Maces are among the most common weapon to make this transition. Not all maces in this transitional category are inscribed, but many are, and those inscriptions were added at the transition from practical to symbolic.

Practical and symbolic functions have been labelled in various ways. Binford, Schiffer, and others articulated this distinction as 'techno-function' versus 'socio-function' and 'ideo-function'.[12] But a more subtle distinction is Preston's 'Proper function' versus 'System function'.[13] Her distinction focuses on the use for which an object was produced versus the multiple uses to which it is put in society. A modern example is usually that of a chair, which has a proper function as seating but can have improvised system functions as a step-stool, door prop, book shelf, etc. An archaeological example is the use of paintbrushes, toothbrushes, and dental tools during excavation. Their proper function is to paint houses or clean teeth, but we improvise a system function to expose finds *in situ* or to clean pottery.

Maces are one of the few weapons invented for human-to-human violence, rather than being a hunting weapon also used in warfare, such as the spear or arrow. The mace's original and normative proper function is unambiguous and restricted to causing injury or death in battle. Maces have a long history in Mesopotamia, from at least the Neolithic through Neo-Babylonian periods. But the mace's function varied over time, as reflected by their contexts, representations in art, and mentions in texts. These all imply the mace had social or system functions as ritual paraphernalia and votive gifts. When did these system functions arise and how were they expressed?

Further, over time, maces were replaced by more efficient weapons in battle, and the mace became entirely symbolic of power, rather than having any practical use. Therefore, we might ask whether it is correct to retain the proper versus system function distinction into the 1st millennium BC, by which time maces' only function was symbolic. This shift in use was accompanied by physical changes, or affordances, that enabled or encouraged certain actions.

10 Woolley 1934; PG 755.
11 Vidal 2011.
12 Binford 1962; Schiffer 1992; Schiffer and Skibo 1987.
13 Preston 1998; 2000.

Figure 1: *Late Chalcolithic maceheads from Tell Brak Eye Temple. Left: 7.62 cm high, BM 126458; right: 5.08 cm high, BM 126459. (British Museum; author's image).*

Mesopotamian maces and affordances

Maces in the 5th millennium BC already present challenges to single-function interpretation. They are usually spherical or piriform and of a size to be practical, *c.* 5–7 cm high and 6–8 cm diameter. They fit easily in the palm of a hand and, if attached to a wooden shaft, can be efficiently swung. But a challenge to the practical-function interpretation is raised by a group of mace heads recovered from the largest house in Level II Tell Abada, dating to Ubaid 2–3.[14] This 'Building A' also contained a large number of infant burials and stone vessels, palettes, clay tokens, and 'proto-tablets', part of a recording or administrative system. Further mace heads come from Ubaid and early Late Chalcolithic levels at Tepe Gawra, including tombs and the Round House in Level XIA.[15] These special depositional contexts suggest that maces could have a symbolic status already in the 5th millennium BC. In the 4th millennium BC, Uruk and Late Chalcolithic maces remained practical in form (**Figure 1**). They are a reasonable size and weight to wield in battle, and many have damage that may be from use, such as chips, cracks, or wear around the perforation.[16] On the other hand, the contexts for some maces, such as the Eye Temple at Tell Brak,[17] suggest that they had a supplementary system function as votives in the late 4th millennium BC.

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[14] Jasim 1985.
[15] Tobler 1950.
[16] A comprehensive study of use-wear of all excavated Mesopotamian maces is not currently possible; assessments of damage here are based on evidence visible in published photos.
[17] Mallowan 1947, pl. VI: 1, 2; LII: 11, 12, 14, 15.

Figure 2: *1. Early Dynastic I macehead with animal combat (lions) in low relief, from Tell Agrab, Shara Temple, L14:1; 7 cm high, 4.8 cm diam. as preserved, IM [= Iraq Museum] 27875, AG 35:1030. 2. Early Dynastic I macehead with four lion heads in high relief, Tell Agrab, probably Shara Temple, M14:2?, 6.5 cm high, 10 cm max width, IM 21388, Ag. 36:191(Both images: Diyala database project CC A-NC-ND 3.0 Unported License, https://diyaladb01.uchicago.edu/). Not to the same scale.*

During the 3rd millennium BC Early Dynastic period, maces continued to hold both a proper function as weapons and a system function as votives. Early Dynastic art shows the mace used in battles, albeit by gods, such as Ningirsu on the Vulture Stele. Contemporary maces, even those from temple votive contexts, often look used, battered and worn. These maces presumably transitioned from battleground to temple. The temples at Tell Agrab, Tell Asmar and Khafajah, in the Diyala region, provide a particularly rich sample of votive maces;[18] one room in the Oval Temple at Khafajah was even described by the excavators as the 'macehead room'.[19] These are supplemented by smaller numbers from the Ishtar and Ninnizaza temples at Mari.[20] Many maces from the Shara Temple at Tell Agrab in particular were made in veined and brightly coloured stones,[21] but most nonetheless have an efficient ovoid or pear shape and a size, like those of the 5th–4th millennia BC, that could be easily used in battle. But the Early Dynastic period also saw symbolic maces that were only made and used as votives. These are maces with lions carved in relief, integral to the object; excellent examples come from Early Dynastic I Tell Agrab (**Figure 2**). While the shape and scale of these maces is appropriate for proper use in battle, their affordances and function are subtly changed by the imagery.

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18 Delougaz 1940; Delougaz and Lloyd 1942; Reichel 2004–2010, Diyala project Object Database, keyword searches 'mace head' and 'macehead'.

19 Delougaz 1940, 27; N 44: 1.

20 Parrot 1956, 129–132, pl. LIV; 1967, 187–189, pl. LXXIII. See Braun-Holzinger 1991 for a comprehensive discussion and catalogue of temple dedications.

21 Delougaz and Lloyd 1942, 238; Lloyd 1961, fig. 66.

An affordance was defined by Gibson as the potential of an object for use in particular actions by particular actors; they provide opportunities or possibilities for action.[22] Affordances are relevant to agency and choice and may invite particular actions or uses.[23] Affordances are based in an object's materials and form and what these suggest, allow and enable; in Hodder's terms, they are part of humans' complicated interdependent, or 'entangled', relationship with material things.[24] In the case of decorated maces, the animals in relief give the mace the potential to be viewed and admired. Decoration in general and lion motifs in particular would suggest connections with other artworks on which lions appeared, such as reliefs and seals. Decorated maces further complicate the concept of affordances based mainly on an object's material, adding aspects of creativity and the temporally-extended, or distributed, making of an object.[25] Affordances are usually framed as positive, supporting specific actions; but they can also deter or constrain other actions, through how an object or material is perceived. Although a decorated mace is still a mace, based on its shape, weight and size (and possibly past use), it is also an artwork with visual impact and layers of encoded symbolic knowledge; how observers dealt with this mixture of information sources remains unresolved.[26] But decoration reduces the likelihood that such a mace would be swung in violent conflict, since it was also, in part, an image.

By the later Early Dynastic period, additional purely votive maces appear, with inscriptions that overtly express their votive function. The inscriptions are usually short texts that identify the mace's dedicator, sometimes their family relationships or profession, and the god to whom it was given. The inscriptions are in 'lapidary' script that is neat, consistently-sized, and even decorative, in the sense that it adds a positive aesthetic quality. But they are writing, not image, and thus a new object type is created. As Malafouris argues, new objects generate new thinking and new human-environment relationships.[27] The new affordances of inscribed maces – their capacity to be read – intersects with the affordances of their users – the capacity to read – and thus shift them even further from battle. Objects incorporate hints to their use through design,[28] which can include material, shape, weight, and surface decoration. A surface inscription and its legibility might over-ride, or at least confuse, the mace's use in violence, based on its shape. The Early Dynastic III period is the same era that inscriptions were first added to cylinder seals, statues and stone bowls. Such inscriptions identified the owner or dedicator of the object, and Pollock has argued that the inscribing of stone, the increased information, and the situating of such objects in public places all work to adjust the orientation of the object from the present towards the future.[29] These inscriptions may be contrasted to contemporary lengthier texts on stelae and plaques, which narrate events and provide their history and supplementary details.

Examples of maces that combine image and text include the late Early Dynastic mace from Khafajah, which is often cited as evidence that Inanna/Ishtar was the deity worshipped in the Oval Temple (**Figure 3**).[30] At just under 7 by 8 cm, it is an appropriate size for a practical weapon in battle, but the inscription and high relief lions on the top suggest a purely votive use. The famous Early Dynastic III Imdugud mace from Girsu has a continuous relief of a lion-headed eagle grasping two lions, and an inscription citing the dedication of the mace by an official of Enannatum to Ningirsu.[31] At 11 by 11.7 cm, this is a large

[22] J. Gibson 1982; 1986.
[23] Withagen *et al.* 2012.
[24] Hodder 2012; 2014. See also Material-Engagement Theory: Malafouris 2013; 2020.
[25] Withagen and van der Kamp 2018.
[26] Knappett 2004.
[27] Malafouris 2020.
[28] Robb 2015.
[29] Pollock 2016.
[30] Kh I 636; Delougaz 1940, 99, 148–149, fig. 91; Frayne 2007, RIME 1.15.add074.01, ex. 01; Renn *et al.* 2021, CDLI no. P222729.
[31] BM [= British Museum] 023287; Aruz and Wallenfels 2003, 75–76; Frayne 2007, RIME 1.09.04.19, ex. 01; Renn *et al.* 2021, CDLI no. P222490.

Figure 3: *Early Dynastic III macehead with lions in relief and inscription to Inanna, from Khafajah Temple Oval III, M44:5, 7.7 cm high, 6.6 cm diam., Kh. I 636. (Diyala database project CC A-NC-ND 3.0 Unported License, https://diyaladb01.uchicago.edu/)*

mace, although not impossibly large for a weapon. However, it was clearly manufactured as a votive. The images are well integrated with the ovoid shape, the carving is crisp and clear, and there is limited damage. Finally, the Early Dynastic III Mesilim mace from Girsu is another probable purposely-made votive. Imagery shows the lion-headed eagle and lions, and the inscription identifies Mesilim as king of Kish and builder of the temple of Ningirsu.[32] Although it is somewhat battered, this is likely to be depositional damage, since this mace is extremely large, *c.* 19 by 16 cm, and it weighs at least 6 kg, a massive weapon to wield. The lions' eyes and perforations at their mouths may have been inlaid with coloured stones, a further argument against use in battle. A votive purpose at production seems most probable. Thus, in the Early Dynastic III, some maces had moved far from a proper function as weapons, to a system function as votives.

The situation in the Akkadian period is similar, with practical/proper, transitioning, and votive/system purpose maces. In support of continued practical/proper purpose, there are artistic representations of mace use in battle. On Sargon's stele, the king uses a mace against a prisoner in a net, echoing the pose of Ningirsu on the Vulture Stele;[33] on the Victory stele of Rimush from Tello, maces are used by two Akkadian soldiers;[34] while on cylinder seals, maces are used by deities in battle.[35] Texts are ambiguous; an Old Babylonian copy of a Sargon text describes Sargon using the god Ilaba's mace in battle.[36] This implies that the mace was possibly special, somewhat archaic and associated with divine figures.

[32] Louvre AO 02349; Parrot 1948, 72; Frayne 2007, RIME 1.08.01.01 ex. 01; Renn *et al.* 2021, CDLI no. P222741.

[33] Amiet 1976, Pl. 6.

[34] Thomas and Potts 2020, 178.

[35] Aruz and Wallenfels 2003, no. 143, 215–216; Rakic 2018, Pl. V.

[36] Gelb and Keinast 1990, Sargon C4.

Braun-Holzinger even asserts that after the Early Dynastic, the mace was used only by the gods.[37] But undecorated and uninscribed maces persist, although it must be admitted that some Early Akkadian maces from the Single Shrine level of the Abu Temple at Tell Asmar may have originated during the Early Dynastic III period and were only ritually discarded later. However, the archaeological record includes maces that have apparently transitioned from battle to votive function, as suggested by inscriptions. For many examples, their size and form are physically practical as weapons, and they bear damage that could be related to use in battle. For example, a mace from Kish with a partially broken base ring may have been used in battle and later inscribed and dedicated as a votive.[38] Its diameter of approximately 5.5 cm places it within the range of easily wielded weapons. The inscription is mostly on the opposite side from the break in its base ring, suggesting a possible sequence of events from battle use, damage, selection for dedication, and choice by the scribe of the object's 'best side' for inscription (there is also post-inscription damage possibly related to final discard). However, other maces that might be war booty appear unused and highly polished; their colourful and highly visible stones do not rule out a use in battle but suggest a votive use only, e.g., a green aragonite mace of Sargon from Ur,[39] or a brown limestone mace of Rimush from Nippur.[40] The damage to the latter maces is clearly not related to their use in battle but occurred later in their lives, perhaps during final deposition, since the inscriptions have been partially broken and some signs are obscured by surface damage.

It can be a challenge to prove that a polished, inscribed and apparently undamaged mace was or was not used in battle. However, scale provides an additional critical aspect and indeed may replace relief imagery in the Akkadian period. A biconical calcite mace from Ur (**Figure 4**) has an inscription that indicates Rimush dedicated it to the moon god Sin after he had overthrown Elam and Baranse and that it was part of the Elamite booty.[41] But like the Early Dynastic Mesilim macehead, the Ur Rimush mace is huge: originally 19 cm high, 21 cm in diameter, and probably weighing *c.* 6–7 kgs. Its awkwardness for practical use suggests it was never an Elamite weapon. Instead, this appears to be votive from the start. Was it a symbolic mace used by the Elamites, or was it entirely fictional, a mace produced in Mesopotamia itself and ascribed to Elam?

In the post-Akkadian period, maces were rarely practical and almost entirely votive. A few standard-sized inscribed votive maces exist, but the most distinctive type dedicated by Gutian and Ur III kings is enormous, with diameters *c.* 18–21 cm and heights *c.* 15–17 cm, regularly weighing more than 5 kgs (**Figure 5**). They are highly visible but completely impractical for their purported function as a weapon in battle. These maces supplement the occasional large examples in the Early Dynastic and Akkadian periods; therefore, massive scale, or monumentality, must be added to inscriptions and imagery as affecting maces' affordances and functions. The inverse, weapons too small to use for practical purpose, has been recorded in deposits of double axes and other weapons in Middle-Late Minoan caves and peak sanctuaries.[42] Gudea's texts support a purely votive function for maces. In his cylinder and statue texts, maces are enormous, they have seven or fifty heads and elaborate names and identities.[43] Maces had lion

37 Braun-Holzinger 1991.

38 Ki 765; Braun-Holzinger 1991, 051, K39; Renn *et al.* 2021, CDLI no. P212432.

39 U 00221, CBS [= Catalogue of the Babylonian Section, University of Pennsylvania Museum] 14936; Braun-Holzinger 1991, 046, K 19; Frayne 1993, RIME 2.01.01.04, ex. 01; Renn *et al.* 202,1 CDLI no. P217324.

40 CBS 08888; Braun-Holzinger 1991, 047 K 22; Frayne 1993 RIME 2.01.02.10, ex. 01; Renn *et al.* 2021, CDLI no. P216851.

41 U 00206, CBS 14933; Braun Holzinger 1991, 046 K20; Frayne 1993, RIME 2.01.02.13, ex. 01; Renn *et al.* 2021, CDLI no. P217325.

42 Flouda 2015.

43 For seven-headed maces see Gudea Cylinder B: Edzard 1997, RIME 3/1: E3/1.1.7.CylB: xiii 21-23; CDLI no. P431882: 157, 313; for fifty-headed maces see Renn *et al.* 2021, Gudea Years 14 and 16 (https://cdli.ox.ac.uk/wiki/doku.php?id=year_names_gudea –– accessed 24 Feb. 2021). Elaborate names and identities are given in Gudea Cylinder B; Edzard 1997, RIME 3/1: E3/1.1.7.CylB: vi 21-25, vii 21-18; Renn *et al.* 2021, CDLI no. P431882: 159–160, 169, 314–316.

Figure 4: *Akkadian Period macehead, votive of Rimush from Ur, alleged booty from the battle of Elam, 19 cm high, 21 cm diam., B14933 (University of Pennsylvania Museum of Archaeology and Anthropology, author's image).*

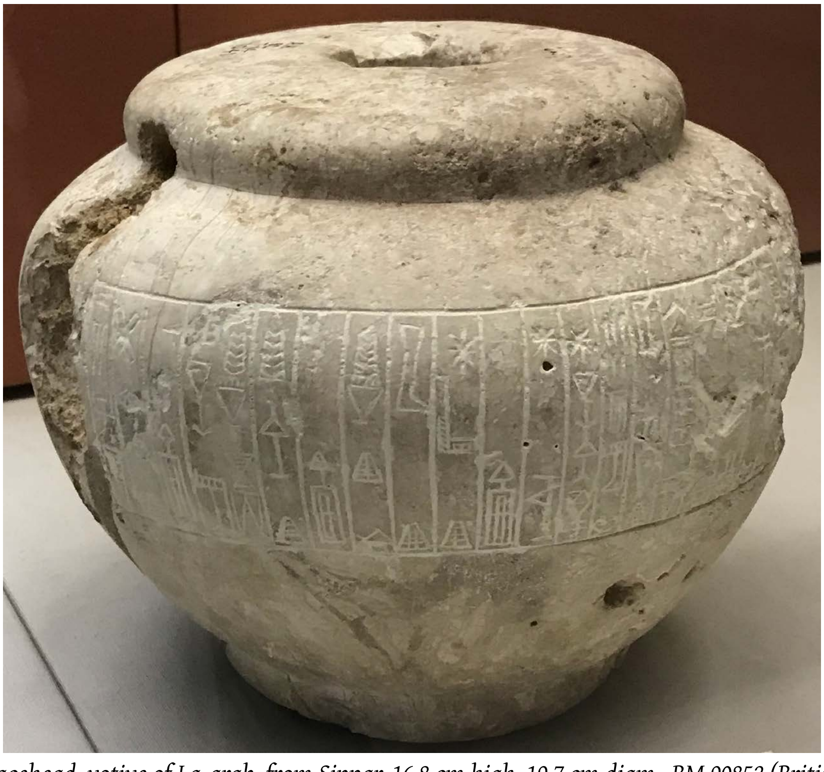

Figure 5: *Gutian macehead, votive of La-arab, from Sippar, 16.8 cm high, 19.7 cm diam., BM 90852 (British Museum; author's image).*

imagery and were gilded,[44] and they were placed in the temple immediately after their manufacture. Their earlier proper function in conflict is not mentioned.

In the 2nd millennium BC, fewer maces are reported from the archaeological record, despite the mace being carried by kings or gods on clay plaques and cylinder seals.[45] Old Babylonian texts in which maces are used in battle are set in the past, such as the *Lament over the Destruction of Ur*,[46] or *Gilgamesh versus Aga*.[47] Old Babylonian royal inscriptions refer to maces as attributes of or gifts to deities, especially Ninurta and Inanna.[48] Texts from Mari suggest that weapons belonging to storm gods (including maces) were used for symbolic and legal purposes rather than violence, especially in signing oaths and contracts and arbitration of disputes.[49] Known maces appear to have reverted to a practical size yet appear unused. A mace possibly from Larsa, dedicated to Nergal by Ir-Utu, a seal engraver, for the life of Abi-Sare, is 6.2 cm high and 5.2 cm in diameter; it has a few chips around the lower perforation, where a handle would have been inserted, but is otherwise a beautifully symmetrical pear-shape with no damage.[50] Two undamaged spherical copper alloy maces of comparable size come from (possibly) Tell Muhammad and are inscribed as (property of?) the palace of Hammurabi.[51] The mace was by then an emblem rather than a useful weapon.

In the late Middle Assyrian and Neo-Assyrian periods, maces changed further. They were even more clearly made mainly for votive and ritual functions—often in precious luxury materials such as lapis,[52] or in fragile materials such as ivory,[53] faience,[54] or glass.[55] These ovoid maces are supplemented in the late Neo-Assyrian period by elaborate cylindrical maces of stone or bronze and iron, some with lion- or goat- head finials and inscriptions;[56] these come from palatial or temple contexts at Sherif Khan, Nimrud, Nineveh, Khorsabad and Zincirli, sometimes in groups of up to 54 objects.[57] Inscriptions record the dedication of some of these maces to the gods, while others simply bear the name of the owner.[58] Representations of mace use in Assyrian art are often ritual: held by kings when approaching the gods (Tukulti-Ninurta I's altar), as votive statues (Ashurnasirpal II, Shalmaneser III), and on palace reliefs (mirrored images of Ashurnasirpal II facing the sacred tree in his throne room relief). The king's mace is generally identified as a symbol of royal power.[59] Maces, especially maces with rosette decoration, are held by royal officials within Neo-Assyrian armies,[60] but when such officials appear in processions or ritual contexts, rather than in violent action. In such reliefs, the mace is held just below the head rather than at the end of the handle, which suggests it was not swung as a weapon but carried as a symbol of

44 Edzard 1997, RIME 3/1: E3/1.1.7.Statue B: 26–37; Renn *et al.* 2021, CDLI no. P431884: 160–168.

45 Moorey 1975; Collon 1986, 148.

46 Michalowski 1989, 45, 53; Black *et al.* 1998–2006, ETCSL t.2.2.2: 222.

47 Katz 1993, 45; Black *et al.* 1998–2006, ETCSL: Gilgamesh and Aga: 40–47, 82–89.

48 Frayne 1990, RIME 4: Ishme-Dagan 4.1.4.7; Renn *et al.* 2021, CDLI no. P448292.

49 Töyräänvuori 2012.

50 BM 104838; Frayne 1990, RIME 4.02.06.x2001, ex. 01; Renn *et al.* 2021, CDLI no. P431605.

51 BM 022455, 022456; 4.6 cm high x 6.4 cm diam. and 4.35 high x 6.23 cm diam. respectively; Frayne 1990, RIME 4: 4.03.06.18, ex. 01 and ex. 02; Renn *et al.* 2021, CDLI nos. P431858 and P431859.

52 BM 91452; Grayson 1991, RIMA 2.0.101.100, ex. 01; Renn *et al.* 2021, CDLI no. P423563.

53 Barnett and Davies 1975, 278.

54 BM 118775, 118776; Curtis and Reade 1995, 182–183.

55 Barag 1985, 74–75.

56 E.g., Louvre AO 21368; Frame 2021, Sargon II 062; Renn *et al.* 2021, CDLI no. P498521. For stone cylindrical maces see Curtis and Grayson 1982.

57 Curtis and Reade 1995, 180; Curtis and Grayson 1982. Maces from Hasanlu in Iran (*c.* 800 BC) are reported as both practical, including spiked copper-bronze examples carried by invading soldiers, and polished/decorated (Danti 2014; Muscarella 1966).

58 Curtis and Grayson 1982.

59 Porter 2010.

60 Collins 2010; Reade 1972.

authority or position. The mace is also restricted to officers in the army or royal bodyguards;[61] average soldiers are not depicted with the mace. By the Neo-Assyrian period, the maces' original proper function had largely vanished and been replaced by a more powerful use as symbol and in ceremony. And that ceremonial function, previously one of several system functions, thus effectively was their new proper function. However, the mace's role in violence was not forgotten; one clear instance of a mace used in battle is during the killing of the Elamite king Teumman in Ashurbanipal's palace relief at Nineveh. However, this was a re-imagined representation of an act of public performance with many ideological layers, for which an 'archaic' weapon was appropriate. Similarly, in text, Ashurbanipal uses a mace to crush a lion's skull while hunting,[62] but this may be an oblique literary reference to Marduk crushing the skull of Tiamat in *Enuma elish*; Marduk had a net, bow and arrow yet chose the mace for the final blow. Despite this connection, relief representations of Ashurbanipal hunting lions show him using a bow and arrow or dagger; this context is intended to be modern and active, not one steeped in tradition.

In summary, the original proper battle function of maces did not continue to a significant degree beyond the late 3rd millennium BC but was replaced by votive and ceremonial functions. That function transition was gradual and marked first by the addition of imagery but mainly and more permanently by the addition of inscriptions.

Textuality of objects

If a text is a coherent, interpretable, set of signs, 'textuality' is how these signs work together to communicate, or 'the quality of coherence or connectivity that characterises text'.[63] In Mesopotamia, signs could be writing, images, or even elements of images. The issues of textuality and proper versus system functions are further complicated by the effectiveness of objects in Mesopotamia. Statues or images, especially those of deities, had agency and power in Mesopotamian belief, and they were ascribed a significant degree of intentionality and the ability to communicate.[64] Could this internal force invite inscription? And, beyond information, what did an inscription add? Did it improve the textuality of the object? In the Vulture Stele or Ur-Nanshe plaque, the text adds detail to information expressed by the images. But the images are very legible and coherent; they narrate the battle sequence, building or feasting through simple distinctive iconography and the relationship between individual figures. The text's content adds little, although the presence of the inscription tells the non-textually literate about the event's importance. Monumental inscriptions meant history and permanence.

Mesopotamian stelae, with their multiple signs and images, are overtly textual. But one of the figures on the Ur-Nanshe plaque is particularly relevant to the textuality of less complex objects. The basket-bearing figure of the king symbolised and communicated royal commissioning of a building project. Its reading suggests the king's involvement in construction, carrying the soil for the temple's first brick. This iconic image was used across the millennia, in Ur III royal foundation figures and in Neo-Assyrian monuments that recorded the reconstruction of Babylon by Ashurbanipal and Shamash-shum-ukin.[65] The basket-bearing figure on its own combines meaningful signs in a specific composition with clear textuality or coherence. It is easily read, even by the textually illiterate; iconic literacy involves reading the basket and the royal male figure as separate icons or meaningful features, and then reading their

[61] Reade 1972.
[62] Novotny and Jeffers 2015–2018, Ashurbanipal 057.
[63] Hanks 1989, 96.
[64] Bahrani 2003; Pongratz-Leisten and Sonik 2015; Winter 1992.
[65] Porter 2004.

composition as an active relationship between them, for comprehension of the message. The deliberate use of an action and pose that would be familiar to many labourers may have been intended to address a non-elite, as well as textually illiterate, audience. Although textual literacy—whether functional, technical or scholarly—was mostly reserved for upper classes,[66] iconic literacy was arguably far more widespread. The Ur-Nanshe relief, Ur III foundation deposits and Neo-Assyrian stelae also bear text, setting up a tension between an accessible image of real-world, working class action and an inaccessible text containing information available only to elites. However, the image is so strong that the content of the text is not especially relevant, although its presence marks the figure as elite and the action as notable.

In the same way, votive maces combine separate meaningful devices: an accessible form and less-accessible inscription, scale, and/or material. Like the king bearing a basket, the form of the mace remained essentially unchanged over time, and this unique shape made it easily read as a weapon and symbol of violence. When it bore images and then inscription and monumental scale from the 3rd millennium BC onward, these wrote a visual text that adjusted the use from violence to piety.

Uninscribed maces from the 4th and 3rd millennia BC could have been removed from their temple contexts and returned to their original use in battle. They could shift between proper and system functions, and their performative capacity was not changed by the act of dedication. But from the early 3rd millennium BC, the affordance adjustments created by inscriptions, imagery and monumentalisation converted what was a mobile, active thing to a still and quiet object, locked into a museum-like context in the temple. Inscriptions in particular adjusted the focus of the mace from the present to the future, and by doing so gave it a past, making it an antique, an heirloom or an artefact, rather than a weapon. Inscription altered the possible affordances of such maces so that they could not return to their initial proper purpose in conflict. They may hold a memory of violence but they had been tamed.

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[66] Veldhuis 2011.

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La Maison d'Urtenu. A Functional Study of a 'Great House' from Ugarit

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Abstract

Many archives have been discovered in household contexts at the site of Ras Shamra-Ugarit. One of these houses was the so-called 'House of Urtenu', unearthed during the last quarter of the 20th century with an important archive inside. Its archaeological remains and textual evidence point to an important role in the management of strategic commodities like copper, tin, timber and horses. The military implications of these can be linked with other texts related to the political development of the Assyrian and Babylonian realm in the last decades of the Late Bronze Age. This article offers a synthesis of archaeological and documentary sources to understand the role of this house in the politics and the economy of Ugarit in relation to the management of these commodities in their international context.

Keywords

Ugarit, Commerce, Diplomacy, Babylonia, Assyria

Introduction

Though the largest number of texts in Ugarit was found in the Royal Palace, many others were discovered in household contexts.[1] Among these houses, the House of Urtenu is probably the most interesting due to the number and the nature of the texts unearthed there.[2] However, a complete study of the function of this house is still lacking.[3] Many texts and the complete archaeological report remain unpublished.[4] Nevertheless, the archaeological characteristics of this house have been discussed in some general

[1] For the study of household architecture in Ugarit see Callot 1983; 1994. Several general works that provide an overview of all these archives in private context: Pedersén 1998, 73–80; Van Soldt 2000; del Olmo Lete 2018. Studies of specific household archives include: the archive of the High Priest in Rosengren-Petersen 1994; the complete archaeological description of the House of Rašapabu in Matoïan 2013; the archive of the House of Yabninu in Courtois 1990; the House of Literary Tablets in Roche-Hawley 2013; and a functional analysis of the House of the Hurrian Priest in del Olmo Lete 2017.

[2] Malbran-Labat 1995, 103.

[3] Malbran-Labat 1995, 111.

[4] The contents of the unpublished texts are described in several publications: see Malbran-Labat 2008 for a complete list of Akkadian texts and Bordreuil and Pardee 1999–2000 for Ugaritic texts. However, the Ras Shamra-Ougarit project has among its priorities to publish the archaeological study of all *Grandes Demeures* of Ugarit and, among them, the House of Urtenu (Matoïan *et al.* 2013, 441).

syntheses about Ugarit as well as in specific archaeological reports.[5] Many texts have been transcribed and translated in catalogs.[6] Based on this information, some overviews have tried to offer an explanation about the possible functions of this archive.[7] Among them, the most notable contributions were made by Florence Malbran-Labat, who established the archive's special link with the management of Ugaritian diplomacy and trade by means of the exchange of different commodities, such as dyed textiles and olive oil, both in diplomatic and commercial networks.[8]

In addition to oil and textiles, the house also managed some other commodities which were essential to the military industry of the Late Bronze Age, including copper, tin, timber, and horses. This house was not the only one to deal with such items, since other archives like those of Yabninu, Rap'anu, and Rašapabu are also related to the management of metals like copper and tin.[9] However, the relationship between the management of these items and international contacts is more evident in the House of Urtenu.[10] In particular, this archive contains several texts of which the contents deal with political and military developments in Babylonia and Assyria.

The objective of this article is to explain the role of this house in the context of the politics and economy of Ugarit, particularly in relation to the management of copper, tin, timber, and horses. Firstly, I will describe the archaeological context of the archive as well as the archaeological remains related to each of these items. Secondly, I will analyze the texts that describe their management and exchange. Finally, taking their military implications into account, I will discuss their relationship to contemporary political and military events in Mesopotamia as documented in the House of Urtenu itself.

Archaeological description of the house

Archaeologists first observed the presence of clay tablet fragments around an abandoned bunker of the Syrian army in the south-center sector of the *tell* of Ras Shamra.[11] This structure was located next to one of the most important streets of Ugarit and near the southern entry to city, which should have been an important route of supply for the city.[12] Preliminary archaeological works commenced in 1973, during which sixty-eight clay tablets and fifty-one fragments were uncovered.[13] The majority of these texts was written in Akkadian and embraced a large variety of genres: diplomatic and private letters, administrative lists and scholarly works.[14] After these first finds, the archaeological project began to expand the investigation of the archaeological context to which these texts belonged. However, some parts of this context had been destroyed during the construction of the above-mentioned bunker.[15] Excavation work nevertheless revealed that those tablets belonged to a large, well-built house.[16] Because many letters quoted the personal name of Urtenu, the archaeological team referred to this house as the

[5] See the syntheses in Yon 2006, 87–88; Saadé 2011, 241–243; and McGeough 2007, 257–259; fuller archaeological reports are given in Yon *et al.* 1987, 184–190; 1990, 18–28; Yon 1995.
[6] Bordreuil 1991a; Arnaud 2001a; Bordreuil *et al.* 2012; Lackenbacher and Malbran-Labat 2016.
[7] Bordreuil and Malbran-Labat 1995; del Olmo Lete 2018, 61–63; Rutz 2019, 223–226.
[8] Malbran-Labat 1995, 104–107; 1999; 2013. On the role of commodities, see Malbran-Labat 1995, 104; 2013, 2–3.
[9] Courtois 1990, 125–126; Bell 2012, 181–183.
[10] Malbran–Labat 1995, 105–107; 2013, 5–8; McGeough 2007, 335; 2015, 92.
[11] Bordreuil 1991b, 7; Bordreuil and Pardee 2008, 186.
[12] Yon 1995, 433.
[13] Bordreuil 1991b, 7; Bordreuil and Pardee 2008, 186.
[14] Yon 1995, 433–434.
[15] Yon 1995, 434–436.
[16] Yon *et al.* 1990, 25.

House of Urtenu.[17] Only recently, Sylvie Lackenbacher and Florence Malbran-Labat have noted that, though the name is conventional, Urtenu's ownership of the house remains uncertain.[18]

This house covered an area of *c.* 250 m^2 and occupied the southwest corner of an îlot in the south-center sector of the city.[19] It was built with good materials, including stone ashlars and masonry in the foundations and corners.[20] It was planned with a complex internal layout, in which there were two distinct parts, professional and domestic, separated by a central paved courtyard.[21] The reconstruction of the main entrance has been subject to some debate. In the opinion of Yves Calvet, the access to the house would have been in the western wall of the house.[22] In contrast, Gabriel Saadé argued that the main entrance would be located in the northern wall, and would grant access to the central courtyard through a little hall (*locus* 2156), in which the stairs leading to the upper floor were also located.[23] The domestic part has been assigned to the western side of the house based on the presence of hydraulic facilities, while the professional area was located on the eastern side, which presents many characteristics of an administrative office, including the presence texts there.[24] However, this hypothesis is difficult to reconcile with the presence of a familiar grave under the floor of the *locus* 2072.[25] From this *locus* 2072 more rooms continued to the east. Among these, the *locus* 2135 stands out because of the large concentration of texts that were unearthed here in 1994.[26] In general, all these features (large size, quality of construction materials, presence of familiar grave, and hydraulic facilities) indicate that the House of Urtenu was one of the elite houses of the city.[27]

Most of the archaeological small finds and objects associated with the House of Urtenu also reveal an important connection to maritime trade with Egypt, Cyprus, and the Aegean. Egyptian finds include a seal-stamp from a scarab of Ramses II, as well as some travertine vases with Egyptian decoration.[28] Likewise, contacts with the kingdom of Alašiya (Cyprus) are visible in the corpus of Cypriot-Minoan texts present here.[29] Finally, examples of the typical Mycenaean decorated pottery add to the evidence of maritime trade involvement of this house.[30] Several remains also linked the owner of the house with horse breeding and chariots, including scenes of chariot hunting on pottery and cylinder-seals and the presence of two alabaster pommels for chariots.[31] Moreover, the structure adjoined to the east of the House of Urtenu, the so-called House of Stone Troughs, has been identified as a stable for horses,

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17 Bordreuil and Malbran-Labat 1995, 444.

18 Lackenbacher and Malbran-Labat 2016, II. However, the two individuals Ur-Teššub and Urtenu are the main receivers of the private correspondence, and thus remain the most suitable candidates to be identified as the owners of the house or at least as its main occupants (Malbran-Labat and Roche 2007, 63–67; Bordreuil 2013, 370–371). A main obstacle for a definite assignment of the property to Urtenu or Ur-Teššub is the virtual absence of private legal texts which could be related to either one or the other (Malbran-Labat 2008, 24–25).

19 Calvet 2004, 94.

20 Yon *et al.* 1990, 25.

21 Yon 1995, 439.

22 Calvet 2004, 94–95.

23 Saadé 2011, 242.

24 Saadé 2011, 242.

25 Saadé 2011, 242.

26 Yon 1995, 436–439; Malbran-Labat 1999.

27 Thus also following the classification of Devolder 2005.

28 On the seal-stamp see Lagarce-Othman 2016, 156–157; the vases are described in Matoïan 2015, 56.

29 Olivier 2016, 150–154. See Steele 2013, 80–83 for a reflection about the spread of Cypro-Minoan literacy. In contrast to the prevalent view that writing developed on Cyprus through contact with other writing civilizations of the Eastern Mediterranean, Philippa M. Steele has recently argued that the beginning of literacy in Cyprus was given impulse by internal social and political developments (Steele 2018, 5).

30 Yon 1995, 440–441.

31 Yon 1995, 440–441; Yon and Caubet 2001, 69–71.

where some equid teeth were also unearthed.[32] Finally, other objects such as jewellery moulds, objects in bronze and a copper melting pot, link this house to metallurgy.[33]

The chronology of the archive ranges from the middle of the 13th century to the beginning of the 12th century BC.[34] Since the first texts unearthed in the area were derived from contexts disturbed by the construction of the military structure, we cannot know from which part they came from. Pierre Lombard's study of the position of the texts unearthed between 1986 and 1992 established that all of them fell down from an upper floor and were scattered on the lower floor during the final destruction of the city.[35] Finally, all texts discovered in 1994 had been filed on the lower floor in *locus* 2135.[36] In this locus, archaeologists determined the existence of niches in the wall where some texts had been placed, as well as little holes for fixing wooden shelves.[37] There were thus two places where these texts were stored, although there is no key aspect related to the content or the form of the texts that could indicate the reason why some were stored upstairs and others downstairs.

The Archive: management of copper, tin, timber, and horses

Copper and tin are mentioned in both the official correspondence and private letters of the House of Urtenu.[38] Some diplomatic letters reveal close contacts between the House of Urtenu and Alašiya (Cyprus), which was the main producer of copper in the Late Bronze Age for many states of the Mediterranean basin.[39] Ugarit had became an important commercial seaport and distributor of Cypriot copper since the Middle Bronze Age, as already attested in the text ARM 25, 718 from Mari.[40] Tin, however, came from the East, though its specific provenance has not been established with any certainty for this time.[41] Carol Bell has argued that the most likely sources were mines in Karnab in Uzbekistan and Muchiston in Tajikistan.[42] Therefore, tin reached Mesopotamia through the routes of Central Iran and was distributed to the western seaports via the Euphrates, a practice likewise already suggested since the Middle Bronze Age by the archives of Mari.[43] Furthermore, these metals were also re-distributed and transformed in the House of Urtenu. For instance, metallurgy is observed in weapon lists,[44] ration lists to metalworkers,[45]

32 Yon *et al.* 1987, 187–190 ; Yon 1995, 442.
33 Yon *et al.* 1990, 22–23; Dardallion 2004, 189; 2012, 171.
34 Arnaud 1991a, 11; Bordreuil and Malbran-Labat 1995, 447–448.
35 Lombard 1995, 227–238.
36 Lackenbacher and Malbran-Labat 2016, I.
37 Yon 1995, 438–439; Rutz 2019, 225.
38 RS 34.141 (Arnaud 1991b, 70–71); RS 34.167+ (Malbran-Labat 1991b, 57–61); RS 34.173 (Arnaud 1991b, 72–73); RS 94.2475 (Lackenbacher and Malbran-Labat 2016, 40–41); RS 94.2595 (Lackenbacher and Malbran-Labat 2016, 189–190); RS 94.2996 (Lackenbacher and Malbran-Labat 2016, 35–36).
39 RS 94.2173 (Lackenbacher and Malbran-Labat 2016, 41–42); RS 94.2177+ (Lackenbacher and Malbran-Labat 2016, 38–40); RS 94.2475 (Lackenbacher and Malbran-Labat 2016, 40–41); RS 94.2447+ (Lackenbacher and Malbran-Labat 2016, 42–44). Malbran-Labat has established the close relationships between Ugarit and Cyprus (Malbran-Labat 2004a). Indeed, there was an important Cypriot community settled in Ugarit (Malbran-Labat 2004a, 371–373), as well as Ugaritians in Cyprus (Pardee 2012). On the role of Cyprus as a producer of copper, see Sauvage 2012, 114.
40 See Klengel 1992, 78; Charpin and Ziegler 2003, 216; particularly Limet 1986, 218 (ARM 25, 718).
41 Sauvage 2012, 124.
42 Bell 2006, 27.
43 Klengel 1992, 77–78; Montero Fenollós 1994, 188–189.
44 RS 34.180,9 (Malbran-Labat 1991c, 128).
45 RS 86.2210B (Arnaud 2001c, 328–329); RS 86.2227 (Arnaud 2001c, 327–328); RS 86.2232 (Arnaud 2001b, 264).

amounts of metals delivered for the manufacture of different objects,[46] lists of copper amounts,[47] and lists of metal purchases.[48]

Though the number of documents from the House of Urtenu that refer to the exchange of timber is not large, these are highly interesting. Individual texts mention the exportation of some manufactured objects made of wood, requests for timber by Hittite authorities as part of tribute, or private exchanges of timber.[49] Obviously, the most valuable wood that Ugarit had was cedar.[50] There were other kinds of wood also distributed from the House of Urtenu such as ebony, which was imported from sub-Saharan Africa through Egypt, but this was only used in ornamental works and sculpture.[51] Important military implications of the mention of wood in the texts from the House of Urtenu can be seen in the manufacture of chariots and ships, as can be inferred from lists of chariot makers, as well as references to shipbuilding industry.[52] Specifically, Ugaritian chariots were exchanged as diplomatic presents, demanded as tribute, and sold as private goods.[53]

However, the most important economic activity with military implications that has been documented in the House of Urtenu was the breeding and exchange of horses, which were also related to the chariot industry.[54] Foals were imported from the region of Central Zagros to Mesopotamia and then distributed in international markets.[55] Some letters establish their exchange in diplomatic relationships.[56] Nevertheless, many other documents point out the trade of horses in private exchanges.[57] Specifically, other texts reveal the involvement of Urtenu in the management of equine livestock of the Royal Palace.[58] These include horse breeder lists, equine lists and lists of rations for horses.[59]

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[46] RS 94.2401 (Bordreuil *et al.* 2012, 117–123). Here the text quotes the manufacture of *krkbm*, possibly it refers to a part of some kind of altar (Bordreuil and Malbran-Labat 1995, 447).

[47] RS 94.2409+ (Bordreuil *et al.* 2012, 123–125); RS 94.2471 (Malbran-Labat 2008, 24).

[48] RS 94.2603 (Bordreuil *et al.* 2012, 126–129).

[49] See on manufactured objects RS 94.2177+ (Lackenbacher and Malbran-Labat 2016, 38–40); on timber as part of tribute RS 94.2497 (Lackenbacher and Malbran-Labat 2016, 31–32); RS 94.2410 (Lackenbacher and Malbran-Labat 2016, 178–179); and on private exchange RS 94.2383+ (Bordreuil *et al.* 2012, 190–192); RS 94.2565 (Lackenbacher and Malbran-Labat 2016, 161–162).

[50] Sauvage 2012, 135.

[51] RS 88.2158 (Lackenbacher 2001, 239–247); RS 94.2002+ (Lackenbacher and Malbran-Labat 2016, 81–86); RS 94.2392+ (Bordreuil *et al.* 2012, 90–95). See Sauvage 2012, 135 on uses of ebony.

[52] See Vita 1995, 35–88 on chariots; Vita 1995, 164–168 on ships. A list of chariot makers is attested in RS 94.2426 (Bordreuil *et al.* 2012, 52–54), references to the shipbuilding industry in RS 34.147 (Malbran-Labat 1991a, 23–25). Other documents point to private ownership of ships alongside the royal navy: RS 94.2412 (Lackenbacher and Malbran-Labat 2016, 121–123); RS 94.2416+ (Lackenbacher and Malbran-Labat 2016, 123–126).

[53] See the diplomatic exchange in RS 94.2002+ (Lackenbacher and Malbran-Labat 2016, 81–86); tribute in RS 94.2364 (Lackenbacher and Malbran-Labat 2016, 133–135); and private sale in RS 94.2390+ (Lackenbacher and Malbran-Labat 2016, 136–138).

[54] Sauvage 2012, 99.

[55] Vermaak 2007, 521; Fuchs 2017, 157.

[56] RS 94.2996 (Lackenbacher and Malbran-Labat 2016, 35–36).

[57] RS 34.140 (Malbran-Labat 1991b, 36–37); RS 34.142 (Lackenbacher 1991, 101–104); RS 34.153 (Arnaud 1991b, 75–76); RS 34.155 (Malbran-Labat 1991b, 53–54); RS 34.163 (Arnaud 1991b, 83–84); RS 94.2377 (Lackenbacher and Malbran-Labat 2016, 172–173); RS 94.2393+ (Lackenbacher and Malbran-Labat 2016, 154–155); RS 94.2447+ (Lackenbacher and Malbran-Labat 2016, 42–44); RS 94.2603 (Bordreuil *et al.* 2012, 126–129).

[58] Malbran-Labat and Roche 2007, 75; 2008, 243–275.

[59] See the horse breeder list RS 94.2184+ (Bordreuil *et al.* 2012, 39–42); and the equine list RS 94.2880 (Malbran-Labat 2008, 22). Rations for horses are documented in RS 94.2356 (Malbran-Labat 2008, 23; Malbran-Labat and Roche 2008, 244–246); RS 94.2407 (Malbran-Labat 2008, 23; Malbran-Labat and Roche 2008, 244–246); RS 94.2415 (Malbran-Labat 2008, 23; Malbran–Labat and Roche 2008, 244–246); RS 94.2431 (Malbran-Labat 2008, 23; Malbran-Labat and Roche 2008, 244–246); RS 94.2480+ (Malbran-Labat 2008, 23; Malbran-Labat and Roche 2008, 244–246); RS 94.2490 (Malbran-Labat 2008, 23; Malbran-Labat and Roche 2008, 244–246); RS 94.2593 (Malbran-Labat 2008, 23; Malbran-Labat and Roche 2008, 244–246).

Discussion: commercial and diplomatic relationships with the East

Common to all these commodities is that they were used to equip an army of the Late Bronze Age. We can thus relate them to other documents from the House of Urtenu which deal with the political development and military events in Assyria and Babylonia towards the end of the Late Bronze Age. These texts are RS 94.5026+, RS 34.165, RS 94.2474, RS 94.2369 and RS 94.2446. The text RS 94.5026+ asks about the situation of shepherds from the region of Suhu (Middle Euphrates region).[60] The tablet RS 34.165 contains a diplomatic letter sent by Tukulti-Ninurta I to Ibiranu VI of Ugarit, in which the Assyrian king relates the victory against Tudhaliya IV in the battle of Nihriya.[61] The text RS 94.2474 shows again the concern about the shepherds of Suhu after political events related to the reign of Kadašman Ḫarbe II in Babylon.[62] For its part, the text RS 94.2369 is a report made by the king of Sidon for the king of Ugarit regarding the international situation between Hatti, Babylon, and Assyria.[63] Finally, although the names of the correspondents are not preserved, the document RS 94.2446 looks like a report about the movement of the Assyrian army towards the Babylonian border.[64] Therefore, considering that these texts bear witness to a period of great instability in the region beyond the Euphrates, they indicate that the Ugaritians were concerned with the political situation there.[65]

It is possible that the House of Urtenu wanted to be well informed about political developments of these regions, since some items were imported from eastern regions, such as tin and horses. In this sense, several documents also involve the House of Urtenu directly in commercial relationships with Babylonian merchants: RS 34.142, RS 34.152 and RS 34.163.[66] Moreover, two other documents quote the names of Babylonians: RS 34.169 and RS 94.2292.[67] This evidence is not isolated. The presence of Babylonian merchants in Ugarit has also been documented in the letter sent by Hattusili III to Kadašman-Enlil II of Babylon, in which the Hittite king quotes a complaint from a previous letter of his addressee that says 'My merchants are being killed in the land of Amurru, in the land of Ugarit…'.[68] Furthermore, Wilfred H. van Soldt has identified a Babylonian scribe in the House of the Hurrian Priest.[69] Yoram Cohen and Itamar Singer have established a close relationship between the House of Urtenu and the House 5/A of Emar, where they identified a Babylonian *kāru.*[70] Emar, in the Middle Euphrates region, constituted the nexus for Ugaritian and Babylonian trade.[71]

[60] Lackenbacher and Malbran-Labat 2016, 78–79. This is the most intriguing letter of the corpus. It makes no sense that the letter was filed in Ugarit, since it was addressed to the king Šagarakti-Šuriaš of Karduniaš (Babylon) by Ini-Teššub, king of Karkemiš. However, the reason could lie in the presents to the king of Babylon, oil and dyed textiles, both commodities present in commercial exchanges managed from the House of Urtenu (Malbran-Labat 1995, 104; 2013, 2; Lackenbacher and Malbran-Labat 2016, 115–118). It is thus possible that the messenger acquired these items in Ugarit before going to Babylon.

[61] Lackenbacher 1982; 1991, 90–100. For a discussion about the authorship of this letter and literature, see Llop-Raduà 2015, 249.

[62] Lackenbacher and Malbran-Labat 2016, 155–158.

[63] Lackenbacher and Malbran-Labat 2016, 105–106.

[64] Lackenbacher and Malbran-Labat 2016, 180–181.

[65] The short reigns of Kadašman Enlil II (1263–1255 BC), Kudur Enlil (1254–1246 BC), Šagarakti–Šuriaš (1245–1233 BC) and Kaštiliaš IV (1232–1225 BC) are the symptom of political instability and royal weakness (Brinkman 2017, 25–26). However, the defeat of Kaštiliaš IV before the army of Tukulti Ninurta I of Assyria in 1233 BC triggered the final decline of the Kassite dynasty of Babylon, whose throne was occupied by short reigns supported by Assyria: Enlil-nadin-šumi (*c.* 1224 BC), Kadašman Ḫarbe II (*c.* 1223 BC) and Adad-šuma-iddina (1222–1217 BC) (Brinkman 2017, 26–27; Beaulieu 2018, 148–149).

[66] Lackenbacher 1991, 101–104 (RS 34.142); Lackenbacher 1991, 84–86 (RS 34.152); Arnaud 1991b, 83–84 (RS 34.163).

[67] See Malbran-Labat 1991a, 17–18 and Lackenbacher and Malbran-Labat 2016, 167–168, respectively.

[68] Beckman 1996, 136.

[69] Van Soldt 2012, 175–176.

[70] Cohen and Singer 2006, 131.

[71] Pruzsinsky and Solans 2015, 325; Monroe 2009, 31–32. The economic belt Ugarit–Emar was reinforced by the so-called *firme commerciale*, which consisted of an international trading consortium that connected merchants from the city of Ugarit with others from Emar and Tyre (Malbran-Labat 1995, 105; 2013, 4). This consortium can be observed in a specific group of private letters (Arnaud 1991b, 65–78; Lackenbacher and Malbran-Labat 2016, 115–131). This company, managed from Ugarit

On the other hand, four of these letters establish direct contacts with Assyrians as well. Specifically, the letters RS 94.2474 and RS 94.2446 demonstrate the presence of Ugaritians in Assyrian territory. Indeed, commercial relationships with Assyria can be inferred from the last sentence of RS 94.2474, in which the sender says that someone 'comes back with all the things that he has acquired in Assyria'.[72] Other texts that involve contacts between Ugarit and Assyria are the two letters that come from the Royal Palace, RS 18.054A and RS 18.268, and a third one from the House of Literary Tablets, RS 23.025.[73] While the former are diplomatic letters, the third one deals with an important historical event, the defeat of the king Kaštiliaš IV by Tukultī-Ninurta I in 1233 BC. The text RS 6.198 has been interpreted as a letter sent by someone called Bēlu-būr, an individual related to the circle of Bābu-aḫa-iddina, an important man of the Assyrian state.[74] The text RS 16.341, found in the Royal Palace, also mentions the name of an Assyrian.[75] Finally, two Assyrian scribes were identified in Ugarit, Naḫiš-Šalmu in the House of Yabninu and Aššur-rēšī-išši in the House of Literary Tablets.[76]

As we have determined for the commerce between Ugarit and Babylonia, the sources indicate indirect trading contacts between Ugarit and Assyria through Emar.[77] In this sense, some texts refer to the Ugaritian exportation of copper and tin to this city.[78] Here, in turn, the metals were purchased by Assyrians.[79] This is indicated again by the text Msk 753, in which an Emariot merchant called Lalû sells a talent of copper to an Assyrian counterpart called Aššur-aḫa-iddina.[80] In addition, texts from Aššur reveal the foreign provenience of bronze and tin, like the text VAT 15396 or the text VAT 15572 from the archive of Bābu-aḫa-iddina.[81] There are also texts that demonstrate the purchase of cedar wood in Syria by Assyrians, like the texts VAT 18013 and Ass. 13058.[82] Moreover, Assyria also imported ebony wood, as attested in the text VAT 8030.[83]

Trade contacts between Ugarit and Babylonia do not imply any contradiction within the terms of Ugarit's vassalage to the Great King of Hatti, since they were allies. However, commerce between Ugarit and Assyria does pose a problem, since Hatti and Assyria became enemies during the last decades of the Late Bronze Age.[84] The treaty signed by Niqmepa VI and Mursili II established the loyalty to this kingdom in international affairs under the terms 'you shall be at peace with my friend and hostile to my enemy'.[85] Moreover, the treaty between Tudhaliya IV and Šausgamuwa, king of Amurru, mentions a possible embargo to Assyrian commerce in territories under Hittite control: 'Since the king of Assyria

by Urtenu and Ur-Teššub (Bordreuil and Malbran-Labat 1995, 444; Malbran-Labat and Roche 2007, 69–74, 93–97; Lackenbacher and Malbran-Labat 2016, 115), points to the development of Ugaritian interregional commerce: Emar connected Ugarit with Assyria and Mesopotamia just as Tyre connected Ugarit with Palestine and Egypt.

72 Lackenbacher and Malbran-Labat 2016, 156.

73 See Schaeffer and Nougayrol 1956, 228–229 and Llop–Raduà 2015, 255 on RS 18.054A; Schaeffer and Nougayrol 1956, 229 on RS 18.268; and Roche-Hawley 2013, 441 and Arnaud 2003, 7–12 on RS 23.025.

74 Thureau-Dangin 1935, 188–193; Postgate 2013, 202–203.

75 Faist 2001, 70; McGeough and Smith 2011, 395–396.

76 See the discussion on Naḫiš-Šalmu in Van Soldt 2001, 430; 2012, 172–173; and on Aššur-rēšī-išši in Cohen 2017, 281.

77 Cancik-Kirschbaum 2008, 91; Monroe 2009, 31–32; Faist 2001, 216–217.

78 RS 34.141 (Arnaud 1991b, 70–71); RS 34.173 (Arnaud 1991b, 72–73).

79 See Faist 2001, 60. Though Assyria could obtain copper from the northern mines of Ergani Maden, there is no evidence that these copper mines were exploited in antiquity (Faist 2001, 62–63).

80 Arnaud 1986, 135–136. We have documented the presence of the merchant Aššur-aḫa-iddina in a private archive in Aššur, where also appeared lists of metal amounts like VAT 8919 (Pedersén 1985, 103 nº 23; Postgate 2013, 241–243).

81 See Pedersén 1985, 74 nº 233; Faist 2001, 53, 90–92; and Prechel and Freydank 2011, 6 and 46 nº 44 on VAT 15396; See Pédersen 1985, 110 nº 53; Faist 2001, 54, 58, 60, 106–108; and Postgate 2013, 205 nº 51, 217 on VAT 15572.

82 See Pedersen 1985, 73–75 nº 165; Faist 2001, 55, 67, 93–95; and Postgate 2013, 152 nº 15, 162 on VAT 18013; Pedersén 1985, 75 nº 164 on Ass. 13058.

83 See Pedersén 1985, 110 nº 7; Faist 2001, 54, 66, 104–106; Postgate 2013, 205 nº 16, 216.

84 Bryce 2001 [1998], 389–392; Freu 2006, 126–131.

85 Beckman 1996, 60.

is my Majesty's enemy, he shall be your enemy. Your merchant shall not go to Assyria and you shall not allow his merchant in your land'.[86]

So, how could Ugarit maintain contacts and commercial relationships with Assyrians without Hittite interference?[87] On the one hand, the House of Urtenu received much information about the arrival of Hittite officials, which could be used to avoid their vigilance.[88] On the other hand, it has been established the high grade of interdependence between the great kingdoms of the Late Bronze Age and the kingdoms of Syria and Palestine acted as necessary intermediaries between them, in spite of political and military confrontations.[89] Thus, taking into account that Hatti derived large profits from the taxation imposed on Ugarit and that these taxes were mainly derived from the international trade of and with Ugarit, it is possible that Hatti was unwilling to ban this profitable exchange.[90] For its part, Ugarit acted with pragmatism in relation to the conflict between Hatti and Assyria. In this line, we can understand the preference of the king Ibiranu VI for paying a tax of 50 minas of gold instead of sending his army to the military campaign at Nihriya against an important trading partner, as Assyria surely must have been.[91]

Conclusions

The House of Urtenu developed an important role in the management of strategic items: copper, tin, horses, and timber. The archaeological evidence connects the house with the practice of metallurgy and bronze making, as well as with timber works focused on fashioning chariots. Moreover, other archaeological remains and structures have also provided evidence for an association with the breeding of horses. This archaeological evidence agrees with that of the textual sources. The archive has supplied texts that reveal the management of these items along the entire productive process: from the importation of raw materials and foals, the transformation into manufactured commodities and the breeding of horses, to the final distribution of these items in international markets.

The management and exchange of these commodities was essential for the military industry of the Late Bronze Age. Several documents from the House of Urtenu deal with the political developments and military events of regions beyond the Euphrates. We can establish a relationship between these groups of evidence in two complementary ways. On the one hand, Ugarit, in general, and the House of Urtenu, in particular, was highly interested in being well informed about the possible political events that could threaten its business beyond Euphrates, particularly the arrival of Babylonian and Assyrian merchants,

[86] Beckman 1996, 101; Bryce 2001 [1998], 389.

[87] We can observe the interference by the Hittite administration in Ugaritian economy and politics by means of different Hittite officials: DUMU.LUGAL, members of the most important political circles of the Hittite state (Malbran-Labat 2004b, 77; Lebrun 2014); *ša rēši*, identified by the sumerograms LÚ SAG as well, they were a kind of courtiers very close to the king (Bilgin 2018, 325); *tuppanuru* or chief of scribes (Bilgin 2018, 244); *kartappu*, related to chariots as chariot driver or chief of military chariot divisions (Malbran-Labat 2004b, 70, 75; Bilgin 2018, 231–232); *uriyanni,* functionary related to the supply of commodities to the royal palace (Bilgin 2018, 186–187).

[88] Malbran-Labat 2004b, 90. Documents from the House of Urtenu about the arrival of these officials are: RS 34.138 (Malbran-Labat 1991b, 31–32); RS 34.148 (Bordreuil and Pardee 1991, 163–164); RS 34.150 (Malbran-Labat 1991b, 35–36); RS 92.2007 (Arnaud 2001b, 260–261); RS 94.2179 (Lackenbacher and Malbran-Labat 2016, 17–18); RS 94.2185 (Lackenbacher and Malbran-Labat 2016, 49–51); RS 94.2352 (Lackenbacher and Malbran-Labat 2016, 19–21); RS 94.2361+ (Lackenbacher and Malbran-Labat 2016, 52–53); RS 94.2363 (Lackenbacher and Malbran-Labat 2016, 21–22); RS 94.2374 (Lackenbacher and Malbran-Labat 2016, 147–148); RS 94.2443 (Lackenbacher and Malbran-Labat 2016, 44–45); RS 94.2509 (Lackenbacher and Malbran-Labat 2016, 64–65); RS 94.2562 (Lackenbacher and Malbran-Labat 2016, 76–78); RS 94.2580 (Lackenbacher and Malbran-Labat 2016, 166–170).

[89] Liverani 2006 [1994], 217–222; Zaccagnini 2000.

[90] These tributes are enumerated in some texts found in Hattuša (Beckman 1996, 151–154) and in the texts RS 17.227, RS 11.772+ and RS 11.732 found in the Royal Palace of Ugarit (Schaeffer and Nougayrol 1956, 40-48).

[91] Vita 1995, 28; Beckman 1996, 182–183; Bryce 2001 [1998], 389; Freu 2006, 132.

through whom Ugarit received raw materials and foals and to whom Ugaritian merchants could sell manufactured commodities. On the other hand, considering that these documents are also particularly connected with the military movements of Assyria, they could imply a specific economic interest on the part of the House of Urtenu in supplying those materials for the Assyrian army, since other direct routes for this last one were closed due to political and diplomatic conflicts with Babylonia and Hatti. In these exchanges, the city of Emar could constitute the catalyst for the development of Ugaritian relationships with Assyria and Babylonia.

Therefore, the House of Urtenu managed the most delicate questions around the exchange of those strategic materials, especially in relation to the Mesopotamian realm, to which it was more oriented than the palatial archives or the archives of other private houses, such as the House of Yabninu or the House of Rap'anu. So then, the House of Urtenu offers invaluable information about the commercial and political interests of Ugarit in the regions beyond Euphrates. It should, however, be stressed that this contribution is based on a partially published archive and archaeological reports. It is left to future research to either change this interpretation or expand the documentary evidence.

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Protecting the Residence: Doorjambs, Lintels, Hieroglyphics Inscriptions, and Blue Pigment between Southern Levant and Egypt

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Abstract

Building 1500 at Beth-Shean represents the best example of an Egyptian 'Residence' in the Southern Levant. This was identified as the headquarters of the governor in service at Beth-Shean, although its practical and symbolic functions are still partially unclear. The most indicative feature of the building, ascribable to direct Egyptian activity, is the presence of inscribed doorjambs and lintels, some of which were originally painted with a blue color. Despite the fragmentary nature of the remains, an attempt can be made to trace a link between the inscriptions, the symbolic value of the color applied, the iconography, the entrance, and the inner circulation. The aim of this essay is to provide a new interpretation of the evidence from Building 1500, together with the adjacent Building 1700, by analyzing them both from a typological and symbolic point of view, in a given chronological and cultural context. Accordingly, related concepts expressed in contemporary textual evidence will be scrutinized. It will be shown that the ultimate function of the residence, considering the employment of the blue pigment and its aesthetic value, provides us with useful insights for elucidating the last efforts of Ramesses III's foreign policy, before the final collapse of Egyptian control in the Levant.

Keywords

Ramesses III, Canaan, Beth-Shean, Architectural Decorations, Egyptian-Blue

Introduction

Beth-Shean is a site of crucial importance for understanding the Egyptian presence in the Southern Levant (**Figure 1**). Under the New Kingdom, this city served as an Egyptian administrative and military center for over 300 years, and such a status is materially reflected in the archaeological record. In particular, Level VI (12th century BCE) represents the peak of the Egyptian presence at Beth-Shean, which was contemporary with the XX Dynasty. The most imposing structure of Level VI is Building 1500 in Area Q. This is commonly considered to represent the best example of an Egyptian residence in Canaan on the basis of specific structural features concerning building techniques, planning scheme, and architectural decorations.[1] Despite various claims throughout the research history about the

[1] The literature on this topic is overwhelming; for a general overview, see Oren 1984; Mazar 1990; Higginbotham 2000; Morris 2005; Fischer 2011.

Figure 1: *Map showing the major sites mentioned in the text (source Qgis).*

presence of both Amarna-style houses and Egyptian temples in Canaan, there are in fact no examples of large-scale, civil and religious, monumental, pharaonic building complexes there. All of them share a hybrid Egyptian-Canaanite nature, and Building 1500 is no exception.[2]

Nonetheless, this structure more than any other has attracted scholarly attention in light of several unusual elements, which are undoubtedly attributable to direct Egyptian activity and reflect the Ramesside style of the period. This is in fact the only residence with a columned central hall, originally embellished with two papyrus shaped capitals, Egyptian-style lintels, and doorjambs at the entrances which bear dedicatory inscriptions carved in sunken relief. All these architectural elements are made of soft, white limestone and appear to belong to the same visual program.[3] East of this building are the remains of another official building, listed as 1700, which probably functioned in co-ordination with Building 1500. Unfortunately, the full interpretation of both is affected by the fact that most of the finds were broken and dispersed in other areas and found in a secondary context or left poorly preserved. Despite these difficulties, I will consider these materials as a whole stylistically, ideologically,

[2] The square blueprint of Building 1500, organized around a central hall, has been considered to have been inspired by the Egyptian house model of Amarna. However, this is a planning scheme already known in the Southern Levant between the Middle Bronze Age IIC and the Late Bronze Age I, as attested at Tananir (Gerizim), Amman Airport, and at Tell el-Khuweilifeh; see Tursi 2016, 124–142. This general view is strongly stressed by Nigro 1994; 1996; and Mazar 1990, 232–294.

[3] Limestone corresponded to the color white (*ḥḏ*) in the Egyptian mentality, and was one of the most commonly employed materials in buildings and the preferred surface for carvings and painted decorations; see Schenkel 2019, 37; Böer and Warburton 2019, 245.

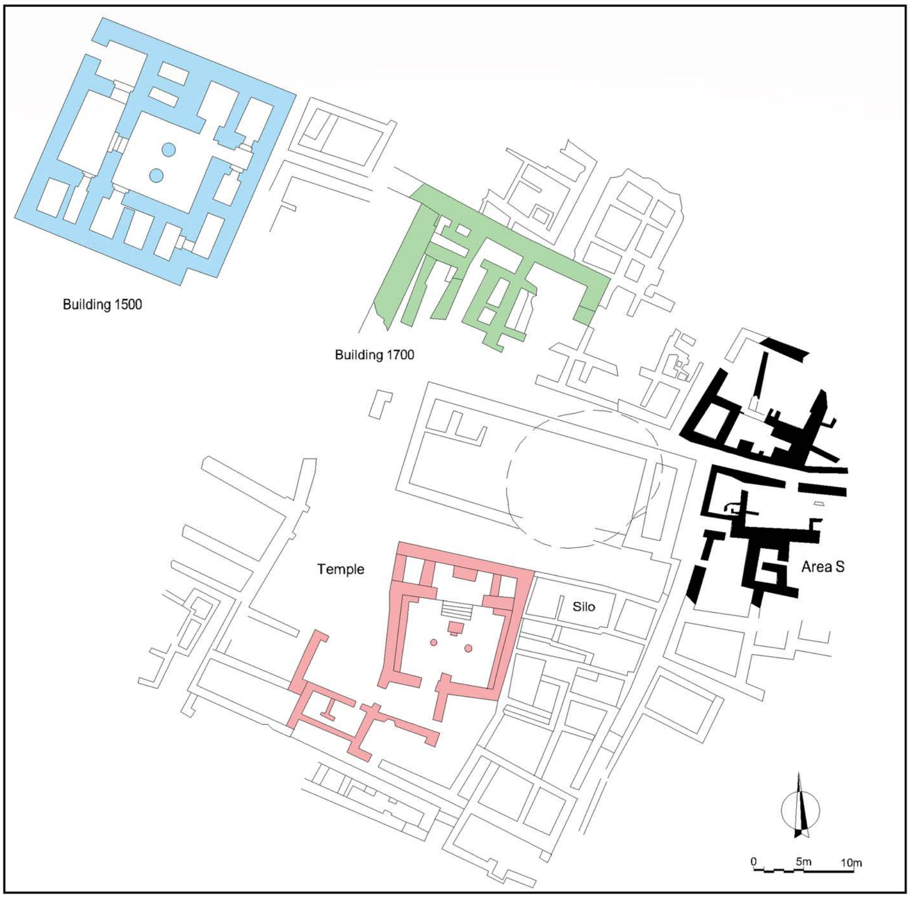

Figure 2: *Plan of Beth-Shean Level VI displaying the structures and the areas mentioned in the text (Adapted from Mazar 2009b, Fig. 1.5 and James 1966, Fig. 77).*

and symbolically and attempt to assign to them a spatial position within Building 1500 and a cultural value within their Egyptian context. Overall, the known architectural elements from Building 1500, as well as from the adjacent, poorly preserved Building 1700, can be grouped as follows:

Building 1500: 5 doorjambs, 7 T-shaped doorsills.[4]

Building 1500 (secondary context): 5 doorjambs, 4 lintels, 3 reliefs, 1 T-shaped doorsill, 2 papyrus-shaped capitals.[5]

Building 1700: 1 cornice, 5 T-shaped doorsills, 7 façade fragments, 1 relief fragment.

Unpublished: 8 doorjambs, 3 cornices (**Figure 2**).

[4] T-shaped doorsills are typical of high-status Egyptian architecture; Morris 2005, 756. Their use is also attested in Canaan at Tell el-Far'ah (S).

[5] The two capitals were found north of the Level VI–VII temple, around 48 m southeast of Building 1500, and they were initially attributed by Rowe to that temple (Mazar 2006, 74). However, because the size of the capitals does not conform to the size of the temple's column base, they have been assigned to Building 1500. The capitals are made of the same stone that is used for making the lintels and doorjambs. Although no traces of pigments have survived, they as well as the lost wooden columns were probably painted with floral motifs; Ben-Tor 2016, 89.

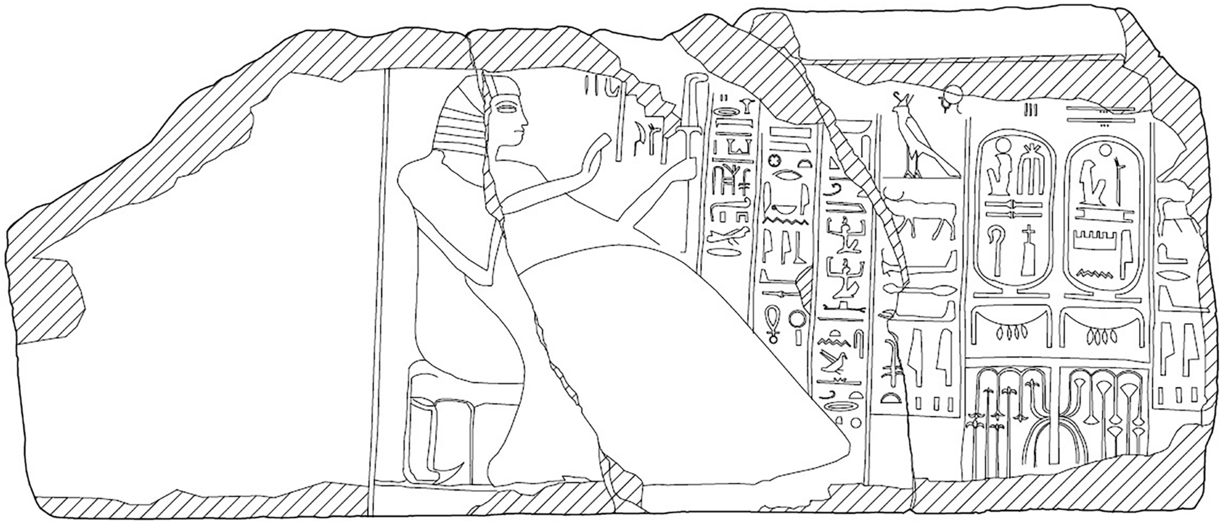

Figure 3: *Lintel C-1 drawing. Drawn by the author (Adapted from Ben-Tor 2016, 87).*

The lintels and the iconographic motifs

Let us start the discussion with the lintel fragments, which are remarkable for their quality and iconography within the entire Levantine artistic record. All convey the same iconographic motif, which features the worshipper (or more than one) before the king's name, as was customary according to Egyptian tradition.[6] Among them, the most impressive piece and the most significant for the nature of the relief is lintel C-1, which surfaced in the later Level V (Iron Age IB). It displays a notable carved inscription consisting of a prayer to the living king Ramesses III, equated with the sun god Ra, and provides the name and titles of the building's Egyptian occupant: army officer, troop captain, royal scribe, and great steward *Ramesses-Weser-Khepesh*. The text reads:

> (1) *ḥr kꜣ-nḫt ʿꜣ nsyt (2) Nb tꜣ.wy Wsr-mꜣʿ.t -Rʿ Mry-ʿ Imn (3) Nb ḫʿ w Rʿ-mss ḥkꜣ ʿIwnw (4) iꜣw n.k s..ḳ tw ḥḥ.wy nn stn tw r Rʿ (5)...[m] ki ḳm.t (?) iry.k nby.s mi Rʿ (6)...ḥry n kꜣ n sš nsw imy-r pr wr (7) R[ʿ-mss]- wsr-ḫpš (8) mꜣʿ-ḫrw.*
>
> (1) 'Horus: Mighty Bull, Great of Kingship, (2) Lord of the Two Lands: Usermare-Meriamon, (3) Lord of Appearances: Ramesses, Ruler of Heliopolis. (4) Praise to you. You are...millions of millions. You are not distinguishable from Ra. (5) [...] in the town which you protect like Ra (6) ...heavens. For the *ka* of the Royal Scribe, Great Steward (7) Ra [messes]-Weser-khepesh (8) Justified.'[7] (**Figure 3**).

Facing the inscription is a kneeling worshipper with a long wig, holding a feather scepter in his left hand before the Horus name of Ramesses III. On the basis of the complete examples of lintels known from Egypt, it is likely that a second symmetrical representation of the kneeling figure was originally present

[6] The other lintels are heavily damaged: see James 1966, Fig. 94:3, Fig. 96:4. Block D-2 displays the Egyptian officer kneeling, whereas behind him is a short inscription mentioning his father Thutmose, another official in service in Canaan. The second block (E-2) was found among the debris of the Hellenistic period, where only the heads of three persons facing left are recognizable, and few words as titles such as 'scribe' and 'of the lady of the house'; see Rowe 1930, 38.

[7] I must here express my gratitude to Prof. F. Tiradritti for having revised the translation from the Egyptian. This inscription, as well as others that will follow, have been revised by him (personal communication, June 2019).

on the right side.[8] The visual concept of the owner worshipping the king's name is a common motif during the New Kingdom that is attested throughout Egypt, Libya, Nubia, and Canaan. This motif is well attested across Egypt in lintels from private architecture, while almost identical parallels include the lintel of *Hatiay*, 'overseers of works', from Amarna; the doorway of *Setpenra*, dated to the XIX Dynasty; and that of *Iyroy*, dated to the time of Ramesses III, both of the latter from Per-Ramesses. Other close parallels are the lintel of *Hui*, priesthood of 'all the goods of *Elkab*', from Elephantine, and, finally, the lintels of *Hory* and *Hekanakht* from Nubia, who were governor of Buhen and viceroy of Kush, respectively.[9] The development of this motif follows the evolution of kingship, which gradually became part of the symbolism of the piety of the individual. Starting from Akhenaten, who contributed to making loyalty to the king a component of religion, the worshipper is depicted more and more frequently on his knees, until one reaches the Ramesside period, when the owner is virtually always kneeling. This phenomenon corresponds to the development of the cultic role of the king and his deification, which took place from at least the XIX Dynasty and which binds his subjects to the person of the sovereign as the intermediate between men and gods. The officer, for his part, demonstrated his loyalty publicly through these kinds of representations. In the case of Nubia and Beth-Shean, which were border stations of the Egyptian Empire, similar reliefs symbolically manifested the authority of the king in remote lands, and strengthened the demonstration of loyalty and closeness between king and official.[10] As far as we can observe, the lintels express a feeling of devotion by the official and a search for protection, which can also be translated pragmatically in the form of material contributions and offerings, normally from the king in the form of food or other goods.

Concerning the sphere of goods and offerings, block C-4, unearthed in the later Level V, is noteworthy for being stylistically different from the others. Here, the governor is depicted sitting on a folding stool while holding a lotus flower in his left hand, a common symbol for re-generation, before an offering table. Iconographically, the presence of these elements is typical of Egyptian offering scenes, as shown from parallels from Per-Ramesses and Medinet Habu.[11] A similar image is found in Canaan itself, but inserted in a banquet scene, as demonstrated by the beautiful ivory panels found at Tell el-Far'ah (S) and also at Megiddo, where the folding chair is replaced by a throne.[12] This motif, with numerous variations, is commonly found in Egypt in funerary contexts. For this reason, the motif of the seated man holding a lotus has been often interpreted as belonging to funerary contexts, and it was because of this association that this relief fragment was initially identified as a private funerary stele.[13]

However, it has been noted more recently by Sweeney that such iconography is not limited to the funerary sphere alone, and that it is unlikely that the block was actually part of a funerary stele, given its lack of archaeological association with any tomb, but that it could instead be another lintel.[14] This theory is supported by the discovery of another relief fragment found during the 1990–1991 excavation season in a secondary context, which may constitute a second part of block C-4. Despite its poor condition, this fragment is recognizable as a man seated on a folding chair, an element associated especially with the pharaoh or other high-placed officials.[15] It is reasonable to assume that block C-4, along with the relief

8 Ben-Tor 2016, 86.

9 Frankfort and Pendlebury 1933, Pl. XXIII-4; Habachi 2001, Pl. 20; 1954, Pl. XXVI; Budka 2001, Pl. 1:56– 75.

10 Budka 2001, 14–59, 99–100.

11 See Habachi 2001, Fig. 39; Epigraphic Survey 1970, Pl. 649.

12 See Fischer 2011, Fig. 349; Ben-Tor 2016, 120. Moreover, also to be noted here is the iconographic development and the local reinterpretation of the lotus motif, which in Canaan has been gradually employed as royal insignia, i.e. as replacement of the scepter. See Ziffer 2002; 2005.

13 Ward 1966, 170–171.

14 Sweeney 2009, 703.

15 These kinds of stools were depicted on the walls of tomb chapels and on funerary stela. In the Ramesside period they also largely appear on lintels as a clear sign of prestige. For a wider discussion, see Sweeney 1998, 49; 2009.

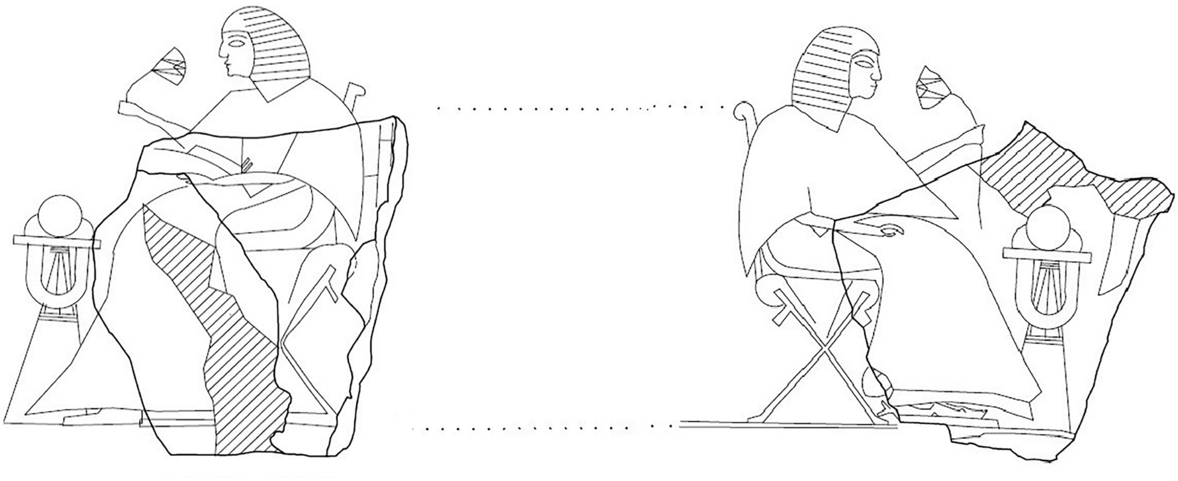

Figure 4: *Tentative reconstruction of the offering scene (Drawn by the author. Based on the relief fragments published in Sweeney 1998, 39, Fig. 1; 2009, 703, Fig. 13.8; and on the relief's reconstruction in the video issued by the Israel Museum Jerusalem 1995–2021).*

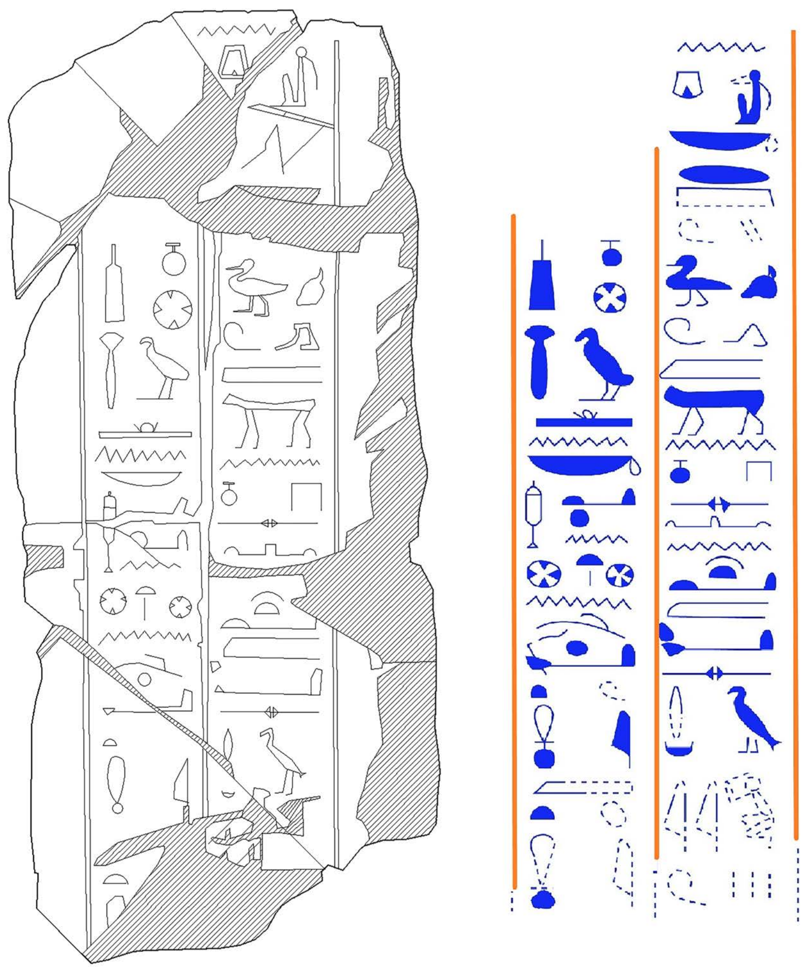

Figure 5: *Doorjamb A-1 drawing and tentative reconstruction of the colored inscription (Drawn by the author. Adapted from James 1966, Fig. 89, 1: A-1).*

fragment found in the 1990s, was originally part of the same architectural feature, belonging to the monumental Building 1500. If we consider these blocks as part of the decorative program of the building, it may be supposed that their importance was not only symbolic but also functional, being related to a specific task of the governor and possibly indicating the purpose of this precise space within the residence. In these kinds of representations where the worshipper is represented sitting, he is usually depicted twice back-to-back at the center of the lintel, instead of in a frontal heraldic position facing the king's name, as in the aforementioned lintel. In what follows I will offer a tentative reconstruction (**Figure 4**).[16]

The doorjambs and the colored inscriptions[17]

The formulae carved in the doorjambs support the visual program of the lintels. These words of adoration are addressed exclusively and directly to the living king, emphasizing his protective aspect. The name of the king is not registered, but he is instead named with epithets referring to his physical power and his assimilation with Ra and the solar disc.[18] Significantly, we know that most of the sunken hieroglyphics were originally filled with blue, which is indicative of the high status given to these texts. The following reconstructions are an attempt to reproduce the inscriptions on the basis of the scant information available.[19] Five fragments have been found inside Building 1500, of which block A-1, located at the entrance to the central hall, is the best preserved (**Figure 5**):

A-1... (1) [...Hqa] *ʻ Iwnw w (ȝ) ḏ.n.k. ʿḥʿ w n Nḫt.ty miʿ Mȝ ʿ. t* [...] (2) *rš [wt] <ḥr> ʿḳw m ḥnw. s nn ḫ ʿm s(y) ḏȝy....*

(1) '[...Governor of] Heliopolis (Ramesses III), the age of the 'Strong Town' (Thebes) prospers for you like *Maat ...*'

(2) '[...] your shout. How joyful is entering inside it. The enemies (do not dare) to rise against it'

The other blocks are more damaged and much of the text has been lost, but the following more meaningful fragments may be quoted:[20]

A-2 (1) *...n niw.t wsr...*

(1) '...for the mighty city...' (or for the city (of) User) (**Figure 6**).

A-3 (1) *[...] n sH n nb=f [...]*

(1) '[...] to the tent of his lord [...]' (**Figure 7**).

A-5 (1) *... [...] Htp r s.t=f [...]*

(1) '[...] sit down on his throne [...]'

[16] Such an arrangement of the figures is well attested in, for example, the sunk relief of *Nb-ms* of the XX Dynasty and in a door panel from Per-Ramesses. See: Bierbrier 1982, 40, Pl. 92; Habachi 2001, 204, Fig. 39, Pl. 28b.

[17] Inscriptions A-1, A-3, A-5 and C-3 have been revised by F. Tiradritti, while other translations are taken from James 1966, 165–169, 171–172. A slightly different translation is also published in Kitchen 2008, 212–214 and Higginbotham 2000, 64–65.

[18] For inscriptions containing metaphorical references to Ramesses III as a flame or heat capable of beating enemies, see Hasel 1998, 84.

[19] The only references to colors for both the buildings appear in James 1966, 5–8 and in Mazar 2009a, 168.

[20] Fragment A-4 is the last found inside the building, but unfortunately almost the whole text is lost.

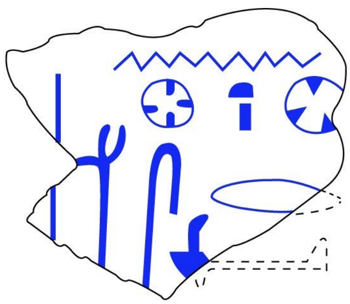

Figure 6: *Tentative reconstruction of inscription A-2 (Drawn by the author. Adapted from James 1966, Fig. 88, 4: A-2).*

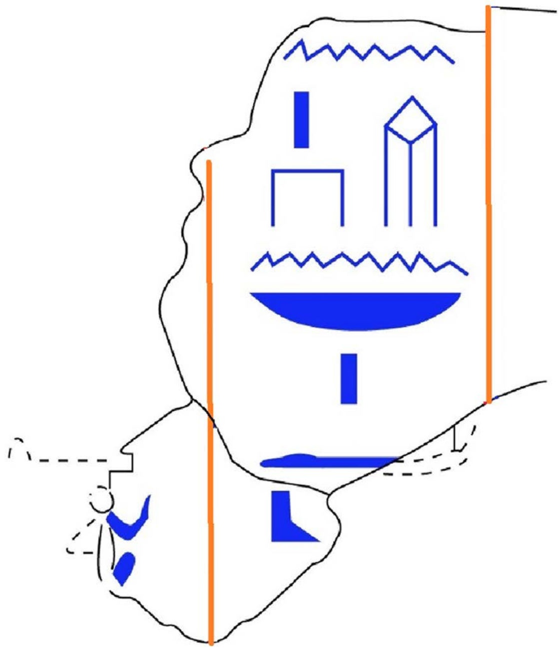

Figure 7: *Tentative reconstruction of inscription A-3 (Drawn by the author. Adapted from James 1966, Fig. 88, 2: A-3).*

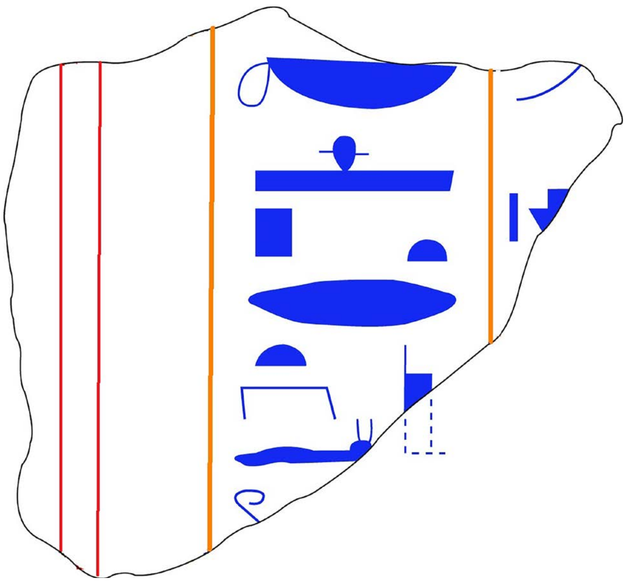

Figure 8: *Tentative reconstruction of inscription A-5 (Drawn by the author. Adapted from James 1966, Fig. 91, 1: A-5).*

According to James' excavations report, block A-5 featured decoration lines in orange and red, as displayed in this tentative reconstruction (**Figure 8**). Hence, it may be supposed that at least the other jamb fragments belonging to this entrance and leading to the central hall were similarly decorated. This in turn thus formed a polychromic context which can also be traced in the doorframe of *Hatiay* at Amarna, mentioned above.[21]

[21] 'The entrance to the central room was framed with limestone painted red, while the lintel has signs painted blue' (Frankfort and Pendlebury 1933, 64–65).

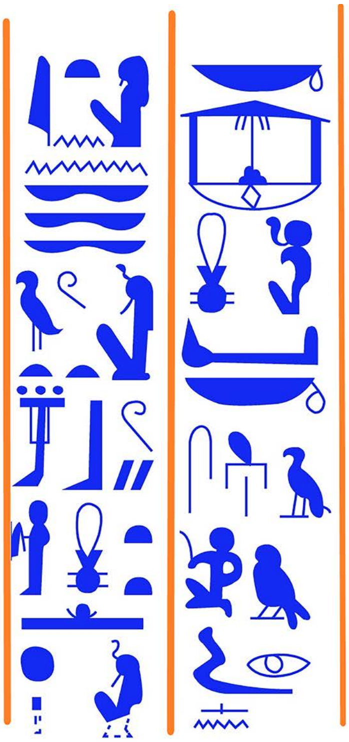

Figure 9: *Tentative reconstruction of inscription C-3 (Drawn by the author. Adapted from James 1966, Fig. 92, 2: C-3).*

Concerning the remaining inscriptions, C-3, C-2, D-1, and E-1 have been recovered in secondary use below Level V or near to the temple, but only regarding the first relief fragment do we have information about the color:

C-3 (1) ... *ꜥItn n pḏ.t twt ꜣbwu mỉtt Rꜥ... (2) ...ḳ ḥb (w)- sd mỉ Rꜥ dỉ.k sꜣỉ m mꜣꜣ. sn...*

(1) [...] Aten for the troops, begetter whose appearance has the likeness of Ra [...] (2) [...] your [...] Jubilee like Re. You give satisfaction when they see [...] (**Figure 9**).

C-2 (1) *... f m-ẖt.ṯ sby.f...r... (2) ... ḥst.f m wsrn...*

(1) ...he...after you that he might pass... (2) ...praise him through the power...

D-1 (1)*: ỉ ꜣw n.k pꜣ ꜥn ẖry nḥḥ...* (2)*: ỉ [ꜣwn].k pꜣ ẖꜥpy...*

‘Praise to you, O Beautiful One (epithet for the sun-god, here Ramses III), possessor of eternity... (2) Pr[aise to] you, o Hapy...’[22]

E-1 (1) *...w r sḏfꜣ šnwt nbt nb(?) nb ỉ r.n...* (2) *...[ỉmy-r] mnfy.t ṯs pḏ.t n nb tꜣ.wy sš nsw ỉmy-r pr wr Rꜥ-mss-wsr-ẖpš sꜣ ṯꜣy ẖw ḥr wnm n nsw ḥry p [ḏ.t ỉmy-r ẖꜣswt ḏḥwty-ms]*

(1) ...to provision every granary... (2) ... the Overseer of Troops, Commander of Troops of the Lord of the Two Lands, Great Steward, Ramses Weser-Khepesh, son of the Fan-bearer on the Right of the King, Captain of Tr[oops, Overseer of Foreign Countries, Thutmose].

[22] Taken from Higginbotham 2000, 66.

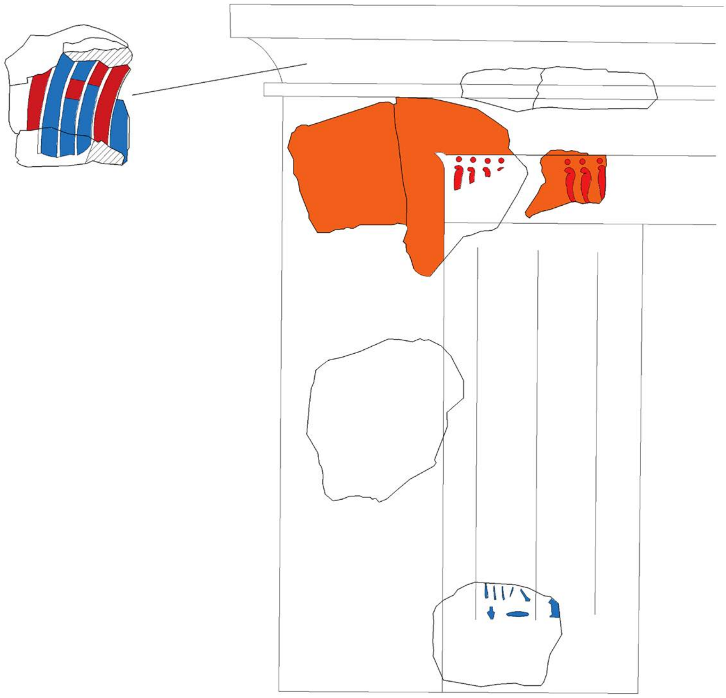

Figure 10: *Tentative and partial reconstruction of the façade from Building 1700 (Adopted from James 1966, Fig. 90, 2: B-3, 3: B-4, Fig. 91, 3).*

The last inscription contains an interesting reference to Weser-Khepesh's duty in supplying the granaries, which suggests that the governor could have been involved in some administrative function in collecting the harvest-tax.[23]

From Building 1700 all we have are the remains of a few hieroglyphics and seven fragments of a façade, which nevertheless give us an insight into the original general architectural program.[24] The frieze is decorated with uraei and sun discs at the top, a common decorative motif in Egypt. This motif is also related to kingship and protection, as attested in the relief portrayals of the balcony of royal appearances of Ramesses II, which originate in the mortuary temple of Ramesses III at Medinet Habu.[25] A part of the façade was covered with orange paint, and the molded cornice was painted in alternate red and blue stripes. From the few data available, we can note how the two adjacent residencies seemed to share the same bichromy, and the same goes for their apotropaic character. According to the archaeological evidence, a general decorative program appears to have been adopted in Level VI at Beth-Shean, which is based on the concepts of royalty and divinity, as well as protection, devotion, and, ultimately, the gesture of tribute (**Figure 10**).

[23] Higginbotham 2000, 66. Interestingly, a second reference to granaries is found at Beth-Shean in the thirteenth line of the private funerary stela of Amenemopet: 'overseer of the granaries of the Lord of the two Lands, steward...' (Rowe 1930, 37).

[24] To this building also belonged two inscriptions which were painted blue and one limestone fragment with traces of black paint. All are unpublished; see James 1966, 6.

[25] See Hölscher 1941, 44, Fig. 22.

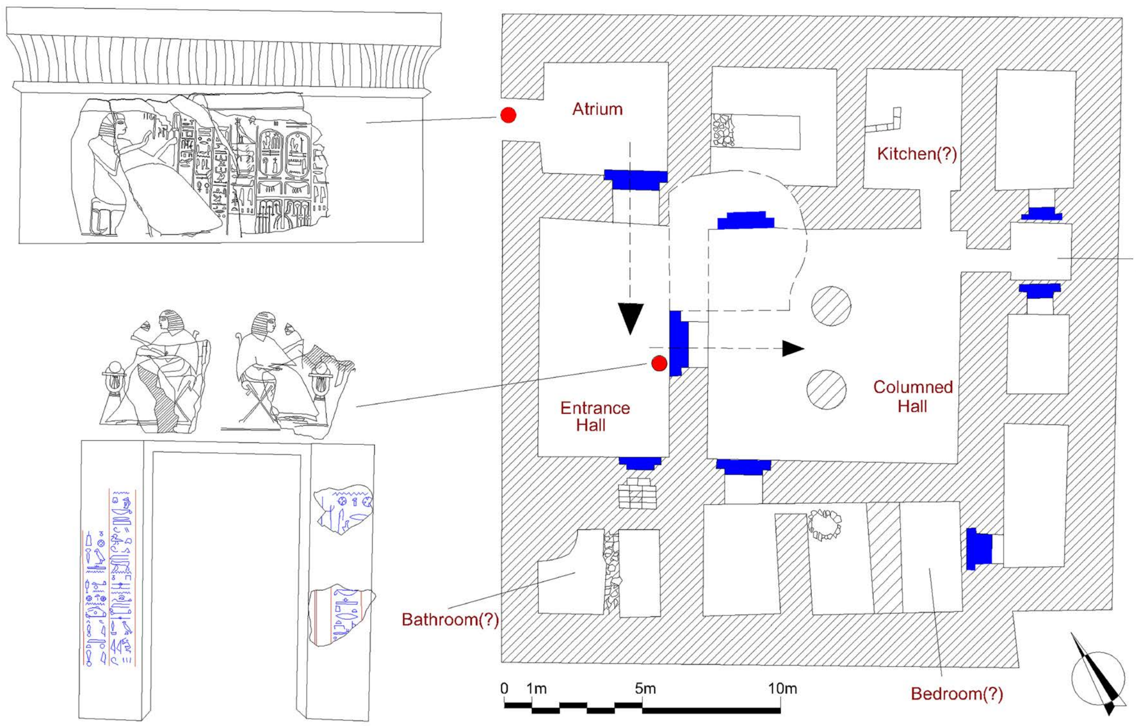

Figure 11: *Building 1500 plan, displaying the circulation from the main entrance to the columned hall, the T-shaped doorsills and the hypothetical position of the main lintels and some jambs (Drawn by the author. Plan of Building 1500 adapted from Mazar 2006, 65, Fig. 3.3a).*

Organization of the spaces and inner circulation of Building 1500

Let us now consider the architectural decorations associated to spaces in Building 1500. The main entrance is unfortunately not preserved. For this reason it has long been debated whether the entrance had a central axis with the main hall, or whether instead it led to the corner room which was located at the northwestern corner.[26] More recently, this latter hypothesis has been proposed by Mazar on the basis of the size of the T-shaped threshold found *in situ*.[27] The lateral position of the entrance would also fit with the ideology of an Egyptian inhabitant, for the main entrance had a symbolic meaning filled with social and ritual implications. The blueprint of a typical Egyptian house in fact always had the main entrance located in a corner room: usually an atrium which led to the next space, as in the case of the second most diagnostic residence attested in Canaan, Residence YR at Tell el-Far'ah (S).[28] In

[26] FitzGerald 1932, 142–143 first proposed that the entrance should be located in the center of the western side, due to an interruption of the stone foundations at that point. This interpretation has been largely followed in the subsequent commentators, see James 1966, 8; Oren 1984, 49; Morris 2005, 756; Fischer 2011, 65; Higginbotham 2000, 270; Nigro 1994, 187; 1996, 41. Higginbotham 2000, 89 interpreted the central position of the main entrance as a means of accommodating a different climate in a region with higher rainfall. For a detailed discussion about the single rooms and loci of the building, see Mazar 2006, 72–80; Pierce 2013, 290–304.

[27] Mazar 2006, 71–72.

[28] This is one of the main criteria for classifying Egyptian residences, but it should be said that, besides Tell el Far'ah (S), it has been recognized in Canaan at Aphek and Gezer only. Both buildings are considered to belong to a local Palestinian rather than Egyptian tradition; see Nigro 1994; 1996.

Egyptian culture, the main door of a house represents its 'first barrier', sanctioning the passage from the outside world to the inner realm. As a result, the path to the innermost part of the house was longer and composed of various parts which contributed variously to the creation of a feeling of sacredness and purification.[29] Such an axis of movement finds support both in the ideology of the builders and in the archaeological record, which suggest that the main entrance should have been placed in correspondence with the northwest corner. This gateway, I suggest, would have been a suitable location for the main lintel C-1 , which could be visible to the entire population. From there a path led from an atrium to an entrance hall and on to the entrance of the main central space, which may well have had all its doorjambs painted and inscribed. As shown above, the inscriptions found inside the building refer to the living king as guarantor of *Maat*, while there is also mention of a 'throne' or 'tent' of the lord, and they invoke protection against enemies. In this connection, the fragmentary lintel which features the offering scene was also consistent with the ceremonial and social purpose of this hall.[30] Indeed, its main entrance could well have been the original location of the two blocks found in secondary use. The following plan displays a possible axis of movement in the building, along with the hypothetical original position of some of the architectural elements described above (**Figure 11**).

Analyzing written sources: Building 1500 as a ceremonial place for tribute

The most basic function assigned to Building 1500 (and 1700) is that of a dwelling, i.e. the private household of the Egyptian governor.[31] But Mazar proposed a different function beyond the merely utilitarian one, stating that Building 1500 was a small palace with a ceremonial purpose and designed to impress visitors.[32] As he observed, Building 1500 and the adjacent Building 1700 were likely to 'create a line of major edifices serving the Egyptian administration'.[33] The corpus of materials coming from Building 1500, understood together with the central hall and its painted reliefs, the capitals, niches and lustration slab, certainly suggest something out of the ordinary in the Canaanite environment. Indeed, from an archaeological and structural point of view, there are enough elements for us to consider Building 1500 a place where cultic rituals occurred.[34] In this regard, written sources provide us with interesting information concerning the socio-political organization of New Kingdom Egypt, which is strictly connected with the gathering of tributes on which the imperial system was based.

From the Annals of Thutmose III, it is known that Syria-Palestine was due to pay a tax to Egypt already during the XVIII Dynasty.[35] In dealing with the nature of these taxes, Egyptian texts regularly refer to them as *inw* and *bꜣkw,* two terms that are difficult to translate and interpret. The same terms are also found in the main textual source for the period of Ramesses III, Papyrus Harris.[36] The most appropriate way to render these terms in modern languages has been the subject of various studies, for they do not correspond to any modern economic concept of commodity exchange; instead they need to be

29 'The fact that an individual had to cross at least three different thresholds before entering the first sizeable room of the house created a gradual passage from the outer to inner world' (Koltsida 2007, 40).

30 'Every single room of every monument will have had its own specific requirements [...] the Egyptians aimed at a bright polychrome color scheme. In principle, the decorations corresponded to the function of the room' (Böer and Warburton 2019, 248).

31 James (1966, 12–13) came to this conclusion because of the domestic pottery and other finds.

32 Mazar 2006, 80; 2009a, 169.

33 Mazar 2009b, 15.

34 Pierce 2013, 401.

35 Morris 2005, 460–728.

36 References to *inw* are also found in the mortuary temple of Ramesses III at Medinet Habu, where they refer almost exclusively to the king's relations with foreign countries (Gordon 1983, 3). The occurrence of *inw* and *bꜣkw* in texts concerned with international relations or with populations subjected to the pharaoh has also been noted by Janssen (1993, 92).

interpreted as more complex socio-economic actions. Modern scholarship normally translates these two terms as 'tribute' or 'gift'.[37] However, more important than their modern and debated renderings for our discussion is the fact that the use of these terms implies that the concepts of kingship and legitimation in Egyptian ideology were closely associated. As argued by Bleiberg, *inw* referred to an economic institution paid on a yearly basis by all foreigners, whether conquered or not, as well as by Egyptians, and it was addressed directly to the king as a result of his divine intervention, contributing to the king's personal finances.[38] Materially speaking, this entailed a relationship of gift-giving, which was an aspect of kingship itself and a royal attribute, for goods were offered to the king in exchange for the 'breath of life'.[39] The main difference with *b3kw*, the second economic system related to Egyptian imperialism, lay in the fact that the first form of taxation was paid to the king by one single person, while the latter was always paid by a country or a region and was destined for a temple or a deity.[40] Materially, these contributions had a quite wide range, depending on the status of the supplying countries. *Inw* consisted of goods such as oil, curds, grains, honey, and there is evidence that it was used by the king to feed the members of his entourage, as well as for donations to temples and for paying the necropolis workmen in the homeland.[41] Conversely *b3kw*, which was addressed to the temples, consisted mostly of raw materials such as copper, wood, gold, silver, lapis-lazuli, incense, and even slaves.[42] Its redistributive function is demonstrated by its use in temple decorations, offerings to the gods, and provisioning the harbors for military purposes. Second, *b3kw* is stated to be the parameter according to which the success of Egyptian economic imperialism imposed on a conquered territory can be measured and was important enough to require an Egyptian temple to be administered.[43]

Such a system of international relations included not only Canaan and Nubia, but also Hatti, Assur, Babylon, and Isy/Cyprus. Accordingly, the kinds of supplies were also different and characteristically individual for each region.[44] Considering the resources of Egypt and that of the other kingdoms of the time, on a more practical level Canaan alone had very little to offer. Indeed, it has been rightly observed that an economic interest in the Egyptian conquest of the Southern Levant was unlikely, and the main interest of Egypt was probably directed towards the main commercial routes to Mesopotamia.[45]

Generally speaking, Canaan lacks raw materials, so the major part of the tribute due to Egypt would have consisted in metals such as copper and, especially, bronze, which was used for weaponry and other items, along with agricultural and pastoral products. But each type of tribute had to be delivered in limited quantities. If we consider, for example, the amount of oil and cereals provided to the pharaoh, the Harris Papyrus informs that the export of grain from Canaan at the time of Ramesses III as tribute for the temple of Ptah in Heliopolis consisted of approximately 200 liters, or 150 kg, per year.[46] Given these modest proportions, Ahituv has concluded that the grain collected as tribute was actually mainly used for the sustenance of the Egyptian military which was in service in Canaan. Accordingly, the donations

[37] Müller-Wollermann (1983, 84–90) nevertheless pointed out how 'gift' or 'tax' are preferable translations to 'tribute', which is subject to more interpretation, since in the terminology of the people involved in the trade it was an exchange of gifts. Liverani (1990, 260–261) proposed translating *inw* simply as 'supply', on the grounds that even the distant and independent kings were called to deliver their supplies. Janssen (1993) instead suggested that *b3kw* simply indicated 'work' and its 'products'. For other translations, cf. Hasel 1998, 69–71.

[38] Bleiberg 1984, 158. Liverani (1990, 262–263) understood the presentation of external supplies as tribute as a case of Egyptian propaganda, aimed at keeping control over the inner population and at maintaining socio-political cohesion.

[39] Bleiberg 1984, 159.

[40] However, Bleiberg 1988, 159 himself stated that *b3kw* could also be provided by single individuals, including foreign princes.

[41] Bleiberg 1984, 161.

[42] Liverani 1990, 256.

[43] Bleiberg 1988, 165.

[44] Liverani 1990, 257–258.

[45] Ahituv 1978, 104–105

[46] Ahituv 1978, 96.

addressed to the Egyptian temple 'were merely symbolic and were of little account in the economy of the temple'.[47]

Moreover, if we look again at the archaeological data, a connection between the goods supplied and their cultic aspect can be tracked at Beth-Shean. For example, in a grain silo attached to the temple, faience objects have been found along with fourteen seal impressions, probably of a single scarab, which bore the name of Amun on a votive model bread of clay and which was probably meant to be read as *imnyt* 'daily bread (offering)'.[48] Despite the very large number of scarabs from Southern Levant, seal impressions are much rarer; this example therefore represents one of the few instances of a scarab which fulfills not only an amuletic function but also an administrative one.[49] Moreover, the presence of a dedication obtained through the name of Amun is a clear indication that the crop at Beth-Shean was part of the royal property, controlled by Ramesses-User-Khepesh and consecrated to the Egyptian god.[50]

From written sources we know that such a tax system was imposed on Nubia under Thutmose III, where several temples were active during the New Kingdom, as well as in Southern Sinai, but was not yet fully present in Canaan.[51] At this point, it should be remembered that, despite several speculations, no actual Egyptian temple has been attested to date in the Southern Levant.[52] Moreover, it seems likely that the *b3kw* redistributive system was indeed extended into Canaan during the Ramesside period, which corresponds to the spread of the Egyptian residencies. Given these considerations, it is perhaps tempting to see residencies in the Southern Levant not only as private households, but also as places where symbolic and administrative functions usually carried out by Egyptian temples occurred, as also applied to the gathering of *inw* and *b3kw* tributes.[53] Grain and other goods were probably stocked in the granary close to the temple, as well as possibly in other spaces at Beth-Shean.[54] In any case, despite various interpretations in the past history of scholarship, it must be highlighted that the temples of the city were places where Canaanite cults were performed and local deities were worshipped even by Egyptian officials.[55] Regardless of the misleading Egyptian terminology, the exchange of gifts in the form of supplies has been demonstrated to be pivotal beyond its practical aspects in the socio-economic structure of the time. Considering also the concepts of royalty, divinity and protection expressed by the inscriptions of Building 1500, as well as the imagery of the tribute that was perhaps placed at the entrance of the main hall, one may assume a scenario in which part of the limited and yet symbolic

[47] Ahituv 1978, 96–97.

[48] James 1966, 18; Morris 2005, 759; Keel (2010a, 116 Nr.42) has also proposed the basic reading 'Amun-Ra is my Lord'.

[49] To my knowledge, the only comparable examples are from Tell el-Far'ah (S), where three seal impressions have been found on the conical stopper of a storage jar within a wine cellar inside Residence YR, which depict the Canaanite god Baal-Seth on a striding lion (see Keel 2010b, 377 Nr. 828, 378 Nr. 829).

[50] See Morris 2005, 757. Cf. also: 'The primary functions that can be demonstrated for Egyptian officials in the Levant are ones of taxation, surveillance and mediation...the tribute of southern Palestine, when collected in the reign of Ramesses III, was directed to the treasury of the reign of Amun' (Higginbotham 2000, 72). Moreover, although its existence has not been archaeologically proven, P. Harris speaks of a temple located at Pa-Canaan (Gaza) dedicated to Amun, where foreigners of *Retenu* brought their tribute to the god (Higginbotham 2000, 57). Additionally, it is recorded that under Ramesses III nine cities in the land of Khuru (Canaan) became the property of the god Amun (Oren 1984, 56).

[51] Bleiberg 1988, 164–165.

[52] The only Egyptian cultic structures in the Southern Levant are found outside of Canaan proper, at Serabit el-Khadim and Timna (Wimmer 1990; 1998). However, they are rock-shrine sanctuaries with no parallels in Egypt. Mazar defined the other structures which are thought to be Egyptian temples in the Southern Levant as 'Canaanite irregular temples' (Mazar 1990, 253).

[53] Archaeologically, the presence of silos is also attested near to the residences at Tell el-Far'ah (S), Deir el-Balah and at Tell esh-Shari'a (Nigro 1996, 17 note 21).

[54] It is known that at the time of Seti I, which corresponded with Level VII, a large circular silo was located in the space in front of the Migdol and west of the temple (Nigro 1996, 15).

[55] Rowe (1930; 1940) labelled the temples of Level VII and VI respectively as the temples of Amenophi III and Seti I, and considered them to be based on the model of the private chapels at Deir el-Medina. The cult of Mekal and Anat at Beth-Shean is confirmed by two stelae (Mazar 2009a, 175).

produce that had to be sent to Egypt, such as oil and wine, was stored in the residence, where the official might have performed rituals to his king.[56] In this context, Building 1500 at Beth-Shean, with its outstanding architectural elements and prayers to the king, surrounding the columned central hall, would perfectly fit such a ritual purpose.[57]

The use of blue color

After having analyzed the architectural and decorative elements of Building 1500 (and partially of Building 1700) on an individual basis, I think it is now worth giving some attention to the use of the color blue in the inscriptions, starting with a brief overview of its use in Egypt and its cultural significance. Considering that the surviving inscriptions are few and heavily damaged, what follows is admittedly somewhat speculative. Whether or not all the entrances (or at least all the ones leading to the main hall) were painted blue in Building 1500, the fact that some of them were painted presents a very interesting case which is unique beyond the Southern Levant. In fact, it should be considered that also in Egypt it is not too common to find exact parallels of blue-painted doorframes.

Regarding the development and use of blue pigment in Egypt, blue was certainly one of the most appreciated colours, being largely attested on several different media. It could also appear visually as green, light blue, dark blue, or even black, for Egyptians made no distinction between lighter blue similar to green and turquoise mineral (*wad)* and darker blue similar to lapis-lazuli (*ẖsbḏ*).[58] All these shades were interchangeable and all related to the well-known concepts of regeneration and rebirth, which is why blue painted inscriptions are mostly attested in funerary contexts.[59]

Egyptian blue has been recorded since the Old Kingdom in the decoration of wall paintings on tombs and temples from the IV Dynasty (2575–2450 BCE), while its first applications in carved hieroglyphs can be found in the architectural inscriptions of the solar temples at Abu Sir and in the pyramids of the V Dynasty (2450–2325 BCE), contemporary with the appearance of the Pyramid Texts.[60] In this period, the inscriptions found are green and azure, mainly because the technique of obtaining a dark blue color before the end of the V Dynasty was highly expensive and was of very limited use.[61]

[56] In this regard, one may perhaps remember the seated statue of Ramesses III, which originated in Level VI and was found reused at the entrance of the Northern Temple in Level V (Mullins 2012, 143). This statue is regarded as a form of Egyptian propaganda during a time of decline (Ben-Tor 2016, 84). It might have been involved in particular libation rituals and offerings. P. Harris also makes mention of foreigners from Canaan who bore their *inw* to the statue of Ramesses III (Bleiberg 1988, 158). Finally, the storage of oil and wine in some of the inner spaces would be consistent with the domestic pottery found within the building.

[57] For a discussion of the central hall and the manifestation of the Egyptian presence, see Mazar 2006, 28. Building 1500 and 1700 are also said to be more ornate than the temple or other buildings in the center of the *tell* (James 1966, 12).

[58] The issue regarding *wad* and *ẖsbḏ* and their interchangeability has been widely debated: see Schenkel 2007; 2019; Tiradritti 2007, 29–30; Warburton 2012. However, it should be noted that blue and green were two different synthetic pigments, since the presence of two different minerals, cuprorivaite and parawollastonite, fired with quartz at different temperatures, was necessary for their production (Pagès-Camagna and Colinart 2003; Pagès-Camagna *et al.* 2006).

[59] Blue was therefore polyvalent. Dark blue *ẖsbḏ* could be used instead of black to indicate hair, a tendency that is also attested in Mesopotamia: see Thavapalan *et al.* 2016, 206–208. Some remarkable examples are the hair of Hathor and Seti I in his tomb in the Valley of the Kings (see: Louvre 2010); and, from the Valley of the Queen, the blue hair of the prince *Amenherkhepeshef* in the company of his father Ramesses III. Also to be noted in the latter example is the combination of different hues of blue with other colors for the inscriptions (Wilkinson 2010). Otherwise, blue could be equated with green to indicate, for instance, Osiris' complexion and therefore fertility, as depicted on the stele of *Ipepi* (note his blue hair) from Abydos (Neues Museum Berlin Ident. Nr. ÄM 24031).

[60] The dates for the Egyptian dynasties are taken from Wilkinson 2010, XV.

[61] F. Tiradritti (personal communication in June 2019). Delamare (2013, 4) also stated about dark blue: 'As in Mesopotamia, this material was a product of great luxury. It was certainly very expensive and produced only in small amounts'. The high degree

In fact, the quantity of blue *ḫsbḏ* produced in Egypt seems to have remained low for a long period of time.[62] With the beginning of the New Kingdom, a much wider use of dark blue in tombs and temples is attested, which is likely to be related to a superior technology achieved in the XVIII Dynasty in the production of blue pigment.[63] This technology is also likely responsible for the introduction of new techniques and colorant from Canaan.[64] Sunken blue inscriptions during this time are attested on numerous stelae and pieces of sculpture, as well as on door decorations, but they are still mainly found in funerary contexts.[65]

To return to Building 1500, the impossibility of knowing with certainty the shade of the colors used in the inscriptions has already been highlighted. Nevertheless, it is helpful to mention that in one room in a house in Area S at Beth-Shean scattered remains of wall paintings have been found which are contemporary with Building 1500. As stated by A. David: 'impressive is the radiant quality of the Egyptian blue'.[66] It is therefore reasonable to assume that the inscriptions from Building 1500 were originally painted similarly in dark blue.[67] Additionally, although limited and without any inscriptions, the use of blue paint in plastered walls is attested at several Canaanite sites during the Ramesside period; this peculiarity has been considered a fairly uniform practice by Egyptian rulers.[68] Indeed, it is likely that the presence of blue painted walls in houses, administrative and temple areas in Canaan expresses the high value that Egyptians assigned to this color, as well as the adherence by the Canaanite population to certain Egyptian ideologies. Color was a primary element of Egyptian art, as has been observed, in Egypt 'paintings occurred in both sacred and non-sacred contexts, and responded in similar ways [...] likewise, certain motifs in palaces acted as talismans to guard against the entry of chaotic forces and reinforced notions of kingship'.[69]

Furthermore, if one considers the painted inscriptions from Building 1500 within a wider chronological and geographic context, it might be intriguing to consider the use of Egyptian blue a few centuries later in the visual program of the Northwest Palace at Nimrud, which was first constructed by Assurnasirpal II (883–859 BCE). Indeed, recent multispectral-imaging analysis on five alabaster wall reliefs from room S of the palace have demonstrated not only the presence of an intense shade of blue pigment, but

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of quality of blue hue was not maintained during the whole Egyptian history, however, as it is attested by the complete absence of Egyptian dark blue from some tombs of the VI Dynasty (Jaksch *et al.* 1983; Delamare 2013, 5–6). Material evidence for the use of light blue during the VI Dynasty is found in, for example, the wall block fragment of the pyramid of Pepy I at Saqqara, which displays green-filled hieroglyphic inscription (Petrie Museum, UC14540).

62 Delamare 2013, 8.

63 Jaksch *et al.* 1983, 530–534.

64 McGovern *et al.* 1993, 2.

65 Some remarkable examples are the stele dedicated from *Baki* to Amun, the stele of the royal scribe Ramose to *Qadesh*, the statue of *Penmerenab*, the stele of *Djehutynefer* and his wife, the stele of the standard-bearer *Mainhekau*, the funerary stela of *Kha*, the stele of *Saiset* in adoration of the Abydos triad and the stele of Maya (Museo Egizio Torino Cat. 1549, 1601, 3032, 1638, 1459, 1618, 1461, 1579). The relief of Nefer-hotep which dates to the time of Amenhotep III may also be noted in this connection (Neues Museum Berlin Ident. Nr. ÄM 9579). For more precise comparisons with Building 1500, one may cite the beautifully painted doorframe dedicated to Ramesses II by the visir *Neferrenpet* and the foreman *Neferhotep* at Deir el-Medina (Museo Egizio Torino Cat. 1464). However, it should be noted that this frame is made of wood and, despite the prominence of azure, it is combined with other colors to create a polychromatic program. Traces of blue were also present on the above-mentioned lintel of *Hatiay* at Amarna.

66 The pigments examined by the scanning electron microscope are composed of cuprorivaite, the major component of Egyptian blue (David 2009, 706, 709, photo 13.6). On the basis of the finds and architecture of this house, Mazar (2009a, 164–165) has argued that this must have been the private residence of a high-ranking Egyptian official. If this is right, then it cannot be ruled out that Building 1500 was an administrative site, and not primarily a domestic residence.

67 It is possible that the color was produced directly at Beth-Shean, where the production of different blue colorants is attested (McGovern *et al.* 1993, 7).

68 David 2009, 711. Traces of blue on walls have also been found at Aphek, Tel esh-Shari'a and in the temples at Lachish and Beth-Shean.

69 Hartwig 20016, 33.

also the fact that *Zangindurû* or Egyptian blue was the key to the decorative program of Assurnasirpal II's royal residence'.[70] Moreover, the bright blue pigment appears to have been used in cuneiform carved inscriptions as well, in order to highlight the written words in a similar manner to Egyptian hieroglyphs.[71] The Neo-Assyrian *Zangindurû* color seems to find its significance as an imitation of lapis-lazuli, especially in respect of its visual and intrinsic value, such as its sheen and its positive and amuletic/protective properties, which lent persons and things the appearance of ritual purity.[72] It follows that the use of blue paint in the inscriptions from Nimrud not only sought to highlight the texts before their viewers, but also played an important role in connection with its amuletic and apotropaic function.[73] The use of dark blue within the inscriptions probably corresponds to a custom that had lasted and evolved for centuries, and which had its ultimate origins in the pyramids of the Old Kingdom, where it first appeared in a lighter shade as green. Interestingly, in a later period, when the use of blue in wall paintings had already become widespread throughout the Near East, during the XXV–XXVI Dynasties (775–525 BCE), carved inscriptions filled with dark blue similar to lapis-lazuli appear in the Theban tombs of *Harwa*, *Pabasa*, *Petamenophi* and *Montuemhat*. These point to a more apotropaic meaning similar to Mesopotamic concepts, despite their standard use in funerary contexts.[74]

This survey of the use of Egyptian blue thus highlights a number of close parallels with the inscriptions from Beth-Shean and, as demonstrated, shows that this color is more frequently found in stelae and funerary inscriptions. Besides showing that blue was a color much appreciated by the Egyptians and was frequently used, Building 1500 has also proved itself to be a significant case, as blue is not simply used to decorate flat surfaces or to paint hieroglyphics, but also for deep carvings and fillings. Furthermore, this practice, which is common in Egypt in funerary contexts, is also found here in a residential-palatial environment, located at the border of the empire. Considering the data as a whole, there is little doubt that the painted inscriptions of Building 1500 conveyed an additional symbolic meaning through the bright presence of blue which can be related to the general purpose of the palatial structure. Blue was popular in Egypt throughout its entire history, and it stands in a semantic connection with concepts such as 'rebirth' and 'regeneration', 'water' and 'wetness'. In this framework, the hybrid Egyptian-Canaanite city of Beth-Shean seems to stand in a halfway position between the Egyptian world and the re-elaboration that will take place in the Neo-Assyrian period. In the latter case, blue tended to express not only the symbolic, apotropaic aspect of lapis-lazuli but was also linked to kingship and divinity.[75] Further analyses into the semantic relations between color and these terms, along with their development over time, lie beyond the ambition of this analysis, but several scholars have historically suggested that Egyptian blue imitates lapis-lazuli since its origins in the Old Kingdom.[76] In this regard, Warburton's view is especially interesting, in seeing the concepts and development of colors as strictly related to the exchange of semi-precious stones of various hues, a trend which he notes as early as the Neolithic period, at the very origin of color production in a period prior to writing.[77] Still, regardless

[70] Thavapalan *et al.* 2016, 203.

[71] Thavapalan *et al.* 2016.

[72] Thavapalan *et al.* 2016; cf. also Winter 1999, 46. Furthermore, Mesopotamian documents which are contemporary with the reign of Gulkishar of Babylon (*c.* 17th century BCE) mention an artificial blue called *uknû merku*, 'moulded lapis-lazuli'. During the New Kingdom Egypt, Mesopotamia paid part of its tribute with *uknû merku* (Delamare 2013, 2–4).

[73] See also Warburton 2012, 201: 'Lapis lazuli was precious: linked to divinity and royalty, tombs and temples'. These data are consistent with the beginning of glass production throughout the Levant, which began as an artificial substitute to semi-precious stone lapis-lazuli (Liverani 2011, 391–392).

[74] I owe this information to F. Tiradritti (personal communication in June 2019). For a photo of the blue inscriptions from the cenotaph of Harwa, see Tiradritti 2007, 373.

[75] In an Egyptian context, a similar conception may be noted in the employment of lapis-lazuli to create the hairdo of Tutankhamun and his wife, as it is depicted on his outstanding gold throne (see Wilkinson 2010).

[76] See Pagès-Camagna *et al.* 2006, 141; Pagès-Camagna and Colinart 2003, 637; Delamare 2013, 4. Cf. also Schenkel 2007, 211: 'In Egyptian language, there was no abstract term to indicate the blue color, but only the adjective: *ẖsbḏ* - lapis-lazuli like'.

[77] Warburton 2012.

of the exact origins of Egyptian blue, its use in Building 1500 can only be linked to the positive value of this color, the aesthetic and symbolic value of which is detectable from the Nile valley to Mesopotamia over time.

Conclusions

Buildings 1500 and 1700, which are most distinguishable by the lack of a central colonnaded hall, were both probably the result of a program established by Ramesses III. They both may have had a similar visual program: this notion is supported by the remains of orange and red paint and the presence of the same characteristic doorsills. Building 1700 is, however, too damaged for us to gain a better understanding of its functions and meaning.[78] Conversely, Building 1500 can be seen as the last material manifestation of the Egyptian ideology aimed at controlling the far city of Beth-Shean. This space was designed not only for the official *Weser-Khepesh*, but was also where he collected the symbolic tributes for the pharaoh, Amun, and the Egyptian temple. Finally, it should be pointed out that Beth-Shean under Ramesess III was one of the few strongholds that survived the end of the XIX Dynasty, during which time Egyptian control of Canaan became much weaker due to the turmoil and crisis that characterized the period between the Late Bronze and the Iron Ages.[79] Hence, as Mazar also remarks, Building 1500 represents an attempt to show off and manifest Egyptian power, but, I suggest, on a more symbolic and metaphorical level, rather than in a military way.[80] On the lintels the king stands at the entrance in his role as a representative of kingship and guarantor of *Maat* and of protection in general, since, in Ramesside ideology, the cult of the king is equated with the cult of the gods. The border between the external and internal space is marked by prayers which reinforce the demonstration of loyalty and closeness to the king by the official or, given the borderline status of the city, the sovereign power of the pharaoh himself. The difference between Level VI and the previous levels at Beth-Shean is to be found in its ceremonial nature, whereby the sacred, royal, and practical aspects merge completely in the use of painted, apotropaic inscriptions. The local population or low-ranking Egyptian military personnel were probably unable to read the inscriptions. Thus, colors and iconography may have served as added channels, so that both the administrative and symbolic value of Building 1500 was able to be perceived and appreciated by all, through a sensorial experience.[81] All these elements joined together would have helped to protect, at least symbolically, one of the last residences of the Egyptian Empire in the Levant.

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[78] James 1966, 12 argued that this structure may have been more imposing than Building 1500.
[79] Mazar 2010, 178.
[80] Some of the major walls of Building 1500 were constructed directly above an earlier building in Stratum Q-2, which was similarly an administrative and public structure, but had massive walls and a layout resembling the XIX Dynasty fortress at Deir el-Balah. Mazar (2006, 83; 2009a, 161) has also stressed how the major difference between the two phases of the buildings was the shifting from a primarily military function to a ceremonial one, as is traceable in Building 1500.
[81] The same function is attributed to color in the palace of Nimrud (Thavapalan *et al.* 2016, 211).

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On the Participation of Egyptian Artists in Achaemenid Art

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Abstract

It has long been acknowledged that the Achaemenid kings used craftsmen from distant corners of their empire. Egyptians were one of the most notable non-Persian craftsmen who worked in the royal Achaemenid workshops in terms of the significance of craftsmanship activities and the number of people employed. The Egyptian craftsmen traveled between royal and administrative centers such as Persepolis, Susa, and Borazjan during the Persian period. The written documents demonstrate that numerous Egyptians such as woodcarvers, goldsmiths, stonecutters and painters, worked and traveled within the Achaemenid Empire. Apart from textual evidence, this paper discusses several artifacts that may reflect the activities of Egyptian artists. This research aims to provide a fresh study of the role of Egyptian artists and their participation in the development of Achaemenid art in the imperial heartland.

Keywords

Egypt, Craftsmen, Artists, Achaemenid Empire, Persepolis Fortification Archives

Introduction

The employment of foreign artisans was common in the ancient world. Already in the Late Bronze Age, for instance, the Hittite king Hattusili III had asked for a sculptor from Babylonia.[1] Non-local craftsmen and specialists were active in urban centers of the Neo-Assyrian state such as Nimrud.[2] Babylonian texts attest that craftsmen from Egypt, Ionia, and Lydia worked alongside Medes, Elamites, and Persians at the Neo-Babylonian court of Nebuchadnezzar II.[3] It has long been broadly agreed that the Achaemenid kings used craftsmen from distant corners of the empire. Indeed, the Achaemenid kings prided themselves on the extensive and multi-ethnic nature of their empire and displayed the many different nations united under a single rule on their palaces and tombs. We have references to Babylonian, Greek, Lydian, Median, Egyptian, Lycian, Assyrian, Syrian, and Carian craftsmen who worked within Achaemenid culture as artists and artisans connected to particular artistic specialties (**Table 1**).[4]

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1 Matthews 1995, 465.

2 Gunter 1990, 12–13; Zaccagnini 1983, 247, 250, and 260; Baker 2016, 55.

3 Weidner 1939, 928–935.

4 On multi-ethnic workers in the Achaemenid period, see Henkelman and Kleber 2007; Henkelman and Stolper 2009, 274–275; Zaccagnini 1983, 262; and Henkelman 2017; 2018, all with references to older literature.

Ethnicity	*Specializations*
Assyrians	The workers who brought Cedar to Persepolis
Babylonians	Mud-brick maker, brickmaker, woodcarver, stonecutter
Carians	Stonemason
Lydians	Stone-sculptor, woodworker and ironsmith
Lycians	Artisans
Syrians	Woodworker and Stone-sculptor... at the columned hall
Medians	Goldsmith and artists who ornamented the walls
Greeks	Stone-sculptor, the laborers ... worked at the columned hall
Egyptians	Goldsmith, woodcarver, artists who ornamented the walls, stonecutter, painter, plasterer, stone-sculptor and the laborers ... worked at the columned hall

Table 1: *Non-Persian artists who worked in the Achaemenid heartland. Table is based on the Persepolis tablets (PFA and PTA) and DSf.*

Two categories of artists and artisans under Persian rule can be distinguished which should be treated separately: the craftsmen who manufactured 'official royal art' for the Persian court and nobles and those who produced their local art for non-royal patrons. Among the non-Persian craftsmen from the ethnicities mentioned, this paper focuses on Egyptian craftsmen who executed Persian art, and not the population of Egyptian craftsmen involved with different non-artistic professions.

Before discussing the Egyptian artists, a brief comment on the conquest of Egypt by Persian kings is pertinent. Psamtik III, the last pharaoh of the Saite Dynasty (XXVI Dynasty), had ruled for just one year in Egypt when Cambyses conquered Egypt at the battle of Pelusium in 526 BC.[5] The first Persian domination of Egypt is known as that of the 27th Dynasty. For approximately 60 years, during the 28th, 29th, and 30th Dynasties, Egypt was independent. The second period of Achaemenid rule is known as the XXXI Dynasty, which started with the reconquest of Egypt by Artaxerxes III Ochus in 343 BC and ended with the arrival of Alexander in 332 BC.[6]

In this paper, I will examine the evidence for Egyptian craftsmen in the Achaemenid artistic workshops and their influential role in the performance of Persian royal culture. For this, two types of evidence will be discussed, textual and archaeological. As I will try to show, these sources support the view that the participation of Egyptian craftsmen was prominent to the performance of Achaemenid art and artistic activities in the imperial heartland and that they moved in different royal centers. The skill of Egyptian craftsmen and artists was famed in the ancient Near East, and they are frequently attested in Assyrian, Hittite, and Babylonian contexts.[7] I do not attempt to explore all Egyptian craftsmen in the Persian empire, such as brewers or physicians. Instead, the paper focuses on Egyptian craftsmen and artists who were specialized in artistic skills such as stonework, woodworking, painting, etc., chiefly in the heartland of the empire.

[5] For a more recent study of the date of the conquest of Egypt by Cambyses, see Quack 2011.

[6] For Egypt under Persian rule, see Colburn 2013; 2015, 165–168 and 195; Qahéri 2013; Wasmuth 2017, 15–16.

[7] See Zaccagnini 1983, 260 and Baker 2016, 55 on Assyrian; Zaccagnini 1983, 250 on Hittite and Weidner 1939, 930 and Root 1979, 32 on Babylonian contexts.

The textual evidence

The written documents which attest to the role of Egyptian craftsmen in the production of Achaemenid royal art include royal inscriptions, administrative texts, and satrapal correspondence. A good starting point is the foundation inscriptions of Susa, the first discovered text that refers to the artists employed by an Achaemenid monarch.

The foundation charters of Susa

A total of 36 royal inscriptions, of which 24 belong to the reign of Darius, were discovered at Achaemenid Susa.[8] The foundation inscriptions of Susa comprise four inscriptions: DSf, DSz, Dsaa and A^{2}Sa.[9] With the exception of DSaa (Babylonian only), the inscriptions are trilingual (Old Persian, Elamite, and Babylonian) and exist in several copies.[10] Most crucial with respect to the specializations of artists are DSf (AE: § 12, 42-48) and DSz (AE: § 11, 42-46 and § 12, 46-52).[11]

The foundation inscriptions list different artistic specializations performed by five non-Persian ethnicities: '... the masons who crafted the stone were Ionians and Sardians. The goldsmiths who worked the gold were Medes and Egyptians; the men who worked the wood were Sardians and Egyptians; the men who crafted the bricks were the Babylonians; the men who decorated the wall were Medes and Egyptians'.[12]

As shown by this text, the participation by Egyptians in the construction of the palace(s) at Susa involved goldsmiths, wood-workers, and adorners of the palace walls.[13] In DSf and related inscriptions, no other foreign group is as prominent as the Egyptians. This observation deserves emphasis, as DSf and DSz have often been used to underscore the assumption that Greek ('Ionian') craftsmen played a significant role within the production of Achaemenid imperial art.[14] Instead, DSf, DSz, and the texts mentioned below all indicate an important role of Egyptians in the execution of Persian art.

The Persepolis Archives (PFA, PTA)

The most valuable sources on Egyptians in the Achaemenid heartland which might corroborate Darius' statement in DSf are the Persepolis Fortification Archive (PFA) and the Persepolis Treasury Archive (PTA), both named after their find spots on the terrace of Persepolis. Egyptian artists or experts related to artistic professions are attested in 16 texts and journal entries from the Fortification Archive and four texts from the Treasury Archive (**Table 2**). The unedited part of the Fortification Archive undoubtedly still contains further attestations.

[8] For the inscriptions, see Kent 1933, 1–23; 1950; Steve 1987; Vallat 2010, 300–317; Herrenschmidt 1983, 177–179; Grillot-Susini 1990, 213–222; and Schmitt 2009, all with references to older literature.
[9] Vallat 2010, 300.
[10] Vallat 2010, 300.
[11] Scheil 1929; Stolper 1992, 271–272; Vallat 2010, 304–305 (DSf) and 306–309 (DSz); Schmitt 2009, 127–134 (DSf) and 142–146 (DSz); for a general view and new perspective on the texts as 'Achaemenid foundation texts/deposits' which did not have been brought together as a set, see Root 2010.
[12] Translation in Kuhrt 2007, 492.
[13] The reference to 'adorning the wall' might be connected to the production of glazed bricks; see Razmjou 2004, 382; Henkelman 2017, 279. The attestations for Egyptian cooperation in the Susa foundation charters are studied in Wasmuth 2017, 45–49.
[14] See, for example, Farkas 1974, 87 and 89; Nylander 1975, 317.

Focusing exclusively on those texts from the Persepolis archives that do state an ethnicity, we find that different non-Persian 'craftsmen' included Arabs, Macians, Armenians, Medians, Assyrians, Babylonians, Cappadocians, Carians, Syrians, Egyptians, Greeks, Lycians, Lydians, and Skudrians. As shown in Table 2 the Persepolis Archives also showcase the activity of hundreds of skilled Egyptians who worked as goldsmiths, stonecutters, stone sculptors, woodcarvers, plasterers, and painters.[15] In terms of the variety of artistic specializations, the archives suggest that, proportionally, more Egyptian craftsmen were involved in the production of Persian imperial art than any other non-Persian craftsmen. As shown in Table 1, the specializations provided by the Persepolis tablets (PFA and PTA) and DSf reflect that Egyptian craftsmen worked in different areas of artistic activities in the Achaemenid capitals. Four tablets of the Fortification Archive attest to a small group of Egyptian goldsmiths (KÙ.GI-*kazzip*) which included men, women, girls, and boys.[16] This group worked at Persepolis from the end of the 23rd year of Darius to the 6th month of the 24th year. In comparison with other goldsmith groups in the PFA, this group is remarkable in terms of its repeated mention. Apart from the Egyptian goldsmiths, more than 800 Egyptian stonecutters and stone sculptors worked at Persepolis and Susa and moved between Persepolis, Susa, and Tamukkan.[17] In addition to these skilled Egyptian craftsmen, 547 other Egyptians traveled from Susa to Tamukkan in the 21st year of Darius (PF 1557). While several Egyptians went to Tamukkan, 29 Egyptian painters (*karsup*) are attested as coming from Tamukkan to Persepolis in the third month of the 23rd year of Darius (NN 1177). One more interesting text provided by PFA speaks about 22 Egyptian men who went from Tamukkan to Egypt in the Ninth (Elamite) month of the 22nd year of Darius.[18]

Egyptians appear as woodcarvers in the Persepolis tablets as well.[19] One interesting attestation is provided by the text PT 01 from the Treasury Archive.[20] The tablet lists one Egyptian man, likely named Haradduma, who was a 'centurion' and also a woodcarver (GIŠ-*šeškira*).[21] He earned 6½ *shekels* of silver, monthly, one of the highest wages for an individual attested in PTA. It is remarkable to note that the tablet is one of the rare cases in the Persepolis archives which states the artist's name. Haradduma thus seems not only to have high status but also to have been likely well known. In addition, the tablets also mention Egyptian plasterers and *hasup*.[22] The Egyptian plasterers carried out work at Nupištaš, the same place where other Egyptians such as stone sculptors and woodcarvers in the 32nd or 33rd years of Darius were also employed.[23]

Based on the Persepolis archives, Egyptians frequently traveled to different residential and administrative sites, such as Persepolis, Susa, and Tamukkan. In general, the Fortification Archive yields much data on the mobility of craftsmen throughout the empire. In addition to the Elamite texts from the Persepolis Archives, mention should be made of one or two tablets in Demotic script and six seals (known from

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15 More discussions are available also in: Henkelman 2017; Wasmuth 2009, 134–136.

16 PF 0872, NN 0448, Fort. 2293–101 (see for both Henkelman 2017, 274 and 276) and Fort. 2293–103 (personal communication W. Henkelman).

17 The exact number of stonecutters remains unclear, since the tablet PT 9 registers two groups (stone sculptors and woodcarvers) together. For the location of Tamukkan in the Borazjan area of Bushehr province in southern Iran, see Briant 1996, 780; Tolini 2008; Henkelman 2008; 2012a; 2012b; for Achaemenid structures around Borazjan related to Tamukkan, see Zehbari 2020.

18 Journal entry Fort. 2009-102(+2012-102+2012-104):42–3 (Henkelman 2020, 201).

19 PT 1 and PT 9.

20 For the newest edition and translation of the tablet see Henkelman 2017, 276–277.

21 Sadabatiš= **satapati*- (Old Persian), 'master of one hundred'.

22 The interpretation of the term *dukkašbe* as plasterers remains obscure (Henkelman 2017, 283 and 284, 4f.), the profession of *hasup* is entirely unclear (see Henkelman 2017, 286–288). Since PT 55 mentions bitumen-*hasup*, the term may be related to an artistic profession.

23 Based on PT 9, we are aware of a palace at Nupištaš, but the location of Nupištaš is still uncertain. A location around eastern or southeastern Fars, likely not far from Shiraz, has been suggested (Henkelman 2017, 278–279).

Attestation	*Profession*	*Number*	*Workplace*	*Route of Travel*	*Date*
NN 0448	Goldsmiths (KÙ.GI-*kazzip*)	5	Persepolis	-	(1/[24?] D)*
Fort. 2293–101	Goldsmiths (KÙ.GI-*kazzip*)	7	Persepolis	-	(6/24 D)
Fort. 2293–103	Goldsmiths (KÙ.GI-*kazzip*)	5	Persepolis	-	(4/24 D)
PF 0872	Goldsmiths (KÙ.GI-*kazzip*)	6	Persepolis	-	(11-12/ 23 D)
NN 1922	Stonecutters (HAR *mazzip*)	106†	Susa	-	(8 (Elamite)/23D)
NN 0480	Stonecutters (HAR *mazzip*)	690	-	Susa(?) → Tamukkan	(4/23D)
PT 9	Stone sculptors (HAR-*huttip*), Wood-carvers (GIŠ-*šeškip*)	55	Nupištaš‡	Susa→ Persepolis§	(4/ 32 or 33D)
PT 1	Wood-carver (GIŠ-*šeškira*), centurion	1	Persepolis	-	(8-12/ 32D)
NN 1177	Painters (*karsup*)¶	29	-	Tamukkan→ Persepolis	(3/23D)
PT 2	Plasterers(?)	14	Nupištaš	-	(7-13/ 32D)
PT 15**	Laborers (*ušparnašpe*) upon the columned hall (*hiyan*)	201	-	-	(7-12/ 3X)
Fort. 2009–102: 42–3	Egyptian men	22	-	Tamukkan→ Egypt	(9(Elamite)/22 D)
PF 1547	Worker (*kurtaš*)††	30	-	Susa → Matezziš	(-/21 D)
PF 1557	Worker (*kurtaš*)	547	-	Susa → Tamukkan	(-/21 D)
PF 1806	*hasup*‡‡	1	-	-	(8-12/23 D)
PF 1814	*hasup*	3	-	-	(13/22 D)
Fort. 1237–101:8–10	*hasup*	6	-	-	(2(?) and 3/15 D)
NN 1190	*hasup*	5	-	-	(3/ 18? D)
NN 2493:27–28	*hasup*	3	-	-	(3-8/19 D)
Fort. 1229–107	*hasup*	3	-	-	(12/22 D)

Table 2: *Attestations of Egyptian craftsmen in the Persepolis Tablets (PFA, PTA).*§§

* D= Darius I, X= Xerxes I.
† 100 *šalup* (free men) plus 6 *libap* (servants).
‡ This is the workplace of stone sculptors who are mentioned in the tablet; see fn. 23.
§ PT 9 records two groups of Syrian and Egyptian workers who served as woodcarvers and stone-sculptors. The group of woodcarvers came from Susa to Persepolis, while the stone-sculptors worked in a palace (*hiyan*) at Nupištaš. However, there is doubt whether all woodcarvers and stone-sculptors worked at Nupištaš or not (Henkelman 2017, 277–278). Also, it is not clear that both ethnicities worked in wood and stone or just one of these.
¶ The translation is an approximation; see Henkelman 2017, 278.
** The text also records Syrians, Egyptians, and Greeks together.
†† *kurtaš* could be translated as a dependent worker which is frequently attested in the Persepolis archives, see Hallock 1969, 717 and Henkelman 2017, 275, 3f.
‡‡ See fn. 22.
§§ The information in the table is based on Cameron 1948; Hallock 1969, 252; Henkelman 2017. Fort. 2293-103 is provided by Wouter Henkelman, whom I thank for his kindness.

impressions on the tablets) carrying Egyptian hieroglyphic inscriptions.[24] This indicates that the Egyptian language and scripts were known and, to a certain degree, could indicate that a community of Egyptians lived in the imperial heartland, perhaps including craftsmen.

Aramaic texts

Another textual source that could be helpful in reconstructing the mobility of skilled craftsmen in the Persian Empire is a letter from Aršāma, the satrap of Egypt sometime in the fifth century.[25] As the documents in the Aršāma correspondence show, the satrap was not in Egypt at the time of writing.[26] In the letter, he asks that rations be provided to his sculptor, Ḥinzani/Hinzanay, who was brought to Susa with his family to make a copy of a sculpture he had once made for Aršāma. The new sculpture needed to be sent to Aršāma immediately.[27] The letter (inside) reads as follows:

> '1. From Aršāma to Nakhtḥor, Kenzasirma, and his colleagues. And now: (he) whose name is Ḥinzani (?), a sculptor, my servant, whom Bagasrava brought to Susa, that one, give rations
>
> 2. to him, and to the people of his household, as (to) the other personnel, my stonecutters [? *BRYKRN.* Or "on my memorandum / ration-list", *BDYKRN*?]. And let him make statues [on] which there shall be horsemen (?), and let him make a statue of a horse with its rider, just as previously he made before me,
>
> 3. and other statues. And send (them), and let them bring (them) to me at once, with haste and h[ast]e! Artavahyah knows thi[s o]rder. Rašta is the scribe.'[28]

It is apparent from this text that some high-level satrap officials had their personal artists. Ḥinzani could have been a well-known sculptor sent to Susa for an official assignment. That he is still called a 'servant' (*grd*= OP **gṛda-*= AE *kurtaš*) reminds us of the use of the word *kurtaš*, 'dependent workers', for craftsmen in the Persepolis archives. That Aršāma asked that rations be given to Ḥinzani and, probably, to his family suggests that he traveled with his personal entourage, a sign of social distinction.[29] Since Egypt must have had its own resident craftsmen, it is interesting that Aršāma nevertheless insists on Ḥinzani.[30]

The text uses *ptkrkr* as a term for 'image maker' or 'sculptor', reflecting OP *patikarakara-*.[31] Other personnel is perhaps called 'stone cutters', but this is uncertain. With due caution, we may compare two specializations known from the Persepolis tablets, ḪAR-*huttip* (stone-sculptors) and ḪAR *mazzip*

[24] See Azzoni *et al*. 2019; Garrison and Ritner 2010, 1–2.

[25] The following references have translated or discussed the letter: Grelot 1972, 318, no. 70; Whitehead 1974, 84–89; Root 1979, 23; Roaf 1980, 72 and 74, n.3; Porten and Yardeni 1986, 120; Briant 1988, 168; Lindenberger 2003, 97–98, no.46; Kuhrt 2007, 819; Taylor 2020, 41; Tuplin 2020a; 2020b.

[26] Roaf 1980, 72.

[27] Also see Tuplin 2020b, 194.

[28] Taylor 2020, 41 TADAE A6.12.

[29] Briant 1988, 168.

[30] Tuplin has assumed that the letter recalls Cyr. 325: 28, a document which provides four years of apprenticeship for a slave of Cambyses in February 530 (before Cambyses was king) in order that he might learn seal-cutting (Tuplin 2020a, 217; also see Strassmaier 1890, 190.).

[31] For *patikarakara-*, 'maker of images, statues' see Tavernier 2007, 429, 4.4.7.85; Tuplin 2020a, 222. For the uses of *patikarā* (reflected in the Elamite transcription *battikurraš*) and the Elamite equivalent *zila-huttip* see Cameron 1948, 40 and 83; 1960, 68; Hallock 1969, 743; Vallat 1974a, 162–163; Hinz and Koch 1987, 1298; Roaf 1980, 65; Giovinazzo 2012, 134; Henkelman 2017, 277.

(stonecutters).[32] Several attempts have been made to identify Ḥinzani as an image-maker or sculptor/stonecutter, but it has been suggested that he acted as a seal cutter and stone polisher as well.[33] Since the letter does not specify the material to be used and since OP *patikarā* may refer to both round sculpture and reliefs, what Ḥinzani has made is not obvious.[34] To complicate matters, it cannot be excluded that Aršāma referred not to images made in stone or wood, but rather to the carving of seals. Interestingly, the Persepolis tablets contain references to two materials for sculptures (*patikarā*): stone (ḪAR *huttip* = stone-sculptor) and wood (GIŠ-*šeškip battikurraš huttip* = wood-sculptor).[35]

In addition to the letter mentioned above, the recruitment of Egyptian artists is nicely exemplified by another letter in the Aršāma correspondence. In this second letter, Aršāma tells his steward, Nakhtḥor, to add more personnel to his estates, all of whom refer to types of artisans.[36] The document might indicate that Aršāma needed different kinds of craftsmen for a building project. The letter, therefore, might underline the value of skilled labor under the Persian Empire in Egypt.

Apart from the presence and cooperation of Egyptians in the heartland of the empire, they certainly collaborated in Egypt under Achaemenid rule as well. It is evident, for example, that Egyptians such as Psamšek and Nakhtḥor were recruited by the Persian administration in a high-ranking position in Egypt under the Persians.[37] Also, in the case of the quarry at Wadi Hammamat and its workers, one person with an Egyptian name, Khnemibre, was the head of works in charge of stone preparation there. This suggests the responsibility of an important imperial administrative official there during the Achaemenid period (the 27th Dynasty).[38]

The presence of skilled Egyptian craftsmen in the archaeological record

The second part of the paper seeks to survey the archaeological evidence for the presence of Egyptian craftsmen in Achaemenid art. Before anything else, two preliminary remarks need to be made. Firstly, it should be stressed that the adaptation and inspiration of Egyptian influences in official Persian art is a separate topic, not at issue here. It has rightly been pointed out that the ethnic origins of craftsmen need not determine the origin of 'art', as craftsmen who performed royal works followed the detailed model which had been finalized by imperial designers. In other words, they did not act as free artists who followed their inspiration or freely applied their native artistic traditions.[39] For this reason, the following overview focuses on the origins of the workmen, not their influence on the artistic endeavor. Secondly, it should be emphasized that determining the ethnicity of craftsmen is more difficult archaeologically than textually. That being said, the corpus of archaeological evidence demonstrates

[32] For more information about these two specialties and the difference between them, see Giovinazzo 2012, 135; Henkelman 2017, 277–281; 2018, 238.

[33] He is identified simply as an 'image-maker' in Tuplin 2020a, 115 and 217. For an interpretation as 'sculptor' or 'stone-cutter' see Grelot 1972, 318, no. 70; Whitehead 1974, 86; 1978, 132, fn. 78; Root 1979, 23; Porten and Yardeni 1986, 120; Lindenberger 2003, 97; Kuhrt 2007, 819; Taylor 2020, 41; Tuplin 2020b, 57. The identification as 'seal-cutter' is argued in Roaf 1980, 72 and 74, fn. 53; Boardman 2000, 134 (see also the discussion in Tuplin 2020a, 219). Finally, Briant 1988, 168 suggests 'stone polisher'.

[34] On round sculpture, see Darius' statue inscription in Vallat 1974a, 162. The reference to reliefs can be interpreted in the Bīsotūn inscription (Cameron 1960, 68) and DNa (Kent 1950, 138); see Roaf 1980, 65.

[35] ḪAR *huttip* might be an abbreviation for *battikurraš* ḪAR-*huttip.* For more information about the term see Henkelman 2017, 277–278.

[36] The letter is discussed here: Grelot 1972, 313–314, no. 68; Whitehead 1974, 69–76; Porten and Yardeni 1986, 116; Lindenberger 2003, 93–94, no.46; Kuhrt 2007, 819–820; Taylor 2020, 37; Tuplin 2020a, 180–197.

[37] Hilder 2020, 98.

[38] Yoyotte 2010, 268–269; Wasmuth 2017, 241; Colburn 2020, 17.

[39] See Root 1979, 15; Roaf 1990, 109.

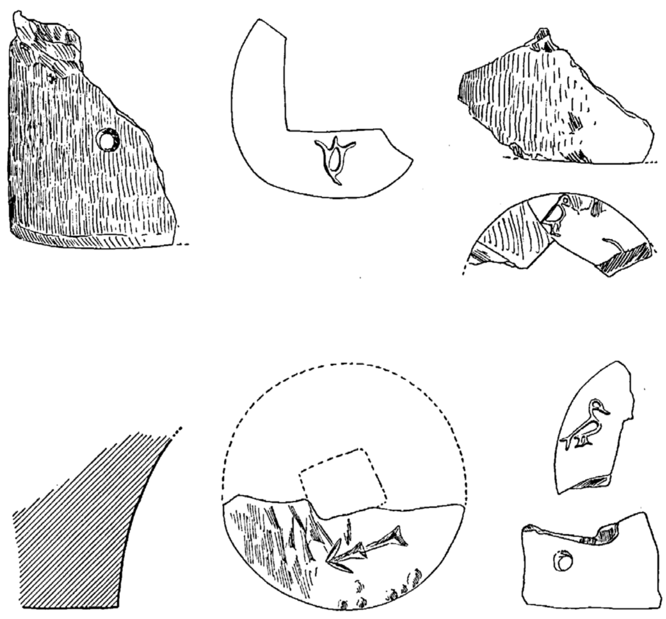

Figure 1: *Fragments of the horns of animals belonging to column capitals made of Egyptian blue and found in Palace D, Persepolis (after Schmidt 1957, 74, Fig. 11).*

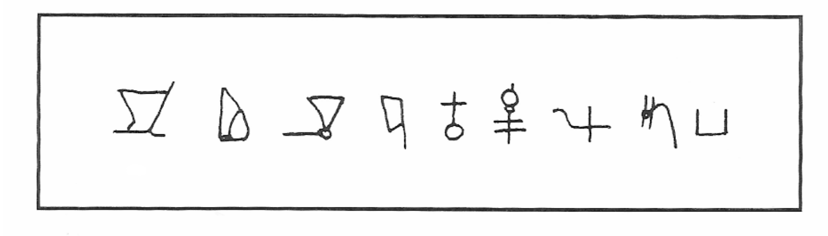

Figure 2: *Marks reminiscent of Egyptian hieroglyphs on glazed bricks from Susa (after Boardman 2000, 131, Fig. 4.2).*

some significant aspects of Egyptian participation in the production of Persian royal art and therefore needs to be included.

The antiquarian delight of certain kings is well known during ancient times. Treasuries, libraries, and literature were collected on the kings' orders.[40] The fact that many objects from the pre-Achaemenid and Achaemenid periods have been discovered in the Persepolis Treasury indicates that Achaemenid kings valued earlier archival traditions. A large number of Egyptian or Egyptianizing objects have been found in Achaemenid sites, especially in Susa and Persepolis: *cippi*, Bes-head amulets or so-called Bes vessels, scarabs, *wadjet*-eyes, and the most well-known object, the 'statue of Darius'.[41]

Several artifacts and other evidence found in the Persian heartland could also attest to the presence of Egyptian artists. For the objects which will be discussed here, a good starting point is provided by some mason marks with hieroglyphic signs on fragments related to the horns of animals which belong to column capitals discovered during the Persepolis excavations. The fragments are made of Egyptian

[40] Root 1994, 34.

[41] For Egyptians and Egyptianizing objects in the Achaemenid heartland see Abdi 1999; 2002a; 2002b; Qahéri 2012; 2013; 2016; 2018; 2020; Qahéri and Trehuedic 2017; Wasmuth 2017.

blue and were found at Palace D at Persepolis (**Figure 1**).[42] The use of hieroglyphic signs may indicate the presence of Egyptian stonemasons at Persepolis. The manufacture of Egyptian blue at Persepolis and Susa could suggest the presence of skilled Egyptian artisans as well.[43] Finally, glazed bricks found at Susa contain fitter's marks slightly similar to the Egyptian hieroglyphs (**Figure 2**).[44] Although any conclusions on the ethnicity of the artisans based on these marks should be drawn with due caution, the clear use of Egyptian signs could again reflect the participation of skilled Egyptian craftsmen in Achaemenid art.

Another considerable finding is a small stone figurine discovered at Susa which depicts an individual in an Achaemenid royal *candys*, a loose gown worn by the Medes and Persians (**Figure 3**).[45] The pose of the person, his left-hand gesture, and his *candys* and belt remind us of the statue of Darius from Susa (**Figure 3.1**), which, according to its inscription, was undoubtedly made in Egypt and then brought to Susa. This fact provides the clearest evidence for an Egyptian stoneworking workshop which would have produced imperial Persian art for the king.[46] As opposed to other small sculptures and figurines, the object lacks detailed workmanship and was probably not made for presentation (**Figure 3.2**). It is safe to assume that small models were often created before starting a larger sculpture in a workshop environment in the Ancient Near East and Egypt.[47] Could the small sculpture of Susa be considered a model as well?

To answer this question, we should first ask how a sculptor's model can be identified. Models can be small and unfinished. They occasionally lack, but sometimes also include, gridlines.[48] For this reason, it is often difficult to distinguish between model and exercise piece. Regrettably, no model or model marked with a grid has been discovered at the Achaemenid centers. Since the small find from Susa lacks a grid, its function needs to be interpreted with caution, and may perhaps be interpreted as an 'exercise piece'.[49]

This, however, also raises the question of which larger statue the exercise piece (**Figure 3.2**) was intended to model. Because of the location of Darius' statue in Susa, we are aware that this was one of a pair of statues, even though the other one has yet to be found. It has been claimed that the second statue is perhaps related to a fragment of a limestone face found at Susa, now in the Louvre museum.[50] The small sculpture could have served as the known mirror image of Darius's statue, since the statue of Darius was surely made in Egypt. As mentioned above, in contrast to areas such as Egypt or Mesopotamia, our knowledge about artists' practices in the Achaemenid period is sparse.[51] Accordingly, the Susa figurine is valuable, but further work is required.

A further example is a stone piece (**Figure 4**) discovered at Susa which bears hieroglyphic signs.[52] It has been suggested that the fragment belongs to the XXVII–XXXI Dynasty.[53] The text reads: '...limit/

[42] Schmidt 1957, 73–74; Qahéri 2020, 54–59.
[43] Schmidt 1957, 133, fn. 4; Qahéri 2020, 51, fn. 9.
[44] Curtis 1993, 8–10, Fig. 3; Boardman 2000, 130, fn. 21.
[45] On the small stone figurine also see Alizadeh 2016, 98; Qahéri and Razmjou 2020; Razmjou 2021.
[46] For the statue of Darius from Susa and its inscriptions see Yoyotte 1972, 253–266; Roaf 1974, 73–160; Stronach 1974, 61–72; Yoyotte 1974, 181–183; Vallat 1974a, 161–170; 1974b, 157–166; Razmjou 2002, 81–104; Wasmuth 2019; Qahéri 2020, 67–69.
[47] For the models in the workshops in the Near East see Reade 2001–2002; Gunter 1990, 13 and in Egypt see Edgar 1905; 1906, XI; Brunner-Traut 1979; Root 1979, 26; 1994, 25; Robins 1994; Russmann 2001, 250–251; 2010, 964.
[48] For models without guidelines, see Russmann 2001, 250; with guidelines and grid, see Russmann 2001, 154 and 157.
[49] See also Qahéri and Razmjou 2020, 209–210 and Razmjou 2021, 308.
[50] Razmjou 2002, 88. The material of this fragment is different from the stone of Darius' statue.
[51] See also Kantor 1957, 21.
[52] Also see Alizadeh 2016, 86.
[53] Qahéri 2020, 63, 52, fn. 20–22.

Figure 3: *1. The Statue of Darius; 2. Small stone figurine reminiscent of the Statue of Darius from Susa (both from Susa ©National Museum of Iran, photo: Z. Zehbari, not to scale).*

Figure 4: *A stone fragment from Susa with hieroglyphic writing (photo: Z. Zehbari ©National Museum of Iran).*

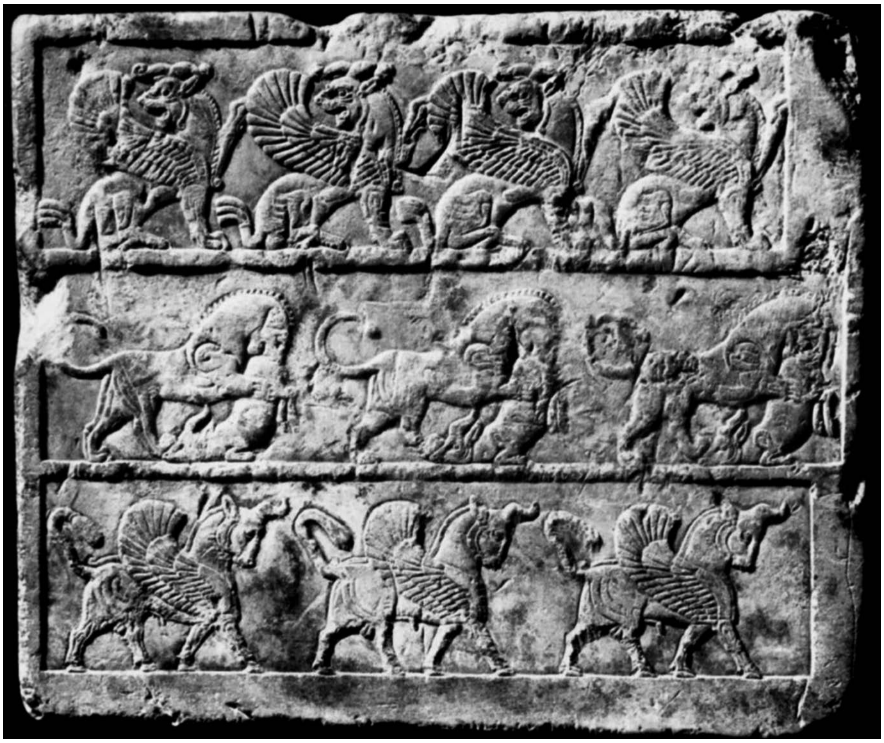

Figure 5: *An Achaemenid sample exercise for apprentices which was found in Egypt (after Frankfort 1950, Pl. III).*

boundary.... limits/ boundaries of (?)'.[54] Since the hieroglyphic signs make sense, but were carved imprecisely and with unusual spacing, might it also represent a trial piece?[55] Against this interpretation, it has been suggested that the piece forms part of a hieroglyphic inscription likely belonging to a stele or block.[56] If, however, we assume it as a trial piece, the piece could indicate that some stone-sculptor used the piece to practice hieroglyphic signs. It has been remarked that the piece is the work of an Egyptian scribe,[57] but seems more accurate to describe him as a craftsman. In any case, it seems to me that discussing the ethnicity of the carver is difficult because hieroglyphs could probably be carved by people without knowledge of the language as well: this is also true for cuneiform, which is simpler and where the signs are less complex. In other words, it is likely that the carvers were not necessarily scribes and sometimes were probably illiterate. For the same reason, it has been suggested that other non-Egyptian craftsmen engraved hieroglyphic inscriptions, including the Persian stoneworkers who may have carved the hieroglyphic inscription of Atyaouahy (Atiyawahy) at Wadi Hammamat.[58]

A more certain example of a practice piece is provided by a limestone plaque which contains an exercise pattern for apprentices (**Figure 5**). The animals on the left were carved by a master as patterns, while the images on the right were made by apprentice(s). It is obvious that the samples started from left to right because the images on the left are more skilfully executed, while those to their right are worked in a far less convincing way.[59] The plaque was discovered in Egypt, but the motif more closely resembles an

[54] Qahéri 2020, 63.
[55] Qahéri 2020, 63.
[56] Qahéri 2020, 63.
[57] Alizadeh 2016, 86.
[58] Goyon 1957, 28 and 118; Briant 1988, 168. However, the evidence cited for such a claim is not enough to propose 'Persian' stoneworkers.
[59] Frankfort 1950, 111.

6.1 **6.2**

Figure 6: *The tomb of Petosiris in the necropolis at Tuna el-Gebel: Egyptian metalworkers at work (1: after Cherpion* et al. *2007, 34; 2: after Cherpion* et al. *2007, 36; 38).*

Achaemenid and not an Egyptian style. Helene Kantor correctly compared the winged lion in the first row of the plaque with the winged lion in the Chicago collection and of the Oxus treasury.[60] The obvious conclusion to be drawn is that the plaque is likely Achaemenid, and may indicate that some workshops in Egypt created artworks in Achaemenid style.

Visual evidence for craftsmen at work in the Achaemenid period is rare. The only depiction of artisans at work with parallels from the Achaemenid period stems from Egypt. This unique document comes from the tomb of Petosiris at Tuna el-Gebel and dates to the 4th century BC.[61] Depicted on the walls of his tomb are scenes of workshops of Egyptian artists, who are making Achaemenid style artifacts: *phialai* (**Figure 6.1**) and *rhyta* (**Figure 6.1–2**). In addition, scenes depict apprentices producing the objects and presenting them to the master or chief as well (**Figure 6.2**). The reliefs are not only the clearest evidence for the manufacture of *phialai* and *rhyta*,[62] but this is also the most explicit document which presents the Egyptian metalworkers who produced typical and official Achaemenid metalwork. Moreover, the hieroglyphic inscriptions on the reliefs in the tomb of Petosiris speak of the skilfulness of the metalworkers at work.[63]

Two more objects may reflect the presence of Egyptians in the heartland of Persia. The first is the stele of Horus on the Crocodiles or *cippus*, with unclear find-spot (**Figure 7**).[64] *Cippi* were Egyptian stelae made to protect a person from creatures such as snakes, scorpions, and crocodiles, by means of the spells

[60] Kantor 1957, Pl. X.

[61] Lefebvre 1924, 35–36; Cherpion *et al.* 2007, 3.

[62] As it is assumed already in Colburn, 2014, 778; 2020, 219–220, and 256–257.

[63] Lefebvre 1924, 53: '*L'homme qui fait ce travail, il est unique dans son métier*.'

[64] Former researchers (Abdi 2002a; 2002b, 139) assumed Susa as the place of discovery of the stelae, but a recent study (Qahéri 2016, 2, fn. 7; 2020, 98) shows that a find-spot at Susa is uncertain and, therefore, it may have been found at either Susa or Persepolis.

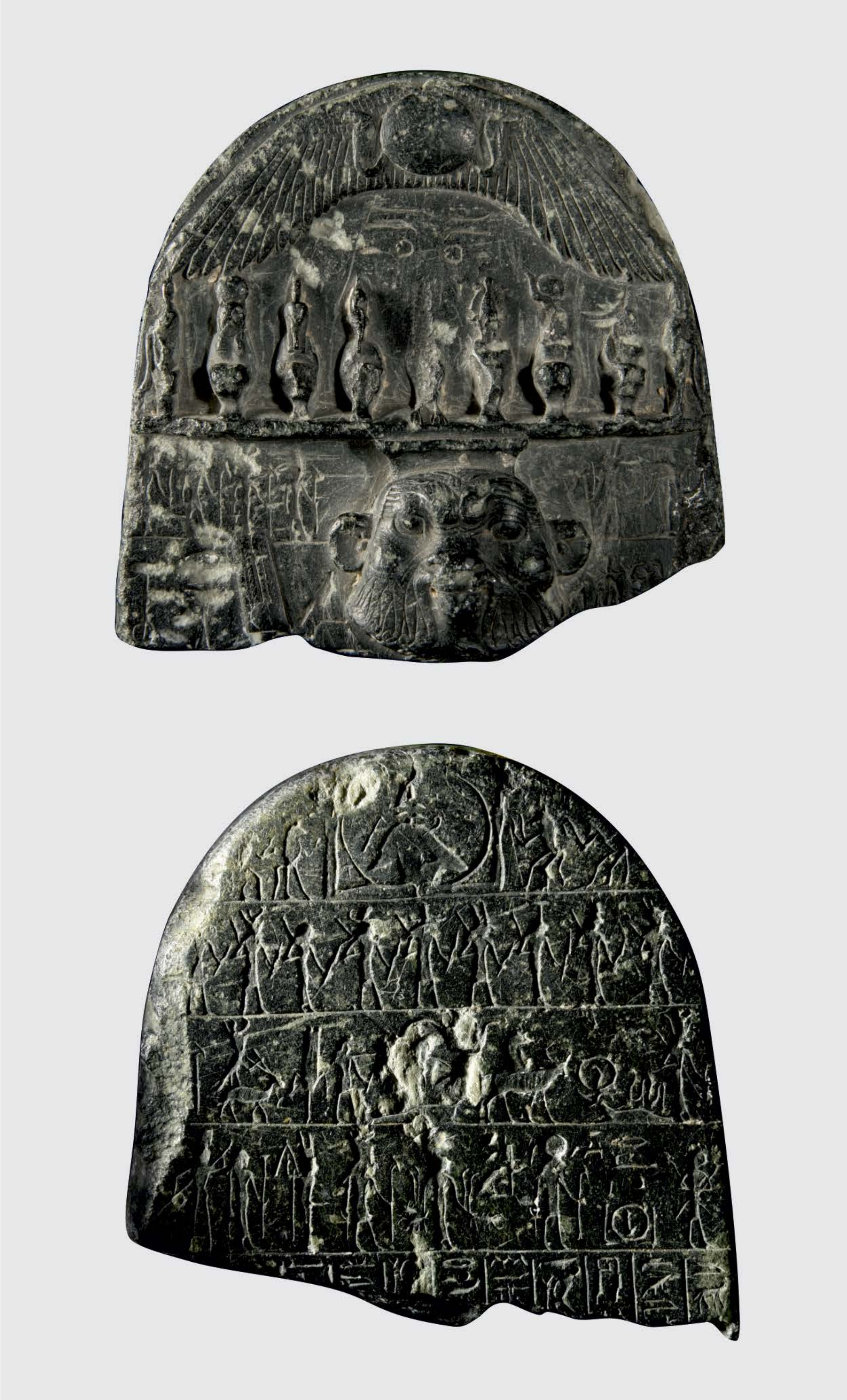

Figure 7: *The Egyptian cippus of Horus (Qahéri 2020, 96, B5.1, photo: Neda Tehrani, ©National Museum of Iran).*

and magical figures carved on them.[65] On stylistic and iconographic grounds, the *cippus* of Horus dates between the XXX Dynasty to the Ptolemaic dynasty.[66] If the *cippus* functioned as a religious item related to Horus, which was probably not used by Persian people in the Persian heartland, why was the *cippus* found in the heartland?

Abdi had argued that the stele be interpreted as a personal religious object which was taken by pious Egyptian craftsmen to protect them from dangers that might occur during their long journey.[67] However, more recent research shows that the steles of Horus on the Crocodiles had a healing function and would have been erected in a public location.[68] This perspective makes an interpretation as a private protective object less likely, and instead suggests rather its use as a public medical-magical medium. In addition, it has been suggested that the stele reflects Egyptian funeral practice in the heartland of the Persian empire.[69] The exact function of the *cippus* remains elusive.[70] In any case, the stele could indicate the long-term presence of Egyptians. As a public medical-magical medium, it could be highly pertinent to Egyptian physicians in Persia.[71]

Religious practices are also nicely exemplified by certain massive mirror handles that were discovered at Susa.[72] These handles were previously known as architectural elements or attached to ritual vessels. According to a new interpretation, they reveal, on the one hand, the existence of Egyptian religious practices in the Persian heartland, and attest, on the other, to the diversity of cults in the central zone of the Persian Empire.[73] From an Egyptian point of view, living and working for several years in a foreign land would not preclude customary religious practice, along with its related measures and objects. Conversely, Persians who lived in Egypt also followed their rituals there.[74] The artifacts such as *cippi* and mirrors may have been used by higher Egyptian classes living in Iran, and we are aware of thousands of Egyptian expatriates who served as artists there. Not only the Persepolis archives but also the classical sources make their presence clear. For example, Diodorus Siculus (I 46, 4) reports that Cambyses brought Egyptian craftsmen to Persepolis and Susa and throughout Media for constructing the famous palaces there.

These two recent cases are an emblematic output that can be categorized as ‘art *in* the Empire’, as opposed to ‘the art *of* the Empire’,[75] and as the art of local ethnicities based on their individual identities under Persian rule. Regarding the function of the items, it is not very likely that the *cippus* and mirrors were utilized by Persians. We should thus think about other users. Many other Egyptian artifacts (alabaster vessels, Bes head amulets, scarabs, and *wadjet*-eyes), have been discovered in Persia as well.[76] Their function needs to be discussed with caution, separating Egyptian objects from Iranian objects which exhibit Egyptianizing influences from Egyptian objects which display Iranian influences.[77]

65 Abdi 1999, 117–118, 2002a, 207; 2002b, 139; Razmjou 2005, 172.

66 This is the newest suggestion in Qahéri 2020, 98; earlier proposals had suggested a chronology between the XXVI–XXX Dynasties (*c.* 600–350 BC) (Abdi 2002a, 209).

67 Abdi 2002a, 210.

68 Hartwig 2014, 210.

69 Qahéri 2016, 2.

70 See Wasmuth 2017, 95.

71 Qahéri 2020, 75.

72 Curtis and Razmjou 2005, 96, Figs. 81–82; Amiet and Frank 2010, 355, Fig. 397.

73 Qahéri 2018, esp. 259.

74 Briant 1988, 169.

75 On the art *in*/*of* the Empire, see Colburn 2014.

76 For the examples see Abdi 1999; 2002a; 2002b; Qahéri 2012; 2013; 2016; 2017; 2018; 2020; Wasmuth 2017.

77 See Abdi 2002b.

Conclusions

Some of the textual and archaeological evidence surveyed in this paper allows us to clarify the participation of Egyptian artists in Persian art more confidently, such as the statue of Darius which was erected in the palace of Darius at Susa, the contents of the Persepolis Archives, the DSf inscription, mason marks and brick marks, and the visual material from the tomb of Petosiris. Although diverse Egyptian or Egyptian-style artifacts have been discovered in the Achaemenid capitals, it is still more difficult to identify the ethnicity of the makers of the artworks archaeologically than textually.

The available Persepolis texts indicate the role of Egyptian craftsmen who were involved with different artistic specializations in comparison with other ethnicities (**Table 1**). As can be seen, not much information about non-Persian artists is available in general. However, at least according to the available Persepolis tablets, it is also apparent that Egyptians were disproportionately active in the Persian centers. Egyptian artists were employed in different artistic specializations in the Persian heartland, as goldsmiths, woodworkers, wall decorators, stonecutters, painters, plasterers, and wood/stone-sculptors. It needs to be stressed that 'executing the most different specializations' does not necessarily mean 'the most important role in executing Achaemenid royal art', but it could be deduced that they were greatly influential in the performance of Achaemenid royal culture. Further study of the evidence presented here is certainly necessary. Taken together, this paper suggests that Egyptian craftsmen not only worked in the royal residences of Susa, as is already well known from DSf, but also at Persepolis and in the Borazjan area.

As discussed in this paper, the clearest indication of the participation of Egyptian artists in the imperial heartland is provided by textual documents. The receipt of high wages and recording of the names of Egyptian craftsmen calls attention to their reputation. The mobility of the Egyptian skilled craftsmen in the cities with palatial structures is well attested in the Persepolis tablets. Despite this fact, the situation of Egyptian craftsmen who lived in Persia is not so obvious. How they were chosen and came to Persia, the degree of mobility with their families, the quality of their life in Persia, and many other questions still remain unanswered.

Acknowledgments

The present paper formed part of my PhD project at the University of Tehran on 'A Study on the Specializations of the Non-Persian Artists in the Art of the Achaemenid Empire'. Special thanks go to the Broadening Horizons (BH6) organizing committee for providing the opportunity to present this material. In addition, I owe a debt of gratitude to Shahrokh Razmjou and Wouter Henkelman for reading and invaluable feedback and advice on the earlier draft of this paper and also to two anonymous reviewers for their comments. Any errors of fact or interpretation nevertheless lie solely with me.

Abbreviations

OP = Old Persian

AE = Achaemenid Elamite

PFA= The Fortification Archive

PTA= The Treasury Archive

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Session 2 — Integrating Sciences in Historical and Archaeological Research

Digital Prosopography of Babylonia: New Horizons[1]

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Abstract

The named individual is the basic unit of information in social historical research. The cuneiform corpus is exceptionally rich in person data. This paper reflects on the changing practices of person-data management in Assyriology and highlights both the challenges and opportunities that are offered by digital prosopography. It uses the Neo-Babylonian text corpus to illustrate the issues at hand.

Keywords

Digital Methods, Neo-Babylonian, Prosopography, Social History, Network Analysis

Names without faces

Social historians of the Near East have long been blessed with generous data on ancient persons contained in cuneiform texts.[2] In the course of three millennia of cuneiform script use, scribes recorded the names of hundreds of thousands of individuals engaging in all manners of transactions that required documentation — names female and male, names complete and broken, names common and unique, names indigenous and foreign... dazzling numbers of names without faces. The problem of scale is exacerbated by the challenge of identifying unique historical persons behind the names recorded in writing. Who were all these people? How can we securely identify individuals, given the high levels of homonymity occurring in every period, the variations in name orthography, the widespread and ill-understood practices of nick-naming and double-naming, and, above all, given the lapidary state of preservation and publication of the cuneiform text corpus?

Assyriology has grappled with these problems from its very early stages. It has developed tools to tackle the seemingly endless flow of people, to sort out who was who, and to provide scholars with a means of access to this data. New possibilities offered by the digital humanities now invite us to rethink some of these strategies and to complement and enrich them with new approaches that are not only more user-friendly but also allow to ask new questions of the cuneiform data. In this chapter, I will focus

1 This article was written in the context of the project Persia & Babylonia (P682241), financed by the European Research Council under the Horizon 2020 framework (Consolidator Grant). I wish to express my gratitude to the organisers of the Broadening Horizons conference in June 2019 for their kind invitation and to the anonymous reviewers for their valuable suggestions. Melanie Gross, Maarja Seire, and Bas van Stein commented on drafts of this article, for which I am most grateful. A special word of thanks is due to the NINO librarians in Leiden for their patience and support during the COVID-19 crisis.

2 On the ‘embarrassment of riches’ that the social historian of Mesopotamia is presented with, see Van De Mieroop 1999, 87–90.

on prosopography as this is the field of study most concerned with identifying the persons behind recorded names and describing their features (*prosōpon*) and relationships. I will use a particular period of Mesopotamian history to illustrate the issues at hand. The period between *c.* 620–480 BCE, also known as the 'long sixth century', is particularly well documented in Babylonia.[3] It was a time of major political, economic, cultural and social transformations, seeing the collapse of the Assyrian Empire, a short period of independence for the Babylonian Empire and the birth of the supersize empire of Cyrus, Darius the Great, and their successors.

Person data in cuneiform texts

The individual represents the smallest data unit of social history. For most periods of the distant past, the named individual is a rare entity found in scant documentation, but in the cuneiform world one is rather presented with an excess of data, often densely concentrated in particular places and times.[4] Estimates of the total number of individuals attested in the cuneiform corpus are not available to my knowledge. Figures relating to segments of the corpus are easier to calculate, albeit with large margins of error. *C.* 51,000 documentary texts from the long 6th century are known, which, at an average of eight individuals per text, record *c.* 400,000 individuals over a period of *c.* 140 years, or *c.* 3000 individuals on average per documented year.[5] Based on some well-studied archives, only about 15–25% of all attested individuals appear more than once, and a smaller percentage appears more than twice.[6] We are, in other words, confronted with a contradictory situation, where the volume of person data is dense but where the volume of data on the same person is limited.

Besides scale, the range of person data is notable. Those most powerful in society appear most often, but many non-elite groups come into purview as well, from slaves, corvee workers and deportees, to cattle breeders, tenants, and artisans. Importantly these people appear as actors and identifiable individuals, and not just as anonymous groups. Moreover, they are presented to us in a variety of life stages and with different gendered roles. This means that our analysis need not be limited to the adult male, but can take into account the adult female, the child, the married couple, widows and widowers, persons in old age, the disabled and ill, the unfree and semi-free.

An additional strength lies in the fact that, for most periods of Mesopotamian history, person data are exactly datable, so that the sequence of events in a person's lifespan can be reconstructed. This opens

[3] Jursa 2005 offers an overview of the available documentary texts, Foster 2007 of the literary texts and Da Riva 2008 of the royal inscriptions. All three categories of texts are subject to continuous study and further exploration. Enrique Jiménez (Munich) currently leads the Electronic Babylonian Literature Project aimed at digitising the corpus of Babylonian literary texts from the 1st millennium BCE (https://iaassyriology.com/in-the-spotlight-the-electronic-babylonian-literature-project/; Jiménez 2020, accessed 17/06/2020); the Munich centre for digital Assyriology is developing an online corpus of the Neo-Babylonian royal inscriptions (RINBE; Novotny and Radner 2018, 145–146); and the archival and administrative texts are the subject both of the NaBuCCo project led by Kathleen Abraham, Michael Jursa, and Shai Gordin (https://nabucco.arts.kuleuven.be/; Abraham *et al.* 2015–2021, accessed 17/06/2020) and of Achemenet for Persian-period cuneiform tablets from Babylonia (http://www.achemenet.com/en/tree/?/textual-sources; Agut-Labordère *et al.* 2017–2021, accessed 05/02/2021).

[4] Van De Mieroop 1999, 87.

[5] See for the estimate of the size of the corpus Waerzeggers 2018, 94; the figure for the average number of individuals mentioned per text is based on a sample from Prosobab, where 1,770 texts yielded 14,300 unique individuals (https://prosobab.leidenuniv.nl; Waerzeggers *et al.* 2019, accessed 23/06/2020). The texts from which this sample is taken are mostly legal contracts. Administrative texts vary a lot as to the number of persons mentioned, some texts containing long lists of persons while others mentioning only one or two.

[6] In the Marduk-rēmanni archive from Sippar, only 18 persons out of 919 occur five times or more. In the archive of Bēl-rēmanni, a near-homonymous contemporary, we find almost double the amount of regular contacts (19 persons out of 447); see Waerzeggers 2014, 10–12.

the door for collective biographical research, as social groups can easily be delineated and variables and constants in their life courses picked out.

Managing person data in Assyriology

The need to organise and manage person data from cuneiform texts was felt early on in the history of the field of Assyriology. From the early 20th century onwards, a number of formats were developed in answer to this need. Often, inspiration for these formats came from adjacent fields, mostly *Altertumswissenschaften*. Based on the type of person data, one can distinguish between at least five types of studies:[7] (a) those concerned with names and name-giving, (b) those concerned with identifying individuals, (c) those concerned with describing lives, (d) those concerned with reconstructing families, and (e) those concerned with studying social or professional groups of individuals. These initiatives are usually known under the following titles or labels. (a) The 'name book' or 'onomasticon' lists all attested names in a corpus and discusses their onomastic features, such as name etymologies, meanings, and spellings of names. (b) The 'person index' makes the crucial step from name to individual; it deals with the unique historical individuals behind the names recorded in a corpus. (c) The 'who is who', or biographical lexicon, adds more detail and describes the lives of individuals—mostly members of the elite—with regard to their date of birth, marriage and death, education and genealogies, careers and major life events. (d) The 'genealogy' is the study of pedigrees. (e) The 'prosopography' pursues a collective study of the lives of a group of actors.

All these types of study are closely related. In Assyriology, name books usually combine onomastic and biographical information, while prosopographies are seldom concerned with explaining social change through group processes; rather, they take the form of structured lists of persons attested in a particular cuneiform corpus, often featuring genealogies of the most prominent families. In a brief overview of the major publications of person data from 1st millennium BCE cuneiform texts, I will illustrate this flexibility of formats in Assyriological practice.

The *Neubabylonisches Namenbuch* (NNB) by Knut Tallqvist, published in 1905, is an early attempt to collect all named individuals from this particular period in a single volume.[8] Despite its title, the NNB was more than a name book, as it makes the crucial step of identifying discrete historical persons behind the name material. It also attempts to be a complete directory of all attested individuals. The volume can therefore be considered an index of the Neo-Babylonian text corpus (as known at the time). For instance, the entry for Iddin-Marduk, son of Iqīšāya (rendered in the now-outdated form 'Iqîša-aplu') of the Nūr-Sîn family, lists 63 attestations for this individual. While modern-day scholarship, especially the work of Cornelia Wunsch, added many new attestations to this list, Tallqvist's identification of the unique historical person behind the name recordings was for the most part correct.[9] It supplied researchers with a convenient starting point towards this man's records and, from there, to a possible reconstruction of his biography. A follow-up search of Iqîša-aplu in NNB yielded five possible sons of

[7] Verboven *et al.* 2007.

[8] Similar projects on other cuneiform corpora were undertaken around that same time, e.g. Ranke 1905 (Old Babylonian), Huber 1907 (early Old Babylonian), Clay 1912 (Kassite). Tallqvist (1914) went on to produce a name book also for the Neo-Assyrian text corpus. The volumes on the Old Assyrian trade colony in 'Cappadocia' by Stephens 1928 and the one on Nuzi personal names by Gelb *et al.* 1943 stand in this same tradition. Recent successors include Hess 1993 (Amarna), Hölscher 1996 (Nippur), Pruzsinszky 2003 (Emar), Nielsen 2015 (Early Neo-Babylonian), Balke 2017 (Pre-Sargonic). Many of these publications combine an onomastic study of the name material with a prosopographical lexicon of the attested persons. Some of the non-indigenous name materials in cuneiform texts have been assembled in dedicated volumes, e.g. Zadok 1977 on West Semites attested in the Assyrian and Babylonian text corpora of the 1st millennium BCE.

[9] Wunsch 1993.

this person. In this way, NNB makes a step towards genealogy. It was left to the user, however, to decide whether all five persons were sons of the same historical Iqîša-aplu or of different ones.

The Prosopography of the Neo-Assyrian Empire is heir to the tradition of Tallqvist but more ambitious in scope by adding a third type of person data to each entry.[10] Besides the onomastic analysis of names and the disambiguation of unique historical individuals behind homonyms, the PNA includes biographical data on each recorded person. In the words of its first editor-in-charge, Karen Radner, the PNA is both a 'Who Was Who in the Neo-Assyrian Empire (...) and a name book in the conventional sense'.[11] Depending on the quality and number of available sources, the biographical entries offer information on the person's offices, where and when (s)he was active, which transactions (s)he participated in and in which capacity. The PNA's primary goal is to serve as a tool for further research;[12] it does not aim to answer any particular questions about the Neo-Assyrian Empire, its society, institutions or economy. In view of the scale of the project, the PNA was a committee venture that benefited from the long-term financial commitment of Helsinki University, the dedication of an editorial team, and the support of linguistic consultants, cooperating institutions and dozens of contributing scholars, who wrote up the biographical narratives. A similar, but much smaller, project is Julien Monerie's prosopographical dictionary of Greeks attested in cuneiform texts.[13] Like the PNA, it offers narrative articles on each recorded individual, but with only *c.* 250 entries (as compared to PNA's 'close to thirty thousand') the work was manageable for a single researcher.[14]

Whereas for the PNA the biographical index 'is' the goal of the project, other prosopographies are produced as a step towards a socio-economic study of a particular field or milieu. This is the fundamental contrast between the PNA and, for instance, the studies by Mariano San Nicolò, Hans Martin Kümmel, and Herman Bongenaar, who investigated how temple institutions recruited their personnel by collecting data on all recorded office-holders and professional groups.[15] Despite making an important contribution to the history of Neo-Babylonian institutions in this way, Bongenaar stresses that his work serves first and foremost an auxiliary function: 'The present prosopographical study will hopefully facilitate the investigation of [...] issues which are fundamental to our understanding of Neo-Babylonian society and economy'.[16] Similar motivations are quite often expressed by prosopographers in Assyriology.[17] San Nicolò too saw the value of his 'mechanical labour' primarily in its service to the field, in this case by aiding the study of epistolography.[18] His conclusions about long-term trends in temple bureaucracy were literally presented as an after-thought to the catalogue.

History of prosopography

It would take us too far to review the history of prosopography here, especially since excellent and detailed overviews are available, but some historical background is necessary in order to contextualise both the Assyriological traditions of prosopography and the 'new' prosopography that the digital age brings about.[19]

[10] Radner 1998 (A); Radner 1999 (B–G); Baker 2000 (Ḫ–K); Baker 2001 (L–N); Baker 2002 (P–Ṣ); Baker 2011 (Š–Z).
[11] Radner 1998, xi.
[12] Radner 1998, xi.
[13] Monerie 2014.
[14] The estimate of the PNA is given in Radner 1998, xii.
[15] San Nicolò 1941; Kümmel 1979; Bongenaar 1997.
[16] Bongenaar 1997, 5.
[17] E.g. Mayer 1978, 8 (Nuzi prosopography).
[18] San Nicolò 1941, 11.
[19] A useful recent history of prosopography is offered by Delpu 2015; see also Charle 2001; Verboven *et al.* 2007; Eck 2010.

The hybrid nature of prosopography needs to be stressed from the outset. For the Assyriologist, as we have seen, the prosopography is part of the field's research infrastructure; it catalogues the individuals who populate cuneiform texts and mostly serves students as a tool for text interpretation and contextualization. For modern and contemporary historians, however, it is much more than a catalogue and a tool: it is a 'broad programme of research',[20] a 'style of historical research',[21] close to a methodology.[22] This programme is not concerned with the individuals *per se*, but with the information that can be pooled from them collectively in order to explain historical change.[23]

In practice, then, prosopography combines two types of research activity. At base level, it is about identifying and describing the historical actors in a structural and consistent way.[24] In the words of Paul Magdalino, prosopography 'literally reduces history to atoms, for a *prosōpon* is an *atomon*, the indivisible unit of human experience'.[25] At an advanced level, it is about analysing the common and divergent characteristics of many individuals together. The catalogue of persons is, in the latter type of prosopography, not the end-product but the means.[26]

The earliest prosopographies, developed in ancient history since the 19th century, were confined to the first level. Theodor Mommsen proposed the first large-scale prosopographic project to the Berlin Academy of Sciences in 1874.[27] The Prosopographia Imperii Romani (PIR) had the aim of collecting all persons of note in the Roman Empire and to compile lists of the offices they held.[28] While this type of catalogue project did not always invite the respect of subsequent generations of (mostly non-ancient) historians,[29] Mommsen's initiative did spring from the desire to improve historical method by moving away from legal-historical and philological approaches that had dominated the study of Rome's institutional history.[30]

Assyriology stands in this earliest tradition of prosopography, as do other fields where the historical record is sparse and scattered, such as Egyptology, Medieval, and Byzantine studies.[31] In these fields, the prosopography continued as an auxiliary discipline into the second half of the 20th century, when major prosopographical resources saw the light of day, and into the present, when some of these initiatives have transitioned onto to the World Wide Web (see below).

[20] Eck 2010, 148.
[21] Lemercier and Picard 2012, 605.
[22] There is an ongoing discussion among prosopographers about the status of prosopography. Keats-Rohan (2000, 4) asks 'Is it a technique or a methodology?' Maurin 1982, 824 describes it as a 'new approach to reality'. A recent reflection on this debate is offered by Lemercier and Picard 2012.
[23] Smythe 2008.
[24] There are divergent views on which actors should be included in a data set. If the source base is (relatively) small and fragmented, prosopographers usually aim at total coverage. In modern and contemporary history, the data set needs demarcation because of the large number of sources available. Whether single attestations, unproductive in a relational sense, should be included is also contested, see on this issue Mandouze 1982, 7; Mathisen 2007.
[25] Magdalino 2003, 46.
[26] Bulst 1989, 14.
[27] Eck 2003.
[28] Klebs *et al.* 1897–1898.
[29] Lawrence Stone (1971, 49) ridiculed the obsessive psychology of prosopographers. See also Pelteret 2000, 13 on prosopography's 'bad name'.
[30] Verboven *et al.* 2007, 42.
[31] A recent overview of Egyptological prosopographies is offered by Birk 2020, 3–6; for Byzantine studies, see the contributions collected by Cameron 2003; in Medieval history, the journal *Medieval Prosopography* offers studies in various strands of prosopography.

Since the early 20th century prosopography simultaneously developed in a new direction. Its aggregate nature allowed historians 'to get behind a Cato, an Augustus, to their factions and supporters'.[32] From the collective biographies of many individuals, it was possible to tease out the structures of government, the pathways into the system, the changes over time, etc.[33] Historians of the modern period picked up this trend, at first for studying political elites, but then also for investigating those persons less prominently represented in historical sources. Non-elite prosopography became popular in the 1970s, as it fitted on-trend research agendas inspired by statistical and social-scientific methods. By considering the individual within the totality of the field, it offered historians a way to balance individualist and structuralist approaches to history.[34]

As far as I am aware, after Marc Van De Mieroop's brief illustration of mass prosopography of the Ur III state, only Jonathan Tenney has applied it to Mesopotamian social history, in his statistical study of Babylonian worker populations.[35] The full potential of this research method is yet to be explored in ancient Near Eastern history.

Recently, prosopography has experienced a second youth. Its popularity is visible in the large number of projects across the historical profession that identify themselves as prosopographies.[36] According to Lemercier and Picard, this renewed interest is fed by a number of intersecting developments.[37] First, as a method of quantitative research, prosopography benefits from the turn to big data in the Humanities. Relatedly, there is a renewed interest in the structural constraints of the individual within the social field, an interest driven by the popularity of network theory in history. Prosopography and social network analysis are well-matched companions: prosopography, by correlating texts and persons, yields the incidence matrices that are used for reconstructing the nodes and edges of historical networks. Connections have been at the forefront of the 'new' prosopography since the 1990s.[38] Third and foremost, digital methods increase the usefulness of the prosopographical lexicon or index far beyond the conventional lists of persons contained in paper editions.

The limitations of paper formats are well-known. First, while paper volumes present a stable reflection of the state of a field at a certain time, it is hard to keep them up to date. Addenda are inevitable but soon become cumbersome. This shortcoming plagued prosopographical projects from the very start. No sooner had Theodor Mommsen's dream of a Prosopographia Imperii Romani been realised in 1898 than a new series had to be started to include all new advances in epigraphy; the new PIR took ninety years to complete.[39] A second limitation of paper editions is that they provide no other search options to the user than those set by the editors: in most cases, that is an alphabetical listing of persons. All meaningful connections between texts and individuals are lost, or at least difficult to find. The PNA project published one index volume, so far, allowing users to find entries of professional titles;[40] many

32 Barnish 1994, 174.

33 Cameron 2001, 25.

34 Stone 1987, 46.

35 Van De Mieroop 1999, 87–90; Tenney 2011.

36 A few examples from many: Trismegistos People (Tm; Egypt 800 BC–AD 800); People of Medieval Scotland (PoMS); Prosopography of the Byzantine World (PBW); Prosopography of Anglo-Saxon England (PASE); China Biographical Database (CBDB); Syriac Biographical Dictionary (SBD); People of Northern England Database 1216–1286 (PONE); Clergy of the Church of England Database (CCED); Repertorium Academicum Germanicum (RAG); Prosopographie des chantres de la Renaissance (CESR-CHANTRES); Prosopographie der mittelbyzantinischen Zeit (PMBZ).

37 Lemercier and Picard 2012.

38 See Smythe 2008, 177 on the 'new' prosopography. A representative definition of this kind of prosopography is offered by Pelteret 2000, 13: 'the study of identifiable persons and their connections with others for the purpose of enabling the modern student to discern patterns of relationships'.

39 On the history of this project and the new prospects created by the digital age, see the contributions in Eck and Heil 2018.

40 Baker 2017.

other searches, such as for geographical and chronological information, social roles of actors, name elements, etc. are impossible to perform unless by browsing manually through thousands of entries.

Digital prosopography

Digital formats offer solutions to both limitations. On an online server additions and updates are easy, cheap and safe to implement, and queries can be customised according to the research interests of the user. It has long been agreed that a good structural model for storing person data digitally is the relational database,[41] and most digital prosopographies use a SQL based platform (e.g. MySQL or SQLite). Alternative technologies such as XML and other NoSQL databases, which offer more flexibility than the schema-based relational model, hold promise for prosopography as well.[42] Several high-profile projects transitioned in the course of the past decades from paper, to CD-ROM, to a web application. Flexible formats invite users to query data in new ways and to ask new questions, pushing entire fields of study into new directions. This is seen clearly in the case of the Prosopography of the Byzantine Empire (PBE), which provided users multiple ways to access indexed data on a CD-ROM, an improvement over the earlier Prosopography of the Later Roman Empire (PLRE) from which this initiative sprang. Its online successor Prosopography of the Byzantine World (PBW) offers users direct access to the relational database, greatly enhancing query control. It also abandoned the narrative article in favor of a list of 'factoids', or assertions that are made about the individuals in the historical records.[43] The factoid model, developed at King's College London, is particularly well-suited for person data collected from many different types of narrative texts.[44]

New horizons

Prosopography still serves a predominantly auxiliary function in cuneiform studies, as explained above. Despite a century and a half of effort, the majority of cuneiform texts are still unpublished or only partially published. In this 'open corpus field', new documents are brought to light continuously through excavation or museum exploration.[45] Given these unique conditions, prosopography will, before it can serve the social historian of Mesopotamia, remain a tool in the hands of the epigraphist who uses it in order to sort out documents, to reconstruct archives, to date undated texts, and to restore broken passages.[46] The back-and-forth process between what is known and what can be added or changed through new texts demands a flexible environment, where adaptations, revisions and updates are easily implemented. Prosopography has long proven its worth as a handmaiden of epigraphy in Classical studies,[47] and the same can be expected for cuneiform epigraphy. In recent years, digital prosopography of the Classical world has boomed to the extent that multiple digital records of the same historical

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41 Keats-Rohan 2000: 'a marriage made in heaven'; see also Mathisen 2007, who looks back on the use of searchable computer databases for prosopographical research since the 1960s.

42 In recent years, interest in XML databases for prosopography is growing — especially in projects where text editions and biographical research are combined; an example is the Digital Mitford project (https://digitalmitford.org/; Beshero-Bondar 2014–2021, accessed 18/06/2020).

43 See Bradley and Short 2005, 5–8 on the trajectory of the Prosopography of the Later Roman Empire (PLRE), to the Prosopography of the Byzantine Empire (PBE) and the Prosopography of the Byzantine World (PBW), and its impact on the research community using these tools.

44 Pasin and Bradley 2015.

45 Richardson 2014, 68.

46 Popova 2015.

47 Karila-Cohen 2016, 874.

individual now require linking across databases.[48] In Assyriology, the creation of online entities for the inhabitants of Mesopotamia is only just beginning.

Berkeley Prosopographical Services (BPS) was set up in 2009 to develop 'a complete package' and 'interactive tool-kit' for analyzing prosopographic datasets.[49] The project caters to all Humanities disciplines, but uses a corpus from Hellenistic Babylonia as its testing ground.[50] BPS offers a flexible workspace for researchers to play around with datasets in customised ways. A distinctive feature of BPS is its disambiguation engine, which allows historians to short-cut much of the manual and mental labour of identifying unique persons behind the name entities in a corpus. The engine uses configurable heuristic rules, allowing researchers to make their own assertions about the identity of named entities. For instance, in case of homonymous individuals, the researcher can agree or disagree with disambiguations proposed by the probabilistic tool or by his or her peers. In this way, users build their own environment where they can challenge existing ideas or follow up on what-if scenarios. So far, BPS has offered a vision of collaborative research in the Digital Humanities through re-usable services, but the tool-kit has yet to be show-cased and implemented. The HBTIN corpus is under construction and includes an index of names, but no prosopographic dataset yet.

Prosobab is an open-source, web-based initiative at Leiden University that offers a prosopography of recorded inhabitants of Babylonia, in the period when southern Mesopotamia was governed by the Babylonian and Persian empires respectively (*c.* 620–330 BCE).[51] Whereas BPS builds datasets from TEI/XML text files, the main input of Prosobab is plain text handled via webforms and stored in a structured relational database (MySQL). The data can be extracted in CSV, Excel and JSON format and processed easily afterwards. A feature of Prosobab is that the distinction between evidentiary and conclusional data is always maintained. A name attestation in a source text belongs to the realm of facts ('evidentiary'), whereas the identification of a person belongs to the realm of interpretation by the researcher, who decides, through an intellectual process ('conclusional'), whether to collapse multiple attestations of the same name into one person or to split them into several persons.

The disambiguation process can no doubt be (semi-)automated, but the text corpus underlying Prosobab does not make the development of such a tool worthwhile. First, persons are mostly mentioned by name, patronymic, and family name—three-tiered onomastic strings that usually yield unique combinations. Second, in case of two-tiered name chains (name, patronymic), most instances of homonymy can easily be resolved by investigating the close-knit social networks from which most archival texts spring. Problems do arise when one person is attested with different names (e.g. a short name, nickname, or second name) and when in certain types of texts, such as letters, long chains of filiation are avoided as a matter of convention. In such cases, an automated tool could offer help.

The database reflects the distinction between evidentiary and conclusional in its structure (**Figure 1**). It identifies three items of interest: the 'tablet', the 'attestation', and the 'individual'. The Tablet table collects information on the cuneiform text recording the person entity, such as place of writing, date, publication, document type, objects mentioned, etc. The Attestation table collects information attributed by the source text to the named entity, such as her or his title, role in the transaction, the spelling of the name, the documented relationships, etc. The Individual table contains conclusional data: the editor decides which attestations of the same name refer to the same individual. For each

[48] The SNAP (Standards for Networking Ancient Prosopographies) project aims to address this problem through Linked Open Data methods, see Bodard *et al.* 2017.

[49] See http://berkeleyprosopography.org/ (accessed 18/06/2020); Pearce and Schmitz 2014; Schmitz and Pearce 2013.

[50] The HBTIN (Hellenistic Babylonia: Texts, Images and Names) corpus is developed as part of Oracc (Open Richly Annotated Cuneiform Corpus) by Laurie E. Pearce (http://oracc.museum.upenn.edu/hbtin/; Pearce *et al.* 2009, accessed 18/06/2020).

[51] Waerzeggers *et al.* 2019; https://prosobab.leidenuniv.nl/ (accessed 18/06/2020).

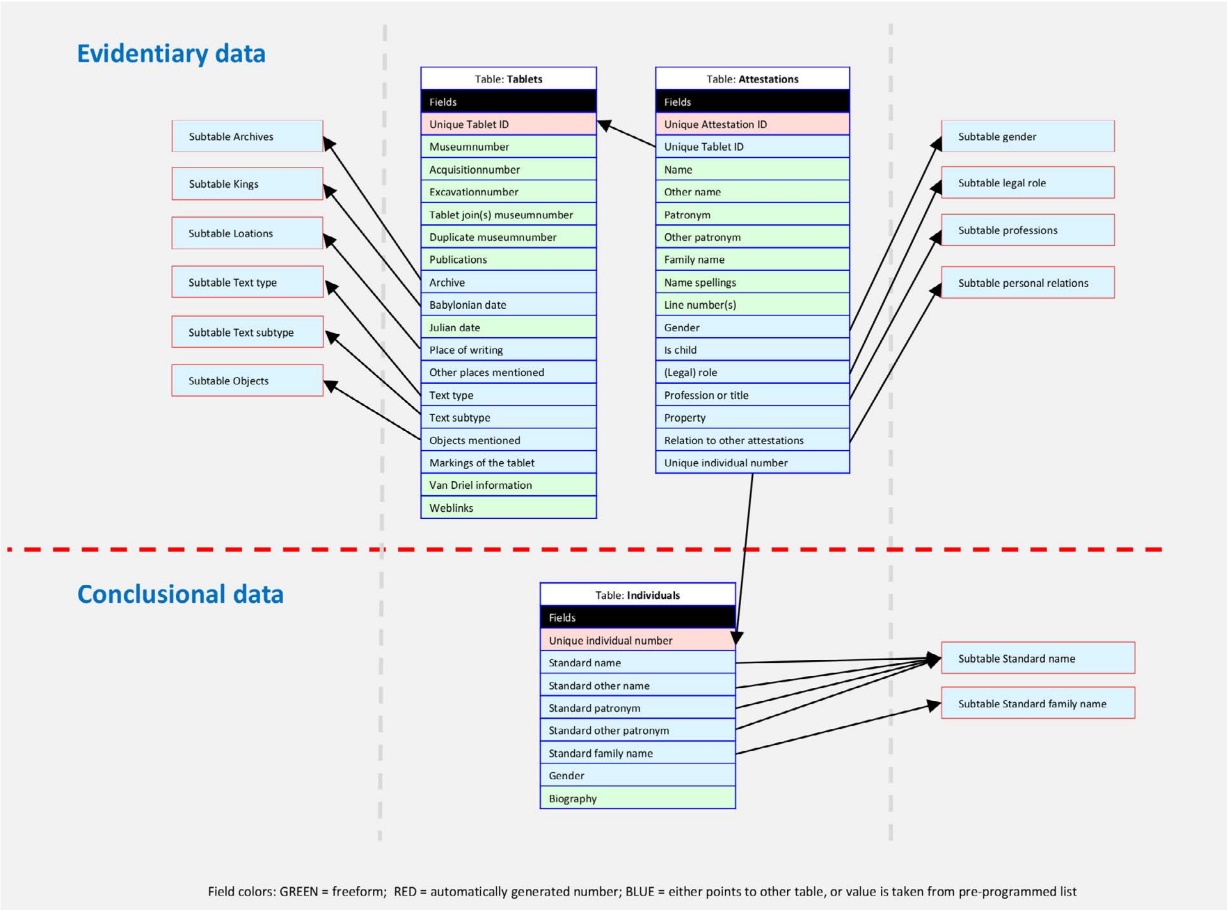

Figure 1: *Prosobab structure (courtesy M.M. Gross and G. Suurmeijer).*

attribution, radio buttons signal three levels of certainty in the editorial decision process. The table takes the form of an 'ID card', showing a standardised name, basic information allowing a location of the individual in time, place, and society, and a list of all attested transactions. Users who do not wish to follow the authorial decisions by the Prosobab team can disregard the ID cards and work only from the Attestations Table, which reflects the structured data contained in the cuneiform texts as closely as possible.

Prosobab allows users control over how they query data by combining any number of fields in customised searches. For instance, users can look for all sales that were transacted in a particular year or on a specific day of the calendar. Or they can look for women who acted as creditors to their husbands, or for slaves working as artisans. Moreover, a browse function offers an extra path of entry for users who are not familiar with the Babylonian name repertoire. Besides flexible searches, Prosobab allows users to export all data in any preferred digital format, such as XML or Excel, and to store the files on their local systems. This is especially useful for those who want to study and visualise networks from Prosobab data. At the moment, the web interface does not feature built-in SNA and visualization tools, but by extracting data to an Excel spreadsheet and using open-source software like Gephi, it is fairly easy to study and display networks. Maarja Seire wrote a tutorial to assist users in this process (**Figure 2**).[52]

[52] Seire 2020.

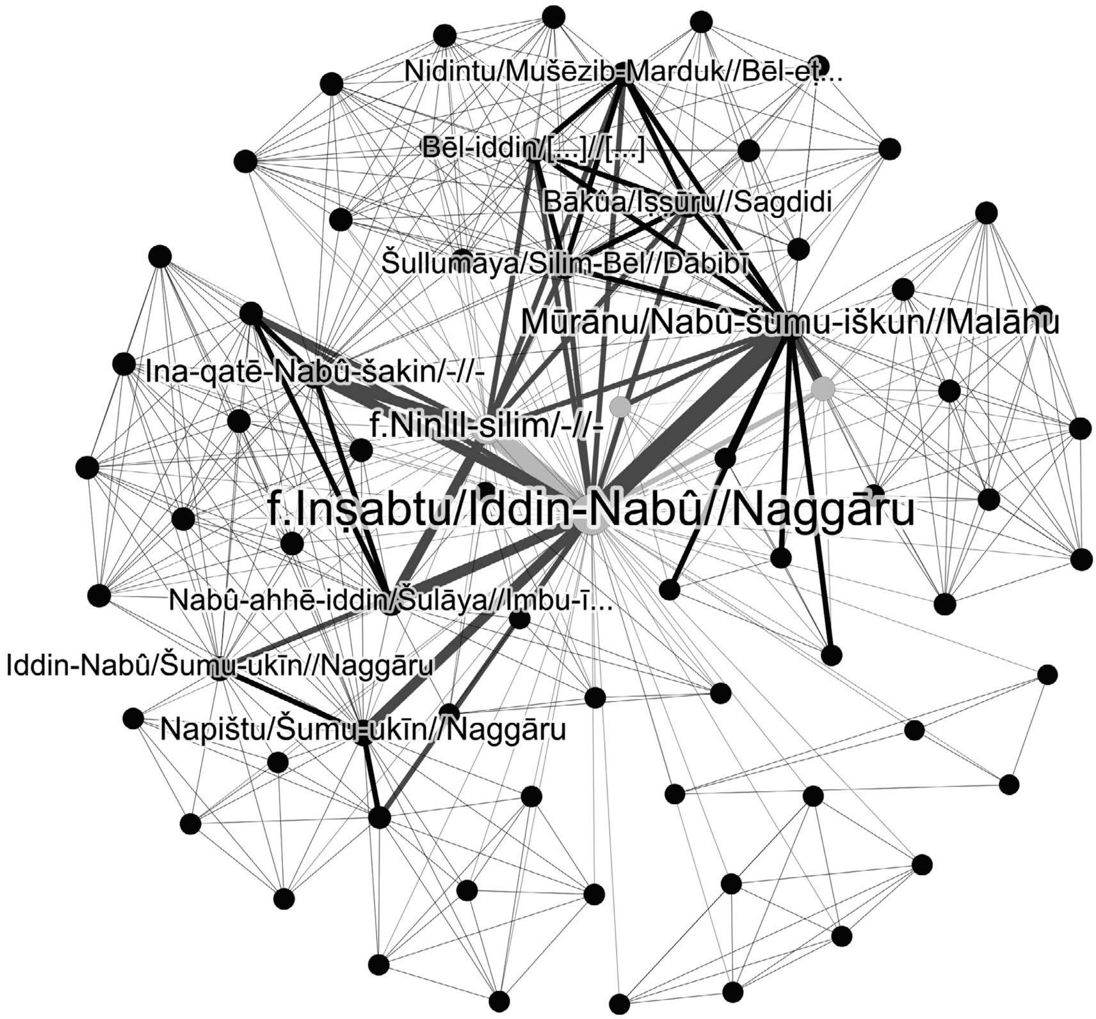

Figure 2: *The social network of the woman Inṣabtu, based on data from Prosobab, drawn with Gephi (courtesy M. Seire).*

A weakness of Prosobab is that it divorces the person data from the text. In a digital environment, one would ideally want to consult the text and the person data together, whether by tagging texts with biographical markup, or by including text editions in the relational database. Prosobab harvests person data manually without also digitising the texts. This choice is based on a number of pragmatic considerations, not in the least limits of time and labour. Moreover, several text corpus initiatives have been established or are well underway (CDLI, Oracc, NaBuCCo, Achemenet). Prosobab includes weblinks whenever such digital corpora are available, but an integrated display of the text would certainly be welcome. Linking person data to digitalised source texts will be facilitated by the stable identifiers for attestations and persons that Prosobab generates in the form of URI's; in this way, Prosobab can serve as an external authority list for TEI initiatives.

Challenges

While online prosopography offers benefits, sustainability is a major concern in the face of advancing technologies.[53] Alongside the development of online tools, more reflection on the pitfalls of statistical analysis and the gaps and structural deficiencies of the cuneiform text corpus is required.[54] The 'labour-intensity' of prosopography — whether on paper or online — poses a well-known challenge that forces researchers to limit the scope of the study or to set up large collaborations.[55] In the case of BPS, the dataset is yet to be developed from HBTIN. Prosobab releases new data intermittently, but it is far removed from full coverage; indeed, given the open-ended nature of the text corpus, full coverage is impossible. Both HBTIN and Prosobab are set to profit from linking up to other initiatives, such as a yet-to-be-developed online version of PNA or of the Early Neo-Babylonian personal name book by Nielsen.[56] There are also possibilities outside of Assyriology. Trismegistos holds data on more than 350,000 individuals from Egypt, many of whom are contemporaries to the individuals contained in Prosobab.[57] Such synchronicities are lost due to the silo effect of separate databases. Visions of large-scale linked data require resources rarely seen in our field. Most digital initiatives are project-based and face the challenge of securing funding after the project's lifespan. Crowdsourcing seems less feasible for such an arcane field as cuneiform studies, but it is perhaps not unrealistic.[58]

On a more positive note, the online publication of research data already presents a massive improvement from the time when researchers produced their own research databases, put them on CD-ROMs or USB-sticks, and rarely shared them with anybody else. Today's practices of sharing and re-using data will hopefully create a more inclusive and sociable field.

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53 Burdick *et al.* 2012.
54 Stone 1971, 58; Carney 1973; Eck 1993, 395–396.
55 E.g. Monerie 2014 and the PNA project, respectively.
56 Nielsen 2015.
57 Depauw and Gheldof 2014.
58 On the vulnerability of prosopographic databases, see Mathisen 2007.

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‘Green Frog in the Water’. A Herpetological Approach to the Magico-Medical Use of Frogs and Frog-Amulets in Mesopotamia

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Abstract

The frogs inhabiting the rivers and marshes of Mesopotamia were a common part of the fauna between the Euphrates and Tigris rivers. Figurative amulets and parts of the animal were used to heal, and frogs served as a substitute animal. In a variety of early societies frogs were regarded as symbols of fertility, rebirth, healing, and transformation due to their metamorphosis and their ability to live in water and on land. Additionally, frogs’ link to water and rain often lead to associations with cleansing. This paper cross-references the textual evidence, collected, and commented on by A. Bácskay, with herpetological insights into the medical use of frogs and toads. Using the descriptions given in Bácskay 2018, four anuran species were identified to have been present in the Mesopotamian marshlands that could have been used as medicinal treatment and as substitute animals. We provide a short summary on their habitat and give insights into their ecology and possible medical value. Together with the presentation of figurative frog amulets from Mesopotamia, dating from the 3rd to 1st millennium BCE, including their materials and archaeological contexts, the authors give a comprehensive overview of the magico-religious perception of frogs in Mesopotamia.

Keywords

Amulet, Frogs, Toads, Medicine, Mesopotamia

Introduction

Frogs, inhabiting the rivers and marshes of Mesopotamia, were a commonly known part of the fauna between the Euphrates and Tigris rivers.[1] Therefore, it is not surprising, that frogs and toads are

* The following contribution presents the results of the collaboration of the authors integrating aspects of their respective work and is published here under equal authorship.

1 Van Buren 1936–1937, 35–37.

depicted early on in Mesopotamian history and found their way into the mythology of the region. Due to their bridging between the aquatic and terrestrial life, frogs were considered as special animals. The metamorphosis from an aquatic, gill breathing tadpole without limbs to a fully developed, lung breathing, terrestrial, four-legged frog has always fascinated humans. Another aspect of their ecological life is their sudden appearance after rains. This 'rebirth' after long dry periods may have led to their mystical associations. Additionally, they regularly shed their skin. The skin on their back splits and is removed by the individual with striking movements of their hind feet. A fresh layer appears underneath the old skin layer and is often eaten. As several scholars have previously stated, these processes likely led to the association of amphibians with birth, rebirth, and immortality.[2]

In the Ancient Near East, frogs are associated with Enki/Ea, god of wisdom, and his underwater realm Apsû.[3] The connection to Enki is also shown in namburbi rituals mentioning frogs.[4] In proverbs and mythology, as in the myth Dumuzi's Dream, frogs and toads are mentioned as part of the fauna and are generally represented positively.[5]

In Ancient Egypt, frogs were associated with the frog-headed goddess of childbirth, Heqet. Frogs were assumed to generate spontaneously out of mud and therefore became a natural symbol for fertility.[6] Women who wished to become pregnant wore frog-shaped amulets and used Heqet amulets during childbirth.[7] Frogs were a powerful symbol of regeneration, rebirth, or resurrection.[8]

As in Ancient Egypt, frog-shaped pendants are well known in Mesopotamia.[9] In this paper we investigate the medical and magico-religious significance of frog-shaped pendants and if they can be acknowledged as amulets. An amulet is an object considered to have magical properties which is fastened by suspension on a person's body or hung in the surrounding area, where it serves as an *apotropaion* or is thought to enforce certain propensities (e.g., good health, good fortune, or fertility).[10] When we talk about amulets in the Near East, we need to identify the correct terminology. In Akkadian and Sumerian, for instance, several terms are used, of which none can specifically be translated as a generic term for 'amulet'.[11] However, numerous descriptions of stones and organic material,[12] amulet tablets and figurative pendants are attested, which served a medical or magico-religious purpose and were worn around the

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2 Crump and Fenolio 2015, 85; Andrews 1994, 63.

3 In the myth of 'Inanna and Enki', a talking frog sits by the bolt of the temple door and Enki takes him by the right foot and sends him after Inanna, who had taken the ME from him while he was drunk (Black *et al.* 1998–2006, c.1.3.1 Segment G, 1–21).

4 Maul 1994, 12; Bácskay 2018, 2–4.

5 'The voice of the frog is the glory of the marsh waters.' (Black *et al.* 1998–2006, c.6.2.2; cf. c.6.2.3; Gadd and Kramer 1966, Nr. 244 (= UET 6/2) ll. 5–6, 6.2.3; Shaffer 2006, Nr. 80 (= UET 6/3) l. 5); Dumuzi's Dream: 'Grieve, grieve, O countryside, grieve! O countryside, grieve! O marshes cry out! O... crabs of the river, grieve! O frogs of the river, cry out!' (Black *et al.* 1998–2006, c.1.4.3; Alster 1972, 53, 26 and 85); The Heron and the Turtle: 'It (the turtle) catches fish; it collects eggs and crushes them. It crushes the suḫur carp in the {honey plants} ... It crushes toads in the ligiligi grass. It crushes fish spawn, its offspring, its family' (Black *et al.* 1998–2006, c.5.9.2).

6 See the Horapollo, Hyroglypica I, 25, edited in Boas and Grafton 1993, 59. The frog as fertility symbol is discussed in Lorenz 2013, 166; Gamer-Wallert 1970, 124.

7 Crump and Fenolio 2015, 253; lamps depicting frogs were used during child birth as well; see Shier 1972.

8 Andrews 1994, 63; Bonatz 2000, 96; Canby 1980, 50; Kákosy 1977, 334.

9 Cf. paragraphs on imagery and context.

10 Auffarth *et al.* 2006, 32; Herrmann 1994, 2.

11 Those strings were called DUR/*ṭurru* ('band'), *takṣiru* ('chain, necklace'), *kuṣaru*, GÚ/*kišādu[E1]* ('necklace'), *lippu* ('envelope'), *mêlu* ('leather bag'), or *ṣerpu* and fulfilled different purposes (Schuster-Brandis 2008, 59–63). From incantations and ritual instructions, it can be concluded that necklaces and pendants were made to serve as magical protection or as a therapeutic remedy (Schuster-Brandis 2008, 70–192). The same thing can be observed for therapeutic/prophylactic phylacteries, that consist of leather bags containing materia medica. 'The formulation of these "amulets" uses the elliptic formula *ina* KUŠ ("in a skin") to say ("you put all these ingredients") in a leather bag (and place it around the neck of the patient)' (Chalendar 2016, 100).

12 Schuster-Brandis 2008, 52, 70–179.

neck, hands, or feet.[13] These examples show that the character of magical protective and supportive amulets was a phenomenon well known in the religious beliefs of the Ancient Near East.[14] The medical texts inform us that body parts of frogs were included in phylacteries.[15] However, there is no mention of frog-shaped amulets in medical texts.

Frog-shaped pendants

Frog-shaped pendants are found from the Jemdet Nasr period onwards in Mesopotamia and stay popular at least until the Neo-Babylonian period.[16] Of the 83 frog pendants collected by Eva Götting-Martin until now, the majority of the 83 pendants were found in southern Mesopotamia.

Material

Frog-shaped pendants were manufactured out of various materials that often had a certain significance. While in the Jemdet Nasr period pendants are made of 'white stone', the most popular material used during the 3rd millennium BCE in Kiš, Lagaš, Larsa, and Ur is lapis lazuli.[17] The significance of lapis lazuli becomes clear in the myth of Lugal-e, where it is considered a blessed stone.[18] In an Old-Babylonian incantation for easing the birth, lapis lazuli is used by the mother in the ritual.[19]

The other materials used in Ur were dark brown steatite and in one case gold.[20] Green stone was another popular material attested in Ur, Uruk and Assur.[21] One of the few copper alloy pendants was excavated in Diqdiqqa.[22] Only in Tell Asmar a pendant made of silver was found.[23] The use of lapis lazuli for frog amulets continues during the 2nd and 1st millennium BCE. From the Old-Babylonian period (1800–1595 BCE) onwards, quartz ceramics were used regularly.[24] Here we present four examples of quartz ceramic pendants that were studied in the British Museum. In Diqdiqqa four large frog pendants (**Figure 1**) were found together with other similar pendants representing aquatic animals (two fish pendants, two water birds and a turtle) and probably date into the second half of the 2nd millennium BCE.[25] The exact location of the pendants was not documented.[26] On two pendants (**Figure 1.2–3**) traces of green glaze were visible, microscopic analysis conducted by E. Götting-Martin further revealed that this green glaze

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[13] Schuster-Brandis 2008, 63–68 offers an overview on the production of medical necklaces. Wiggermann 2000; Heeßel 2004; Farber 2014. For amulet tablets / tablets with handles: Heeßel 2014; Reiner 1960; Lamaštu amulets: Farber 2014; Wiggermann 2000. For Pazuzu heads and figurines: Heeßel 2004, 69–74; zoomorphic pendants: Van Buren 1936–1937; Lion and Michel 1997; 2006. For medical and medical and magico-religious aspects: Van Buren 1945; Goff 1956; Schuster-Brandis 2008, 70–179; Heeßel 2004, 69–74; Farber 2014.

[14] Cf. footnotes 11–12.

[15] Bácskay 2018, 12; Sa-gig tablet 29 lines 15–16 and 25–26 in Heeßel 2000, 117–130; Scurlock 2014, 216, 219.

[16] Limper 1988, 32–33, 132–133, F354–357.

[17] On Larsa, see Fig. 1. Kiš: De Genouillac 1936, 101, pl. 83, Fig. 5; Mackay 1929, 57, 133, and 183 (one in each grave of no. 59, and no. 100 and two objects in no. 63); Mackay 1927, pl. 4, No. 26; Ur: Woolley 1934, 158, 175, 375, 552, and 585, pl. 142, U 10008, 578; Woolley 1934, 578.

[18] Van Dijk 1983, Lugal I ll. 120–122, ll. 531–545.

[19] Cohen 1976, 135–136, Z. 18–21, 454.

[20] For brown steatite see Woolley 1955, 199, 143, pl. 28, U.19047. For gold see Woolley 1934, 585, U.12701D.

[21] Limper 1988, 33, F355, Nr. 270, Taf. 38; cf. Fig. 2.4.

[22] U. 2822, 1927.1003.251, BM Archive Nr. 194, Box 29, Page 30.

[23] Frankfort 1932–1933, Fig. 29, top row; 1933, 48, Fig. 31.

[24] Schmitt 2012, Nr. 587, Taf. 217. Woolley 1976, 217, pl. 93, j. (U.1274, U.1276).

[25] Woolley 1976, 86, pl. 93, 183.

[26] Woolley 1976, 86.

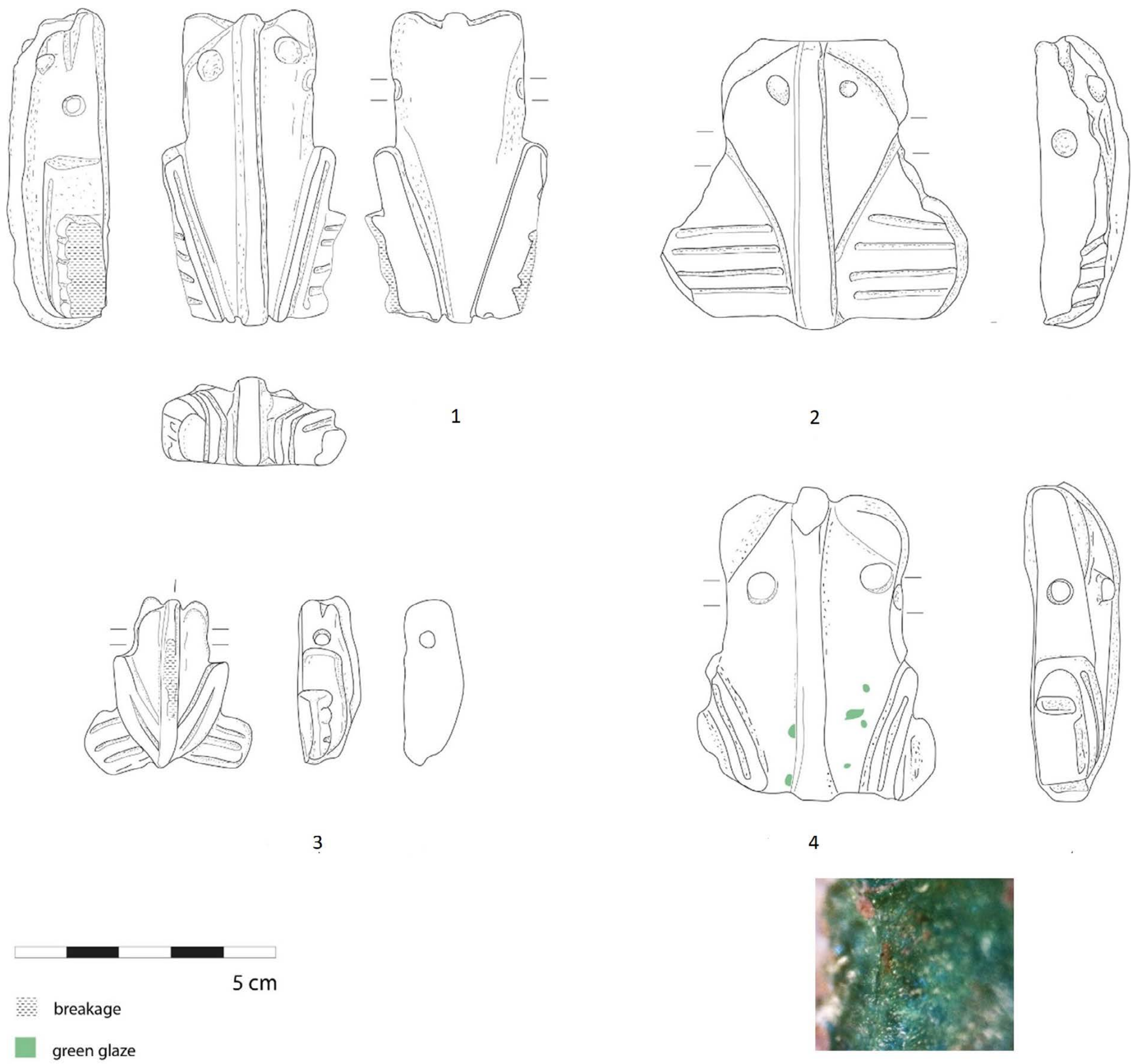

Figure 1: *Frog pendants made of glazed quartz ceramic, from Diqdiqqa (Ur), 1. BM 116913, 1924.0920.174, 6.2 x 3.5 x 2.0 cm, 33.7 g, Woolley 1976, 217, van Buren 1936–1937, No. 925. 2. BM 116914, 1924.0920.175, U. 1775, 5.6 x 5.8 x 1.8 cm, 42.4 g. 3. BM 17070, 1931.1010.201, 6.1 x 4.8 x 2.0 cm, 46.7 g. 4. BM 17070, 1931.1010.202, 3.4 x 3.2 x 1.2 cm. Detail of the glaze on the bottom side of the frog under the microscope.*

could be discovered on all four pendants. The size of these pendants, which are up to 6 cm long and weight up to 46.7 g (**Figure 1.4**), makes it possible that they were not worn around the neck but either hung in a room or used as a votive offering. All four frog pendants are fashioned with a noticeable ridge on their back, wide webbed feet, and bulging eyes. The use of quartz ceramics is not surprising, since the material becomes widely popular and is suited to imitate the blue lapis lazuli or shades of green.[27] The choice of colour (blue, green, and brown) seems to be connected to the appearance of frogs and toads and their connection to water. The materials used seem not only to reflect the characteristics of the animal but were possibly aimed at enhancing the effect of the amulet.

[27] Note that the term ZA.GÌN (*uqnu*) is sometimes used as a synonym for lapis lazuli, quartz ceramics and Egyptian blue (Schuster-Brandis 2008, 453–454).

Figure 2: *Frog pendants from 1. Larsa, 2.2 x 1.2 cm, BM 122106, 1856,0903.243, lapis lazuli, courtesy of the British Museum. 2. Ur, surface, steatite, 0.9 x 0.8 cm, BM 123669, U 12080, Woolley 1934, 578, courtesy of the British Museum. 3. Ur, ED III A, lapis lazuli, 1.67 x 1.87 cm, BM 120650, U.7910, Tait 1976, no. 333, courtesy of the British Museum. 4. Assur, gC6II, near grave Ass 20161, green stone, 0.8 x 0.7 x 0.5 cm, 0.2 g, Ass 20188, VA 5788, Haller 1954, Nr. 599, Taf. 13 c, d; Miglus 1996, 164, Plan 10. Illustration: E. Götting-Martin.*

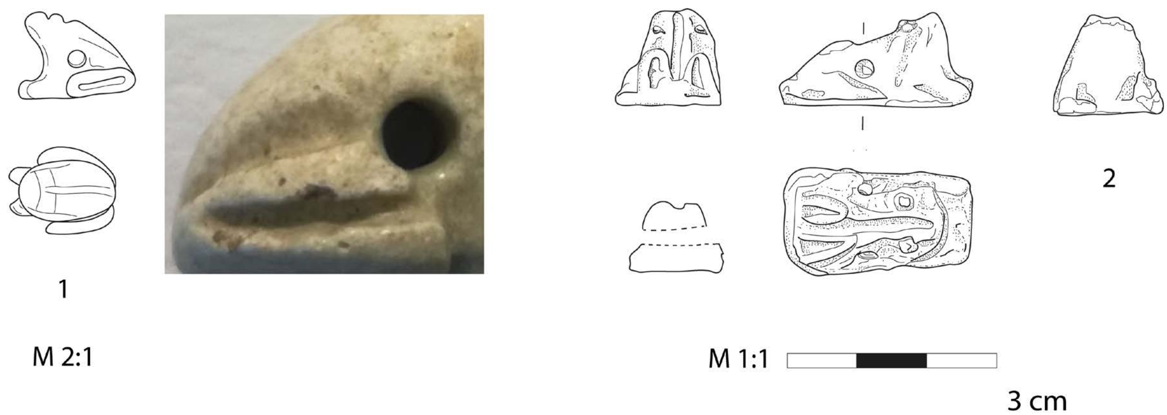

Figure 3: *1. Frog pendant, Assur, Ass 13603a, VA 5591, 0.9 x 0.6 x 0.4 cm, 0.2 g, quartz ceramics, eC7III-NT, South court ca. 1.50 m under floor level, in vessel; Detail (Ass 13603a): green 'ghost of a glaze', formerly green or blue glaze. Photograph and illustration: E. Götting-Martin. 2. Frog pendant, Assur, Ass 20526g, VAM, 2.8 x 1.6 x 1.4 cm, 4.8 g, glass (according to Femke Groups). Illustration: E. Götting-Martin.*

Imagery

The artistic execution of the amulets was highly variable. While the frogs are partly decorated with a score line down their back (**Figure 2.2**) and partly are ridge backed (**Figure 2.3**), these two variations cannot be called a type but can be found throughout all millennia. In only two cases, the frogs appear very naturalistic.[28] Iconographic similarities can be noticed among groups of objects found in the same location and possibly were manufactured in the same workshop (e.g. **Figure 1**). At the end of the 2nd millennium BCE, quartz ceramic frog scaraboids become more popular (**Figure 3**).

[28] Van Buren 1936–1937, 36.

Context

Frog pendants are mainly found in graves, but occasionally also in temples, palaces, or private houses. Of the 83 objects documented so far, 40 had a known context, of which 27 were funerary.[29] The occurrence of the pendants in grave contexts might be explained by the fact that necklaces are a commonly used grave good. However, it is possible that the appearance of frog pendants in grave context is not merely coincidental. The ambiguity of frogs might make it suitable for leading the dead between the realm of the living and the dead. Furthermore, a sepulchral association of frogs is reflected in the fact that fly amulets and frog pendants are often worn together.[30] A question worth asking might be who wore the pendants. In Kiš five of six graves containing frog pendants belonged to children.[31] Due to a scarcity in contextual data collection, it cannot be verified if frog pendants were equally present in the graves of males and females. Furthermore, the sex often was estimated by the general build of the individual and the grave goods. However, it can be said that frog shaped pendants appear in the burials of both men and women. The lack of contextual data makes it difficult to verify if frog pendants were worn by women to enhance fertility or protect them during pregnancy, as was the case in Ancient Egypt. In a particular case in Assur, a golden frog pendant was found near the hip of an individual thought to be female.[32] While the location of the find might initially support the use of a frog as fertility amulet, it should be noted that the forearm of the individual was near the find and therefore the initial hip location may have been coincidental.

Fourteen pendants were found in an architectural context. The appearance of a frog pendant in Temple A in Nuzi, which was interpreted by the excavators as a temple of Ištar, goddess of love, makes the frogs interpretation as a symbol of fertility plausible.[33] Of two amulets from Ešnunna, one was found in a palace and the other in a jewellery hoard.[34]

Healing stones associated with frogs

In the stone list *abnu šikinšu,* the *kurgarrânu*-stone is described as 'like the back(?) of a frog'.[35] It is unclear if the shape or colour of the frog's back is meant. The *kurgarrânu* does not seem to be a stone in the shape of a frog but a type of mineral, Schuster-Brandis assumes, that the stone had a green colour. Of the amulet necklaces studied by Schuster-Brandis, ten included this stone, which is also mentioned as a blessed stone in the myth of Lugal-e.[36] The necklaces are supposed to cause 'ecstasy in a man'.[37]

This corresponds to its connection to the cult of Ištar, since the stone is mentioned in two instructions for the fabrication of necklaces assuring the reconciliation between Ištar and the patient, or alternatively Ištar, Gula and the patient (cf. the necklace depicted in **Figure 4**).[38] The appearance of frogs in love compositions adds to the association of frogs to fertility or potency.[39] Three other necklaces were fashioned to heal flickering before the eyes.[40] Four other necklaces containing this stone served the

[29] Since collection of the pendants is ongoing in the framework of the PhD study carried out by E. Götting-Martin, the numbers might change.

[30] Frankfort 1932–1933, Fig. 29, top row; Assur, pendant, lapis lazuli, Bonatz 2000, 96, Fig. 12.

[31] Mackay 1927, 57, 133, and 183. For an example of a child grave from Ur dating to the Kassite period, see Fig. 4.

[32] Haller 1954, 127, Grab 45, cf, Abb. 159, Ass. 14630 cf. The pendant was either worn on the hip or the forearm near the hip.

[33] Starr 1937, Taf. 120, AAA; 1930, 4, 6.

[34] Frankfort 1932–1933, Fig. 29, top row; 1933, 48, Fig. 31.

[35] Schuster-Brandis 2008, 424.

[36] Schuster-Brandis 2008, 424, *kurgarrânu* (necklaces: Nos. 2, 11, 47, 57, 58, 59, 115, 138, 215, 240).

[37] Schuster-Brandis 2008, 424, 88 (Kette 2), 83 (Kette 11).

[38] Schuster-Brandis 2008, 424, 88 (Kette 2), 83 (Kette 11).

[39] Wasserman 2016, 151, PRAK 1 B 472: i 12', ḫu-du-šu qá-ba-li-ni.

[40] Schuster-Brandis 2008, 107–108, Kette 57–59.

Figure 4: *Frog amulet on necklace, Uruk (W 13642/c, IM 18143,8), 1.5 x 1.52 cm, serpentine?, Pc 17-3, pot grave of a child, Kassite, Limper 1988, 33, F355, No. 270. © SMB. Photograph: Olaf Teßmer.*

purposes to: break a spell, heal the 'AN.TA.ŠUB.BA' epilepsy of the left foot,[41] help against 'hand of a ghost (and) paralysis of hands and feet',[42] help 'a courtier who enters the palace'.[43] The stone is also known as a remedy to keep the *rābiṣu*-demon (MÁŠKIM) away.[44] The association with Ištar/Inanna, potency and eye disease corresponds to the use of frog parts in Mesopotamian medicine.[45]

In two texts identified as namburbi rituals, frogs were used as substitute animals.[46] Within the ritual the disease is transferred to the 'green frog in the water', which served as a 'scapegoat' and was thought to take the illness from the patient. On two other occasions, commented on by András Bácskay as well as Henry Stadhouders, the texts instruct the healer to rub a patient seized by '*li'bu* of the mountain'-disease with a frog, spit into the mouth of the frog three times and knot it on a *baltu* thorn in the steppe.[47] The unfortunate scapegoat frog was then released into the water, assuming it survived this highly unpleasant treatment. As Bácskay pointed out, comparing a very similar ritual which used a fish instead of a frog, it becomes clear that the illness and sin of the patient was to be taken to the Apsû.[48]

41 Schuster-Brandis 2008, 131, Kette 115.
42 Schuster-Brandis 2008, 142, Kette 138.
43 Schuster-Brandis 2008, 173–174, Kette 215; To face the authorities the incantation corpus E.GAL.KU$_4$.RA - 'entering the palace' (or Egalkura texts) and amulet necklaces helped the courtier to be received kindly in the palace (Pedersén 1986, 54; Stadhouders and Panayotov 2018).
44 Köcher 1964, BAM 344, 7.
45 Examples similar analogies are mentioned by Pliny (Plin. Nat. Hist. 32, 74), where frog eyes are used as a treatment against deep set eyes and white spots in the eye. For examples of sympathetic healing see also Rumor 2015, 68–69.
46 Bácskay 2018, 3–4; Stadhouders 2018, 161–164.
47 Bácskay 2018, 3–4; Stadhouders 2018, 161–164; *li'bu* was an intermittent fever (Scurlock and Andersen 2005, 30, 482–483).
48 Scurlock 2014, 675; Bácskay 2018, 3–4.

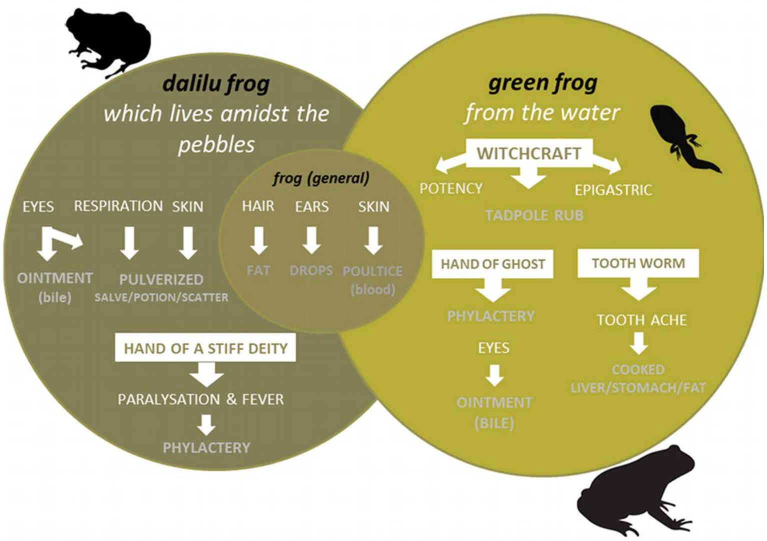

Figure 5: *Schematic depiction of the use of* ‘dalīlu-*frog’ and ‘green frog’ in Mesopotamian medico-magical practices. Affected body areas or symptoms (white), cause (white container), and treatment (grey). Illustration: C. Dittrich and E. Götting-Martin.*

Identification of frogs

Magico-medical texts from Babylonia and Assyria underline the perceived therapeutic significance of frogs. These texts have been recently studied by András Bácskay.[49] In incantations, two main categories of frogs are mentioned: the green frog ‘*muṣaʾʾirānu*’ and ‘the one that lives amidst the pebbles’ ‘*dalīlu*’. Parts of frogs, as well as bile, blood, skin, and tendons, were used in various forms, e.g. as ointments, poultice, ear drops, and potions to cure ear complaints, falling hair, eye problems, skin, and respiratory complaints, as well as complaints caused by ghosts, witchcraft, the tooth worm, and the evil eye (**Figure 5**). These texts date from the Old-Babylonian (1800–1595 BCE) to Neo-Assyrian (966–609 BCE) period.[50]

To identify these species more accurately, the first impulse of an archaeologist is to turn to archaeozoology. However, due to the fragile bone structure of amphibians, remains of frogs and toads are rarely found. The bones decompose quickly and if preserved are fragmentary in nature often only found by sieving. When found at dig sites, amphibians are mostly considered to be wild animals that got into the archaeological context by chance and therefore have received little attention in archaeological publications. Only one recorded example from Israel indicates that frogs were used as a food source or as a sacrificial animal in the Ancient Near East.[51] If frogs or toads are found in an archaeological context, for example in the pellets of owls, they are classified as belonging to the taxa anura (frogs and toads) without further classification. Therefore, a look into the recent fauna of Mesopotamia might shed some light on the ‘green frog’ and the ‘frog that lives amidst the pebbles’ and there by alluding to their possible medical significance.

49 Bácskay 2018.
50 Bácskay 2018, 1.
51 Weissbrod and Bar-Oz 2004, 23.

Figure 6: *Anurans inhabiting Mesopotamia. 1. The marsh frog,* Pelophylax ridibundus, *found in Sulaimania, North Iraq, 05.05.2013. Photograph: Markus Auer. 2. Lemon-yellow tree frog, Hyla savignyi, found in Barzan, North Iraq, 01.05.2019. Photograph: Torsten Panner.*

Figure 7: *The eastern green toad,* Bufotes sitibundus, *found in Tawela, Northern Iraq 03.05.2019. Photograph: Markus Auer.*

There are only four species of anurans that occur in Mesopotamia today and match these descriptions translated by Bácskay.[52] These four species have different life-histories and ecologies, which we can group into two main categories.

The *muṣaʾʾirānu* is the most often used term for frog (after Bácskay) and is complemented by the adjective 'green'.[53] The marsh frog (*Pelophylax ridibundus*) belongs to the family of true frogs (*Ranidae*). The Latin species name means 'the laughing one', which is attributed to their specific mating call that sounds like a powerful laughter.[54] They are characterized by their pointy snout, a relatively rough skin, long hind limbs, two dorsolateral folds on the back, and a prominent dorsal line on their back (**Figure 6.1**).

They reach a body size up to 15 cm. The marsh frog is a semi-aquatic species and inhabits a wide variety of flowing and stagnant waters (shallow puddles, ponds to large lakes, rivers, and flooded riverbeds, as well as mountain streams).[55]

They are closely associated with water bodies and do not move farther away from water than a few meters. A rich vegetation underwater and along the shoreline is favoured. During the day, marsh frogs can be seen sunbathing close to the water's edge, escaping with a long jump to the water if disturbed.

The marsh frog is diurnal in most of its distributional range, but populations in drier areas can be smaller and shyer, and often more active during the night. We think that the marsh frog could have been the green frog, *muṣaʾʾirānu,* in Bácskay´s translation, due to the mainly greenish/brownish body coloration with green blotches and the dorsal stripe, which is present in most individuals, as well as their loud voice and their comparatively high abundance in Iraq (personal communication Markus Auer). Additionally, many amulets (e.g. **Figure 1.1–4 and 2.3–4**) have a ridge or score line on the frog's back which matches the characteristic dorsal line of the marsh frog. This further supports these findings.

Another anuran species is described by Bácskay as a frog 'which stands on a *samallû*-plant or an *urullu* reed'. Another species identification is needed for this particular description.[56] A species known to show the 'plant standing' behaviour is the eastern tree frog, *Hyla savignyi* (Lemon-yellow tree frog, **Figure 6.2**), which is known to live in Mesopotamia.[57] This species is considerably smaller than the marsh frog, with a body length of up to 4 cm. It occurs in dry environments, but needs areas with stagnant waters and shore vegetation, where it sits on shrubs, bushes, or reeds. It is plausible that the frog 'which stands on a *samallû*-plant' can be identified as the eastern tree frog.

The *dalīlu*, the 'one that lives amidst the pebbles', could belong to the group of burrowing or fossorial toads, namely the eastern green toad or variable toad (*Bufotes sitibundus*) and the eastern spadefoot toad (*Pelobates syriacus*).[58] The eastern green toad belongs to the family of true toads (*Bufonidae*). They are characterized by a thick, warty skin, short hind limbs (compared to frogs), a short snout, horizontal pupils, and parotid glands above the ears. The body colour is whitish to light brown with green blotches and reddish dots, with a body length of up to 10 cm (**Figure 7**). The eastern spadefoot toad has a similar body form, but the skull is flatter. The colouration can be grey to greenish yellow, with some orange dots. They reach a body size of up to 9 cm, 7 cm on average.[59]

[52] Al-Barazengy *et al.* 2015, 30; Salman 2019.
[53] Bácskay 2018, 1
[54] Note the semantic similarity between the Latin meaning 'laughing one' and the Akkadian meaning of *dalīlu,* 'the praising one'. Both seem to refer to the characteristic voice of the animal.
[55] Speybroeck *et al.* 2016, 185
[56] Bácskay 2018, 11.
[57] Gvoždík *et al.* 2008, 541; Salman 2019.
[58] Dufresnes *et al.* 2019a, 6.
[59] Dufresnes *et al.* 2019b.

These toad species are well adapted to hot and dry conditions. They inhabit steppes, riverbanks with sandy soil, maquis shrubland and man-made secondary habitats like quarries and agricultural land. Breeding takes place in small, shallow, and mainly temporary ponds, like puddles, flooded riverbanks, or ditches. They are mostly terrestrial, nocturnal, and spend the daytime in self-excavated burrows or hidden under rocks, hence, they live amidst the pebbles. Some amulets, like **Figure 2.1** or BM 123555,[60] match the general habitus of these toads with short limbs and a plump/short body. Therefore, we believe that the *dalīlu* 'frog that lives among the pebbles' belongs to the family of *Bufonidae*.

Medicinal properties

Amphibians are used in traditional medicine all around the world today as well as in the past.[61] But what does herpetological evidence tell us about the medical properties of these animals? When toads are disturbed or threatened, they secrete a milky substance from the parotoid gland that protects the toads from skin parasites or simply from getting eaten.

The bufotoxin of the eastern green toad contains bufadienolide, in which the main compounds include cardiac glycosides which increase the force of heart muscle contraction but reduce heart rate and are used as treatment for cardiac arrhythmia and heart failure. They have a steroid structure and their consumption in high doses can lead to cardiac arrest. In traditional Chinese medicine, the secretion of toads, called Chan'Su, was used to treat different heart diseases and bile against pulmonary diseases.[62] Additionally, arenobufagin, another compound synthesized in the toad's parotoid glands, was shown to be effective against liver cancer.[63]

A further substance produced in the parotoid gland is bufotenin, an alkaloid related to the neurotransmitter serotonin.[64] Its chemical structure is similar to the psychoactive tryptamine derivatives psilocin and DMT (*N*, *N*-Dimethyltryptamine), which have been used for centuries as psychoactive drugs for religious purposes (like 'magic mushrooms' or Ayahuasca). However, bufotenin needs to be applied with additional substances, as it cannot pass the blood brain barrier by itself.[65] Therefore, the consumption of toads or parts of it for psychoactive purposes seems unlikely.

Amphibian skin is a complex biochemical and physiological system. The skin needs to be moist most of the time (depending on the species), which makes them vulnerable to bacterial and fungal infections. Naturally, they have evolved defences against such assault. A recent review shows that most amphibian species produce a variety of antimicrobial peptides (AMPs) in their skin, which are antibiotic, antiviral, wound-healing, antidiabetic, anticarcinogenic, and have the potential to treat cardiovascular disease. Therefore, these AMPs serve as their mechanism to deal with bacteria and fungi in the aquatic environment. So far, 20 AMPs have been characterized in the broader genus of *Pelophylax* species ('green' frogs) and two in the genus *Bufo* (toads).[66]

In some Akkadian prescriptions where the whole frog is used, the *dalīlu* is specifically mentioned. The symptoms that are described and treated are eye and skin problems, respiratory problems (*suālu*) and

[60] Van Buren 1936–1937, 36.
[61] Alves *et al.* 2013.
[62] Crump and Fenolio 2015, 203; Wang and Carey 2014, 9965.
[63] Zhang *et al.* 2013.
[64] Dufresnes *et al.* 2019a, 10.
[65] McBride 2000.
[66] Xu and Lai 2015.

illnesses coming from the 'hand of the stiff deity'.[67] The AMPs Buforin I and II, first found in the stomach tissue of the Asian toad, have a strong antimicrobial activity which could be useful against bacterial infections, although they have not been tested on humans.[68] The only AMP that made it to clinical trials is magainin, an antibiotic peptide derived from African clawed frogs. This peptide was shown to be effective against fungi, bacteria, and even protozoa that can cause Malaria as well as against some viruses.[69] It works by forming an ion-channel in the cell wall of an 'enemy' cell, leading to lysis and death of the cell. The peptide was used in a creme against infected diabetic foot ulcers, but was not approved by the US Food and Drug Administration, because it was not more effective than already licensed products.[70]

Several recipes use either tadpoles of the green frog or parts of the green frog (dried and pulverized, some cooked). They were used in Akkadian medicine as treatment against caries (tooth worm), skin disease (*epqēnu*), problems with potency, and hair loss.[71] The microbiome of tadpoles differs significantly from the microbiome found on adults, though studies on their chemical properties are lacking.[72] Nevertheless, AMPs are not very stable. In every recipe where ingredients are cooked, potential benefits should be negligible because peptides will denature. We still lack detailed information about the pharmaceutical properties of frogs against human diseases. In conclusion, the antimicrobial effects from amphibian skin seem to be the only congruence between modern herpetological evidence and Mesopotamian treatments, as described by Bácskay.

Conclusion

The green frog in the water, the frog which stands on a *samallû*-plant, and the *dalīlu* frog that lives among the pebbles are identified as: the marsh frog, *Pelophylax ridibundus*, the lemon-yellow tree frog, *Hyla savignyi*, and the eastern green toad *Bufotes sitibundus*, respectively.

The use of frogs in Mesopotamian medicine is connected to the principles of analogy. Features of the frogs' body are associated with symptoms and body parts of the patient. The shimmery skin, bulging eyes, loud voice and high fertility might be the reason why it was used in recipes against skin, eye, and respiratory diseases, as well as against potency problems. The therapeutic efficiency according to modern herpetological evidence shows that the use of frog skin, body parts, and secretions could potentially have therapeutic properties. However, some of the described preparation practices may have nullified any of the active ingredients.

Frog-shaped amulets are not mentioned in ritual instructions and might not be connected to the symptoms treated with frog materials. However, the use of lapis lazuli, the association with other amulets as well as parallels in Egypt make it highly likely that frog pendants served as amulets. Textual sources and archaeological contexts connect frogs to Ea/Enki and to Ishtar/Inanna and make a connection to fertility and childbirth plausible. Frogs certainly had an aura of magic due to their ability to bridge the aquatic and terrestrial lifestyles and to undergo a metamorphosis from an aquatic tadpole to a terrestrial, four-legged animal. Their fertility in association with rain and seeming ability to cross borders made these creatures fascinating to both ancient and modern societies alike.

[67] *Suālu* is a barking cough (Scurlock and Andersen 2005, 48); 'hand of the stiff deity' has a relation to Ea, god of the sweet waters. Symptoms include high fever, sweating and stiffness in joints (Scurlock and Andersen 2005, 488).
[68] Cho *et al*. 2009.
[69] Zasloff 1987.
[70] Moore 2003.
[71] Akkadian *epqēnu:* variously coloured thickening of skin (Scurlock and Andersen 2005, 71 and 232).
[72] Kueneman *et al*. 2014.

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Ancient Agriculture in Early Bronze Age Northern Mesopotamia Reconstructed from Archaeobotanical Remains

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Abstract

This article gives a survey of macrobotanical data from three Early Bronze Age sites in Northern Syria: Tell Shiukh Fawqani, Tell Halawa, and Tell Beydar. In comparing the archaeobotanical data from these sites, this study thus aims to contribute to the reconstruction of the agricultural system of the region during the period. These results from can also support some preliminary conclusions on contribute to the reconstruction of the economy and agriculture of Upper Mesopotamian society during the Early Bronze Age.

Keywords

Archaeobotany, Mesopotamian Agriculture, Northern Mesopotamia, Early Bronze Age

Introduction

This article presents new macrobotanical data from three Early Bronze Age sites in Northern Syria: Tell Shiukh Fawqani and Tell Halawa, both located on the eastern side of the Syrian Euphrates bend, and Tell Beydar on the Upper Khabur river (**Figure 1**).[1] These sites all have occupational phases before and/or after the end of the 3rd millennium BC. At each site, the discovery of preserved remains of seeds and fruits also allows for a reconstruction of local agricultural production. Indirectly, this also allows us to draw conclusions on the local paleo-environment. By comparison and contrast, the modern Northern Mesopotamia landscape has become severely degraded. The causes for this degradation are mainly human, through the exploitation of available natural resources. Both deforestation in order to supply timber for construction or as a source of domestic or industrial heating and overgrazing on shrubs and grasses have all led to the landscape's desertification.[2] This study thus aims to contribute to the reconstruction of the agricultural system of the region and to draw some preliminary conclusions on agriculture practices in order to understand the agriculture economy during the relevant period of occupation.

[1] Tell Shiukh Fawqani was excavated between 1994 and 1998 by the International Archaeological Research Group (GIRA), composed of Syrian, Italian, and French specialists under the supervision of Luc Bachelot (CNRS Paris, France) and F. Mario Fales (University of Udine, Italy) (Bachelot 1999a; 1999b; Bachelot and Fales 2005). Tell Halawa was first discovered as early as 1967 during a survey conducted by M. van Loon, who identified settlement remains from the 3rd millennium BC (Meyer and Pruß 1994). The mission of Tell Beydar is a Syrian-European excavation, started in 1992, organized by the European Centre for Upper Mesopotamian Studies (Lebeau and Suleiman 1997). An earlier archaeobotanical analysis of the finds from Tell Shiukh Fawqani was already published in Klesly 2005.

[2] Sanlaville 2000.

Figure 1: *Location of Tell Shiukh Fawqani, Tell Beydar, and Tell Halawa in Upper Mesopotamia (image by author, based on Google basemap).*

To contribute to this reconstruction, the article emphasizes the importance of particular agricultural crops discovered in the Mesopotamian region during the Early Bronze Age. The main results can be summarized as follows. While two-row barley (*Hordeum distichum*) was found at all three sites, both emmer wheat (*Triticum dicoccum*) and naked wheat (*T. durum/aestivum*) are less abundant. Leguminous crops had been present since the earliest times in the Mesopotamian region, as they were cultivated both as food for humans and as animal feed. Legumes were most abundant at the site of Tell Shiukh Fawqani, which yielded evidence of lentils (*Lens culinaris)*, chickpeas (*Cicer arietinum*), peas (*Pisum sativum*), bitter vetch (*Vicia ervilia*), and grass peas (*Lathyrus sativus*). In contrast, only scant evidence for the consumption or production of legumes is available for the sites of Tell Beydar and Tell Halawa. Many wild plants have also been discovered, which may have been introduced either as a high source of protein as animal feed or fuel, or even for medicinal uses. Among the fruit trees, the site of Tell Shiukh Fawqani yielded mainly almonds (*Prunus sp.*) as well as individual seeds identified as pistachios (*Pistacia atlantica*) and figs (*Ficus carica*), respectively. Only one seed identified as belonging to the grape vine (*Vitis vinifera*) was recorded at the Halawa site, while no evidence for fruit trees is available for the site of Tell Beydar. We note that Tell Shiukh Fawqani also provides evidence for the fruits of oil crops such as flax (*Linum usitatissimum*) and false safflower (*Carthamus tinctorius*).

Sites, climate, and environment

The archaeological sites treated in this study are located in Upper Mesopotamia, in the modern Syrian Jezirah, which covers the area between the Euphrates and Tigris rivers. Evidence from Tell Shiukh Fawqani derives mainly from Sector D, located on the west flank of the *tell*, which also includes occupation levels dated to the Early Bronze Age.[3] Three levels of occupation within this sector can be highlighted, termed

[3] See Morandi Bonacossi 2005, 128 for a summary of the radiocarbon dates of Period II at Area D, which cover an interval of 3380–3090 and 2890–2620 BC.

A, B, and C, of which levels B and C are the best preserved. They consist of buildings and alleys from which samples were taken. The site of Tell Halawa is divided into Tell A and Tell B, separated by a *wadi*. The Early Bronze Age settlement consisted of blocks of houses surrounded by alleys. Archaeobotanical samples derive from Tell A and were excavated in 1986. A more precise provenance of the samples cannot be identified. The third site which provided archaeobotanical samples analyzed in this paper is Tell Beydar. In particular, the samples derive from sector M, excavated during the excavation season of 2006, which also included Early Bronze Age levels (Early Jezirah IIIb).[4] In each case, the samples were collected from a well-defined context.

In general, the current climate of the area in which these sites are located, the Middle Euphrates and Jezirah region, is of the semi-arid Mediterranean type. The temperatures here vary greatly between summer and winter. Monthly averages of temperature are lowest in January (5°C to 8°C), and reach a maximum in July.[5] As is widely known, an annual average of 250 mm of rainfall is generally a prerequisite for the dry cultivation of crops, and regions where average rainfall is lower required additional irrigation.[6] In the northern and north-eastern regions of Syria, the annual rainfall averages between 250 and 350 mm. This relative abundance of rainfall is reflected in a greater dependence on strategic crops such as wheat, cotton, barley, and lentils.[7] Due to the shortage of rains, current cultivation of most crops depends on irrigation even in this area. The most commonly used natural sources for irrigation include rivers, springs, and wells. Intensive exploitation of these sources has, however, lowered the level of groundwater significantly. In Upper Mesopotamia, the steppe becomes more wooded, but because of the density of agricultural and/or pastoral exploitation, trees have practically disappeared. How these observations apply to the sites mentioned above remains unclear, and a full discussion of the evidence for climate change and its impact would go beyond the scope of this paper. In this context, however, it can be mentioned that evidence indicates increasingly arid conditions in Upper Mesopotamia after *c.* 2500 BC, culminating in the so-called 4.2 ka BP event.[8] This date for progressive aridification would also divide the earlier Tell Shiukh Fawqani contexts from the later ones at Tell Beydar and Tell Halawa.

Methodology of sampling

Archaeobotanical sampling was conducted in Tell Halawa in 1986, in Tell Shiukh Fawqani between 1996–1997, and in Tell Beydar in 2006. Work was carried out according to the individual objectives of the respective excavations and the nature of the individual sites. The results of the microscopic examination of the samples at the three sites depended on the various strategies of collection. At the site of Tell Shiukh Fawqani, the method followed a spatio-statistical collection scheme in each room of the site. At the other sites, other preferences in the excavation process precluded a systematic sampling, with preference for a random sampling method which focused on the presence of ash or wood charcoal clearly visible to the naked eye. This is also directly reflected in the results. We find this information in the sample tables for the three sites (**Tables 1–3**). Extraction was achieved by flotation, using the Siraf-type system with coarse mesh sieves 1 mm on the inside and small mesh sieves of 0.5 mm on the outside.[9]

4 See the description in Lebeau and Suleiman 2012.

5 Traboulsi 1981; Alex 1985.

6 Traboulsi 1981. A greater differentiation is suggested by Map 3 in Wirth 1971, which would place both Tell Beydar and Tell Shiukh Fawqani above the 300 mm isohyet.

7 Zohary 1973.

8 Among the vast literature on the topic, see Staubwasser and Weiss 2006.

9 Williams 1973.

Figure 2: *Archaeobotanical determination, DAI Laboratory, Berlin (photographs by author).*

The sieved remains were subsequently dried in the shade and placed in boxes on which the relevant information (origin, date, place, and volume of each sample) was recorded.

By examining the samples, the archaeobotanical remains were in total carbonized. The strategy for examining the sample was based on the following. A large sample was divided into two or four parts depending on the sample size. Then, each sub-sample was sorted to separate individual species, until no new species were distinguished. Small volume samples were completely sorted directly. Sieve residue was sorted under a binocular with a magnification ranging from 10x to 50x as well as with the help of a new 3D digital system for observation and measurement (HIROX RH-2000).

For the materials from Tell Shiukh Fawqani, sorting and identification were carried out in the Laboratory of Oriental Prehistory in Jalès-France, for the other two sites at the laboratory of the German Archaeological Institute (DAI), Berlin (**Figure 2**). Remains were identified primarily using the reference collections of current and archaeological seeds of the laboratory of Jalès-France and of the DAI as well as the atlas of botanical classification and the drawings of identified seeds. Reference was also made to works specialized in the regional classification of botanical materials as well as to older publications on archaeobotanical remains from the Near East.[10] Only one counting method was followed in processing the seeds. Whole seeds and fragments were distinguished with regard to the taxa of cereals, while other taxa were expressed as whole seeds.

The density and conservation of carbonized plant remains varies from one context to another. Temperature, duration of carbonization, type of soil, and atmospheric conditions all play decisive roles in the conservation of remains. Seed densities were comparatively higher at Tell Shiukh Fawqani than at the other two sites. At Tell Halawa, the majority of samples are very rich in charcoal.

Archaeobotanical analysis

The number of botanical remains that have been identified is sufficient to draw preliminary considerations on agriculture practices and to compare them in order to investigate the evolution of the subsistence economy at the settlements and the development of the agriculture economy during the period of their occupation (**Tables 1–3**; **Figure 3**). More than 70 taxa (seeds, fruits, and floral parts) have been identified at Tell Shiukh Fawqani. The study of the percentage of seed remains of cultivated plants and weeds shows that cereals compose the main crops in the total remains. Two-row barley (*Hordeum*

[10] See Mouterde 1966–1978 on the flora of Lebanon and Syria; Davis 1965–1982 on the flora of Turkey and the East Aegean islands. For older publications, see Neef 1989; Neef *et al.* 2012.

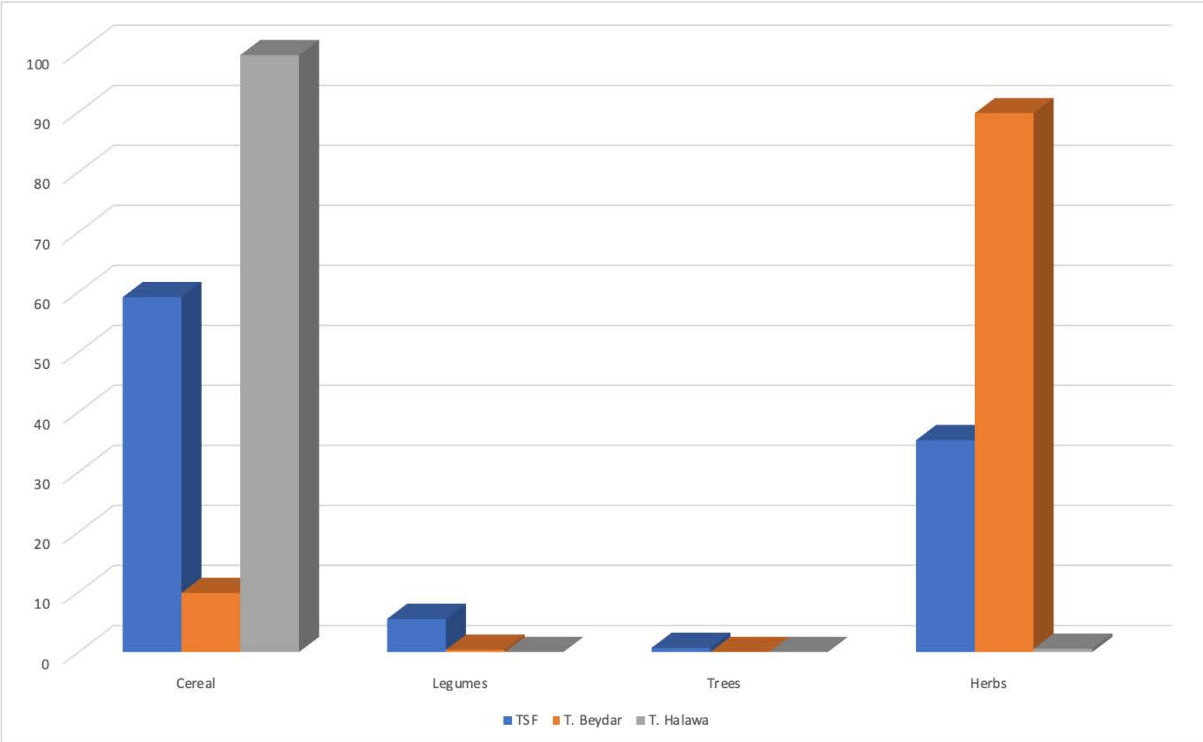

Figure 3: *Relative frequency of associated botanical groups at Tell Shiukh Fawqani (TSF), Tell Halawa, and Tell Beydar (chart compiled by author).*

distichum) is the most common. This dominance of barley is a common feature in arid and semi-arid environments, due to a higher tolerance for unfavorable growing conditions such as drought, stress, and soil salinity and due to a shorter reproduction cycle compared to wheat species.[11] While hulled and free-threshing wheat and hulled emmer wheat (*Triticum dicoccum*) are present, their importance among the first cereals and staple crops in the Late Neolithic decreased continuously in the Near East until the end of the Early Bronze Age. Free-threshing wheat / naked wheat (*T. durum/aestivum*) are accordingly less abundant. The rachis internodes of free threshing wheat were mainly identified as belonging to the tetraploid form. It can be noted that many researchers consider tetraploid genotypes of wheat more tolerant to drought stress in arid environments than hexaploid wheat genotypes.[12] Einkorn (*T. monococcum*), a common crop in the Khabur area during the Early Bronze Age, was only present in limited numbers at Tell Shiukh Fawqani. Considering their complementary nutritional value within a diet based mainly on cereals, pulses occur in rather limited numbers at Tell Shiukh Fawqani as well, and are particularly rare at the other two sites during the Early Bronze Age. Among the leguminous crops grown, lentils (*Lens culinaris*) are the most common, grass peas (*Lathyrus sativus*), chickpeas (*Cicer arietinum*), garden peas (*Pisum sativum*), and bitter vetch (*Vicia ervilia*) are less so.

A high percentage of weeds is systematically present in all samples. These remains consist mainly of grasses and small legumes. Weeds are plants associated with crops and suitable for loose soil. Many seeds of weeds have been identified in the assemblages of the sites. At Tell Shiukh Fawqani, they represent more than 50% of the taxa identified at the site. Otherwise, at Tell Beydar, the percentage of weeds exceeds 80%, as the presence of goatgrass (*Aegilops* sp.), including complete spikelets and seeds, could

[11] Riehl 2010.
[12] Percival 1974.

be determined at the site. The importance of *Aegilops* as a weed genus lies in the fact that it delivers genomes to cultivated wheats. It is particularly numerous in the Early Bronze Age and outnumbers even the cereal remains there. This weed might have been tolerated due to its considerable contribution to the cereal harvest.[13] At Tell Halawa, weeds were very few (less than 10%), though this can be ascribed to the limited number of samples and the method of collection. Other weeds, which belong to several botanical families, include: grasses like *Hordeum* sp., *Bromus* sp., *Avena* sp., *Phalaris* and *Lolium*; and legumes (*Fabaceae*) like *Trigonella*, *Astragalus*, *Medicago*, *Coronilla*, and *Onobrychis.* Other families have also been identified as *Caryophyllaceae*, *Rubiaceae*, *Chénopodiaceae*, *Asteraceae*, *Boraginaceae*, *Lamiaceae*, *Papavaraceae*, *Valérianaceae*, *Malvaceae*, *Cyperaceae*, and *Ranunculaceae* (**Figures 4–5**).

The majority of the weeds identified are associated with cultivated fields; few are usually found in other environments far from the field, such as in a ruderal environment. Other taxa have no preference; they can be found in both types of environment (fields / ruderal). Added to this are wild plants which proliferate in the steppe, like *Lithospermum* sp., *Arnebia* sp., *Androsace maxima*, *Alkana* and *Bellvalia* sp., *Capparis* sp., and *Ziziphera*, which can be transferred to the site through direct human use or through animal dung.

Fruits of oil crops such as flax (*Linum usitatissimum*) and safflower (*Carthamus tinctorius*) have been attested at Tell Shiukh Fawqani. These plants could have been grown during the Early Bronze Age at Near Eastern archaeological sites.[14] Safflower is a crop well adapted to arid conditions, with a strong tolerance to drought and salinity. Tree fruits are also present, such as grape vines (*Vitis vinifera*), figs (*Ficus carica*), pistachios (*Pistacia atlantica*), and almonds (*Prunus* sp.).

Conclusions

Preliminary results on the archaeobotanical data of our sites and the sites located in the northern region of Mesopotamia, particularly those located near rivers (Euphrates, Balikh, and Khabur), has enabled us to shed light on the economic place of agriculture in the societies of Upper Mesopotamia during the Early Bronze Ages.[15] They have also helped to understand the agricultural changes observed in relation to the choice of supply strategies and exchange. Two-row barley, the most stress-tolerant cereal of those cultivated at the sites, is the main crop in most of the Early Bronze Age sites in the Near East. It is often associated with naked wheat and emmer. These cereals likely formed an important part of the diet of the inhabitants, though barley is often grown for both livestock and human consumption. Experimental and ethnographic studies in Turkey and Greece have shown the types of products and residues resulting from different processing stages and their susceptibility to being stored in carbonized form.[16] The observation of archaeological contexts with preserved botanical remains shows that the crop stored was purely barley, stored as kernel caryopses, and partially sorted. In addition, the great amount of chaff and weeds indicates that cereals were probably treated near the site and that these weeds originated from cereal fields. The presence of grinding equipment associated with cereals means that these grains were probably reduced to cereal kernels in small fragments or as powder. Lentils and the two species of pea remain the most common vegetables in the region from these times.

At most sites of the Bronze Age, the grapevine is considered a minor crop or even a wild plant. The absence of other common plants used by humans during this period does not necessarily mean that

13 Riehl 2010.

14 Van Zeist and Bekker-Heeres 1985.

15 Van Zeist 2003.

16 Hillman 1984; Jones 1984.

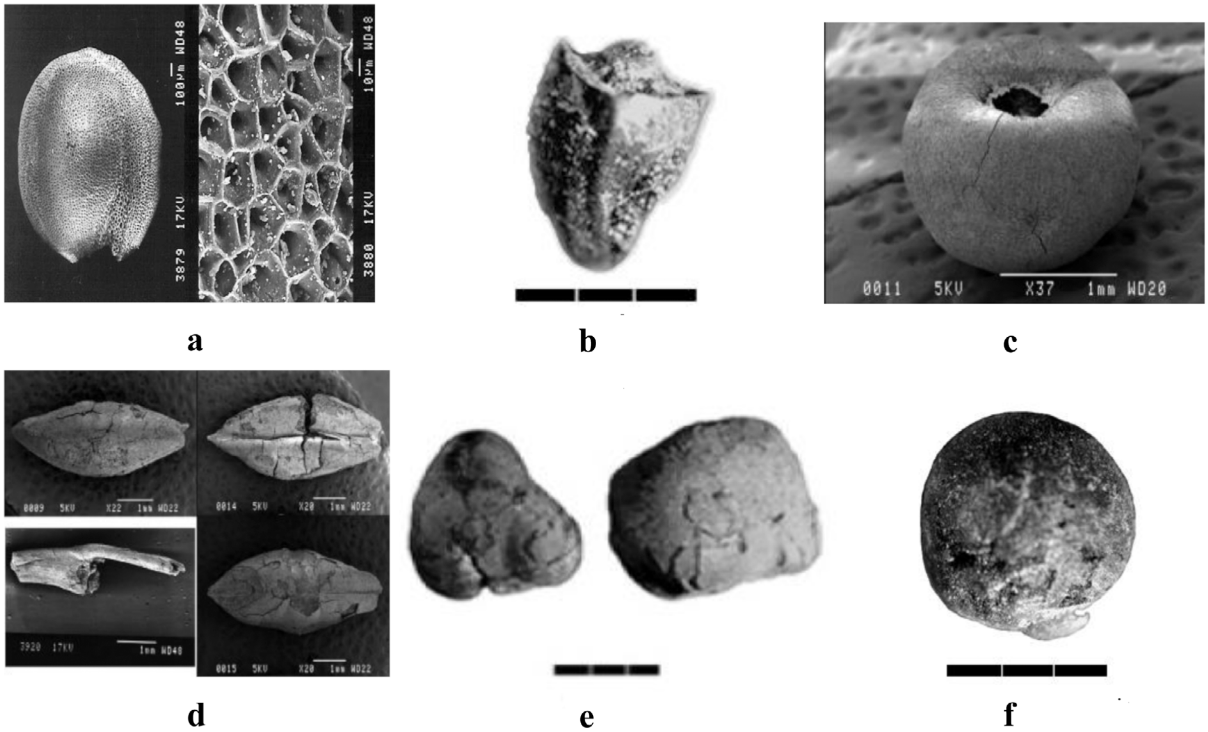

Figure 4: *Digital microscope images of seed samples: a)* Camelina sativa*; b)* Carthamus tinctorius*; c)* Galium *sp.; d)* Hordeum vulgare *subsp.* distichum*; e)* Lathyrus sativus*; f)* Lens culinaris *(all images by author).*

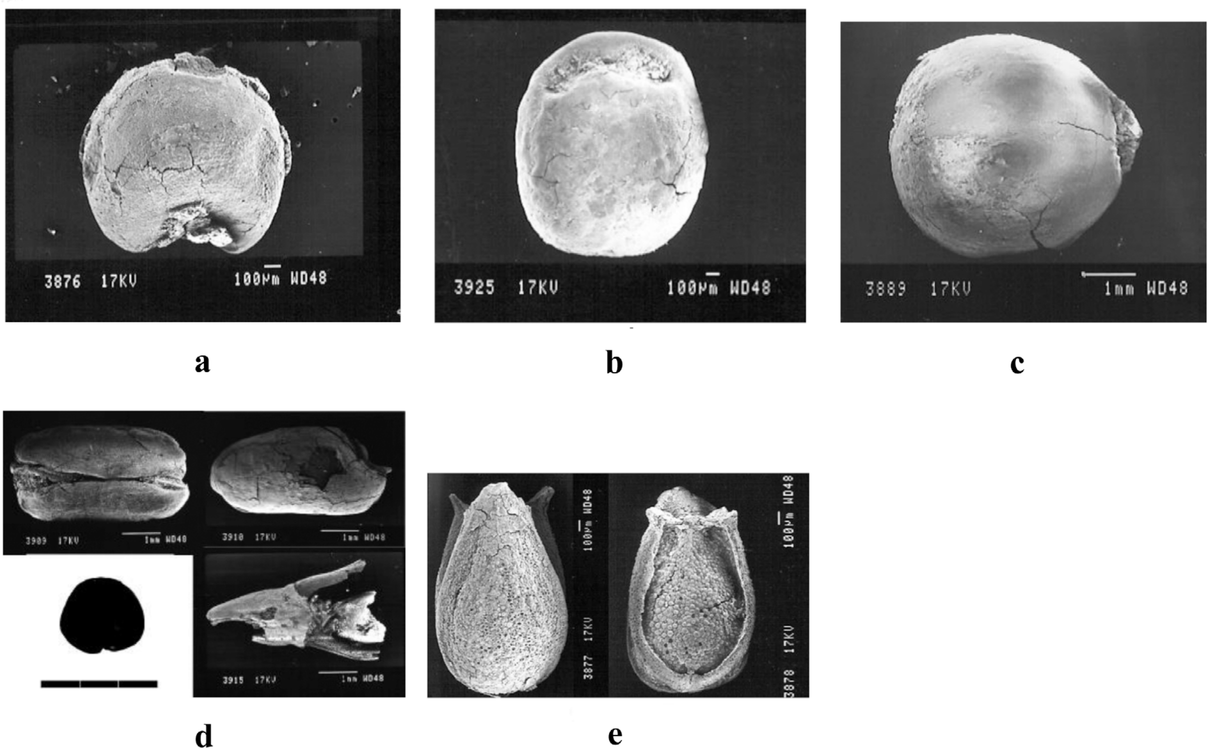

Figure 5: *Digital microscope images of seed samples: a)* Malva *sp.; b)* Nepeta *sp.; c)* Pistacia atlantica*; d) T*riticum aestivum-durum*; e)* Valerianella coronata *type (all images by author).*

they were not cultivated. However, the number of sites at which saffron (*Carthamus tinctorius*) is attested increased since the first identification in the region. This confirms the idea that it was cultivated. The earliest evidence of saffron dates back to the Uruk period, at the site of Tell Brak. According to McCorriston, false saffron was used both for dyeing and oil production.[17] This was likely the case at the sites sampled above as well.

Acknowledgments

I would like to thank Prof. Dr. Dominik Bonatz for giving me the opportunity to pursue my research and for strongly supporting it at the Freie Universität Berlin, and Dr. Reinder Neef for allowing me to work in the DAI laboratories and with his important botanic reference collections. I also thank the Gerda Henkel Foundation for the scholarship that enabled me to come to Germany and conduct my scientific research after Mesopotamia was ravaged by war and destruction.

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17 McCorriston 1998.

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	Botanical sample no./Year	32/97	1/01	2/96	3/96	15/96	18/96	23/96	4/96	10/96	13/96	64/97	11/96	12/96	14/96	1/96	31/97	40/97	8/98	30/97		
	Locus	1062	3006	455	455	413	495	651	458	456	449	1099	477	478	484	486	842	381	1286	38		
	Layer	A	A	A1	A1	A2	A3	A4	B1	B1	B1	B1	B4	B4	B5	B7	C?	C2	C	D		
	Litre of sediment	110	400	9	9	9	144	90	9	9	9	204	18	9	9	170	276	36	180	180		
	Vol. Flot (ml)	20	175	30	26	10	130	120	8	1	3	26	2	2	2	120	20	5	230	36		
	Vol. Sorted (ml)	20	55	15	26	10	40	50	8	1	3	26	2	2	2	30	20	5	30	36		
	Nature of Sediment	cend	limon	grai	cend	cend	cend	cend	jarre	cend	cend	cend	cend	cend	cend	accu	lim	cend	cend	cend		
Family	Structure	occu	sol	silo	fond	sol	accu	rem	con	foyer	remp	occu	sol	foyer	sol	sol	sol	four	remp	occu	Total	Occurrence
Poaceae	*Hordeum disticum* seeds	74	46	40	4	8	80	197			5	45	2	9		214	32	4	308	49	1117	16
	Hordeum disticum rachis	14	20		2	5	9	4				4	1	1	15	2	77	68	27	2	251	15
	Hordeum fragments	43	150	800	21	20	9	19	5	7	30	65	15	20	12	81	68	14	180	60	1619	19
	Triticum dur/aesti seeds	4	10			3	2	14				14				12	10	1	4	6	80	11
	Triticum dur/aesti rachis														3		6	4	2		15	4
	Triticum monococcum seeds						1										4				5	2
	Triticum dicoccum seeds	8	9			3	12	5			2			1		3	2		8	15	68	11
	T. dicoccum glume base	12	8		28		3		1			7	1	1			15	6		2	84	11
	Triticum fragments	14	20		5		6					33				1	21	2	5	4	111	10
	Céréales fragment	200	85		38	190	200	250			31	150	23	15	35	250	255	217	200	300	2439	16
Fabaceae	*Lens culinaris*		10		1		42	138		1	5	25	1	5		25	3	5	21	7	289	14
	Cicer arietinum	2	1			3		4			1	2		1	3					3	20	9
	Lathyrus sativus		11				11	9				5				11	3		7	2	59	8
	Vicia ervilia		1														1		2	1	5	4
	Pisum sativum		1									1								2	4	3
	Léguméneuses fragments		30				1	75				14		3			12		26	3	164	8
Anacardiaceae	*Pistacia* cf. Atlantica																			1	1	1
Moraceae	*Ficus carica*	1																			1	1
Rosaceae	Fragments d'Amygdalus	1	5					1									3			5	15	5
Linaceaae	*Linum usitatissimum*(seeds+capsule)							3(1)									1			1(1)	7	3
Asteraceae	*Carthamus* cf. *tinctorius*																4	1			5	2
Poaceae	*Hordeum murinum* seeds		2					7		2				1		2	1		2	3	20	8
Poaceae	*H.* rachis type sauvage																3	3			6	2
Poaceae	*Hordeum* sp.		6									8			3	2	2		3		24	6

Table 1: *Number of macrobotanical remains per sample from Tell Shiukh Fawqani (TSF).*

Poaceae	*Aegilops* sp. Seeds	19	29			22	21	15			3	28	3	4		30	10	5	6	138	333	14
Poaceae	*Aegilops* glume base	2	7		2		6	1				5	1			4	4	2	7	7	48	12
Poaceae	*Bromus* sp. Seeds	6	3		1	2	6	30			2	6	1		1	2			3	11	74	13
Poaceae	*Avena* seeds						5	3				5									13	3
Poaceae	*Lolium* seeds		5			1	9	15				9		1	1	7	2		1	1	52	11
Poaceae	*Ereomopyron* seeds											14							25		39	2
Poaceae	*Echinaria* seeds																1				1	1
Poaceae	Graminées	7	6		1	12		51	1		2	24	3	2	2	13	15	4	11	5	159	16
Poaceae	Graminées fragments	53			10		100				6	50		5			28	11	21		284	9
	Tiges fragments	5	17		4	15	19			8	1	4	3	11	26	28	30	5	13	5	194	16
Fabaceae	*Vicia* sp.		3			1		3				1					3		2		13	6
Fabaceae	*Trigonella* types	20	17			1	1	18				13					3			1	74	8
Fabaceae	*Astragalus* types	30	14			2	5	8				8	4	2			14	6		5	98	11
Fabaceae	*Medicago* type	6				3		1				2	1							3	16	6
Fabaceae	*Coronilla*	21	13		1		5	30				26								7	103	7
	Onobrychis	2					1	1				1									5	4
Fabaceae	Grande légumineuses	2			3			5			1			1		5				3	20	7
Fabaceae	Petits Légumineuses	12	5			7											2	2	1		29	6
Ranunculaceae	*Adonis*	6	5					5			1	2			1	7	2	4	3	3	39	11
Polygonaceae	*Rumex*	1	1					1													3	3
Polygonaceae	*Polygonum*		2			1	1	4				1					1				10	6
Caryophyllaceae	*Silene*	34	8			1	4	73			1	9		3			10	3			146	10
Caryophyllaceae	*Vaccaria*		2			2	2	7				1				3					17	6
Caryophyllaceae	*Gypsophila*					1		1											1		3	3
Rubiaceae	*Galium*	2	8			1	8	19				4				12	12	17	7	2	92	11
Thymelaeaceae	*Thymelaea*	2	4				1	5				4				1	2	17	1	2	39	10
Liliaceae	*Beta*																1				1	1
Asteraceae	*Centauria*	1				1	1					1					2			1	7	6
	Cirsium sp														1						1	1
Asteraceae	*Composeae*	1																	3		4	2
Labiateae	*Teucrium*	2	2		3	2		10									3	1	1		24	8
Laminaceae	*Nepeta*	2	1			2		18												1	24	5
Labiateae	*Ajuga*					2		2									1			1	6	4

Table 1 cont.: *Number of macrobotanical remains per sample from Tell Shiukh Fawqani (TSF).*

Labiateae	*Labiateae*	2				3		2												2	9	4
Malvaceae	*Malva*	5	1		2		2	3				3					2			1	19	8
Euphorbiaceae	*Androsace maxima*	1																	1		2	2
Brassicaceae	*Brassica type*	1	1									2								4	8	4
Crucifère	*Crucifère*	2	4					1									2				9	4
	Nesilea capsule															1					1	1
Hypericaceae	*Hypericum type*																			1	1	1
Poaceae	*Poa bulbosum type*				2														1		3	2
Plantaginaceae	*Plantago*		1														4	1		2	8	4
Ranunculaceae	*Ceratocephalus*	5	4									4					3	2	1	18	37	7
Liliaceae	*Bellevalia type*	2						2									2		1		7	4
Brassicaceae	*Camelina sativa*						1														1	1
Poaceae	*Phalaris*	4					1	8			1	2			3					1	20	7
Papaveraceae	*Faumaria*	1	1				2	1						1				2		1	9	7
Valerianaceae	*Valerianella* type *coronata*	4	14		1	4	7	51			2	11	1	1			10	3	1	14	124	14
Valerianaceae	*Valerionella* type *vesicaria*	1					4	2											1	1	9	5
Cyperaceae	*Scirpus maritimus*							39						1						1	41	3
Chenopodiaceae	*Chenopodium*		4				1													1	6	3
Boraginaceae	*Arnebia*	88	16			1	40	61			1	74		7	1	8	10		98	68	473	13
Boraginaceae	*Lithospernum*	32	23			1	1	2				4				1	2	1	1	1	69	11
Boraginaceae	*Heliotropium*	2	1					3				3					5	1		1	16	7
Capparidaceae	*Capparis*	1				2											1				4	3
Fabaceae	*Prosopis*		1				6	2				2									11	4
Amaranthaceae	*Salsola*																1				1	1
	Floral part																2				2	1
	Dungs							1									1			1	3	3
	Tubers							1								2			2		5	3
	Spiked							1				1									2	2
	Caramels					31	2									40					73	3
	Undetermined	2	9			14	10	22			34	6	15	4	6		3		8	1	134	13
	Indeterminable	22	3		7	50	50	90				20			20		30	8	1		301	11
	Total	784	650	840	136	417	698	1345	7	18	129	723	75	100	133	767	747	420	1017	782	9788	
	Taxon numbers	40	42	1	12	27	31	45	3	4	13	37	8	16	11	19	42	21	30	33		

Table 1 cont.: *Number of macrobotanical remains per sample from Tell Shiukh Fawqani (TSF).*

HLW A/Sample number	A/86		A/86				84	A/86	A/86	
Fundnum	86N3	86BM118	N86:5	86BM106	86BM183			N86:1		
ID	60	53	33	50	54	62		61	140:13:00	
Reference	M0e:030	BM4a:55	M0e:030	6b:67	BM6b:70	BM3b:30	L7f:26	MOe:13	86, 140:13	
Liter of sediment	1 Dose	1 Tüte	1 Dose	1 Tüte	1 Tüte	1 Dose	total org	Erde		
Vol. Flot.						531/30,79g sorted				Total
Hordeum disticum seeds		3		2	37		15.51 g	146.24 g	286.83 g	448.58 g/1 g=35 seeds
rachis Hordeum							2			2
Hordeum sp.							1			1
Triticum dicoccum	1						5		1	7
Aegilops	6	1	6						6	19
Papilionaceae	4						3		4	11
Valerianella versicaria	1						1		7	9
Vitis		1								1
Eremopyrum			5							5
Phalaris			9							9
Malva			15							15
Silene			7				1			8
Gypsopilia			2							2
Adonis			4							4
Lolium			2							2
Fumaria			1				1			2
Medicago			10							10
Gramineae			4							4
indetermine				1						1
Dung					1	15				16
vaccaria pyramidata							1			1
Bellevela							2			2
Total	12	5	65	3	38	15	17		18	

Table 2: *Number of macrobotanical remains per sample from Tell Halawa.*

Tell Beydar/Sample number	13315	13315	13322	13312	13312/C1	13315	13315		
Field/Area	M	M	M	M	M	M	M		
Period	EJIIIb	EJIIIb	EJIIIb	EJIIIb	EJIIIb	EJIIIb	EJIIIb		
Strat	soil	soil	floor	floor	floor	floor			
Vol. Flot.	35 ml	94 ml	9 ml	2 ml	2 ml	3 ml	10 ml	Total	Occurrence
Hordeum disticum seeds	15	56	6					77	3
Hordeum disticum (internodes)	20	46	42		3	10		121	5
Hordeum vulgare fr.	20	62			8			90	3
Triticum aestivum/durum seeds		1	1					2	2
Triticum aestivum/durum compactum		3						3	1
Triticum compactum (spikelets bases)		9						9	1
Triticum dicoccum	3	1				1		5	3
Triticum mono/dicocc (spikelets bases)			3					3	1
Triticum aestiv/dur (spikelets bases)	9	35	9		1	3		57	5
Cerealia fr.	600		40	6		35		681	4
Vicia ervilia			1					1	1
Fabacee fr.		5	4					9	2
Heliotropium			1					1	1
Gypsophila pilosa	2	1						3	2
Silene	5	2						7	2
Vaccaria pyramidata/segetalis	1							1	1
Chenopodium spec.						1		1	1
Alyssum		2				1		3	2
Erodium type *(umbelifera)*	1	1						2	2
Gramineae	60				1			61	2
Aegilops	116	400					250	766	3
Aegilops fr.		300					66	366	2
Aegilops (spikelets bases)	135	700					135	970	3
Avena	4	2						6	2
Bromus	4	8	2					14	3
Eremopyrum	16	15						31	2
Hordeum cf. Wild (*muranium*)	5	10						15	2
Lolium	9	29						38	2
Phalaris	2	1						3	2
Hypericum			15					15	1
Teucrium/Ajuga	2							2	1
Ziziphora capitata/tenuior					1			1	1
Bellevalia type		2						2	1
Malva	2	6						8	2
Fumaria			1					1	1
Astragalus	4	1	4			1		10	3
Coronilla	2	2	1					5	3
Trigonella spec.	28	5	10	1		19		63	5
Plantago psyllium type	3							3	1
Adonis annua type		2						2	1
Apium nodiflorum		3						3	1
Indeterminate	10	8	1		2	10		31	5
Dungs		2						2	1
Total	1078	1720	141	7	16	81	451	3494	

Table 3: *Number of macrobotanical remains per sample from Tell Beydar.*

3D Imagery for On-Site Assessment of Mud Brick Architecture: A Case Study from Gird-i Shamlu (Iraqi Kurdistan)

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Abstract

The application of 3D photogrammetric recordings at the ancient site of Gird-i Shamlu (Iraqi Kurdistan) contributes to the documentation of mud brick architecture as well as its identification and stratigraphical interpretation. This paper proposes a general workflow for three-dimensional 'Structure-from-Motion' recordings of the results of archaeological excavations and examines possible benefits of 3D imagery for archaeological fieldwork. A workflow for the enhanced detection of mud brick architecture by 3D recordings and subsequent on-site verification is proposed and exemplified by case studies from Early Dynastic period buildings at Gird-i Shamlu.

Keywords

Close-range Photogrammetry, Near-Eastern Archaeology, Archaeological documentation, Structure from Motion, Excavation Methodology

Introduction

During the last decade, the use of 'Structure-from-Motion' (SfM)-photogrammetry has become more popular on archaeological excavations all over the world. Often used only as a documentation method, our experiences from Gird-i Shamlu show that 3D recordings can assist the understanding of complex archaeological deposits already during ongoing fieldwork.

The case study is based on insights gained during excavations at the ancient settlement site of Gird-i Shamlu, which is situated in the centre of the Shahrizor Plain in Iraqi Kurdistan, Sulaymaniyah province. Gird-i Shamlu has been excavated since 2015 as part of the DFG Emmy Noether research project 'Flight — Migration — Interaction', directed by Simone Mühl from the Ludwig-Maximilians University of Munich.[1]

This article introduces a general workflow for 3D recording based on experiences from excavations at Gird-i Shamlu.[2] Due to the rapid development of 3D documentation techniques, technical details concerning equipment, software settings, and their specifications will not be the focus of this paper, as they undergo constant change and improvement.

[1] The projects' website can be found at http://shamlu.net (Mühl 2020).

[2] Some 3D-models from Gird-i Shamlu were made available online and are referenced in the text (Wolter 2020; https://sketchfab.com/Shamlu/collections/bh6). These are accessible with most internet browsers and can be visited for interactive 3D imagery.

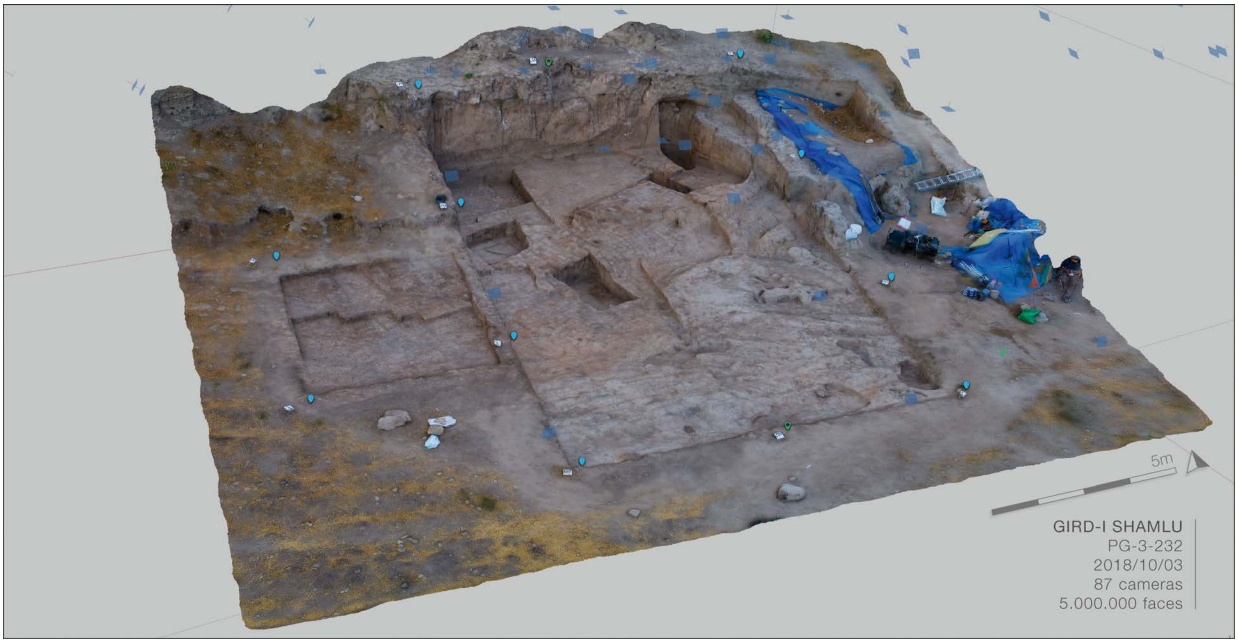

Figure 1: *3D model (screenshot) of Gird-i Shamlu, Sector 3 (Shamlu Archaeological Mission).*

3D photogrammetry

Data recording in the field

During the fieldwork seasons 2016–2019 at Gird-i Shamlu, all excavated areas were documented with 3D techniques at the end of each workday (e.g. **Figure 1**). Thus, the whole trench was photographed with several nadir images and additional oblique angle images. The images were recorded in RAW format with a drone-mounted camera with the flight height and the field of view adjusted according to the size of the documented area and the desired resolution.[3] Significant overlap between the images, full coverage of all sides, and well-focused images are essential for good results in the post-processing of 3D data.[4] Additionally, throughout the whole workday, small installations, burials, special find situations, or sometimes intermediate excavation phases were recorded in separate 3D models with hand-held cameras. The use of DSLR-cameras allows for smaller scale *ad hoc* recordings during ongoing excavation work. The higher resolution and wider tonal range of these images offer more possibilities in the post-processing of the recordings than does the drone imagery, but often need longer post-processing time.

The final quality of the 3D models is influenced by several factors. Knowing the abilities and limits of the recording devices is essential for recording a set of images suitable for successful post-processing. To keep the process efficient, a correct estimate of the number of images needed to produce a complete 3D model is crucial. Selecting the right exposure conditions, exposure settings, and image angles adapted to the situation can greatly reduce the number of images needed.

All photogrammetric 3D images contain several numbered targets for ground-control points (GCPs), which are placed in the recorded area for later geo-referencing of the models. The position of the targets is measured in the excavation coordinate system by total station or GNSS. The GCPs for the daily

[3] Gutierrez *et al.* 2016, 8.

[4] See Willis *et al.* 2016 for a detailed introduction to archaeological 3D-recording based on the SfM-method.

drone recordings are permanently placed on the edges of the excavated areas and re-measured on a weekly basis. The GCPs for the hand-held camera recordings are placed shortly before the recording and removed after measurements and photographs have been taken. An incremental numbering system for the 3D recordings fosters the connection of surveyed data with the 3D models later. Additional control points, which are not used for referencing, later serve the independent assessment of the precision of the 3D models.

Post-processing

After each workday, all recorded data is downloaded, sorted, and checked for quality. Images that are blurred or improperly exposed are discarded, and the subsequent measurements are attached directly to the image folders. For 'Structure-from-Motion' processing (SfM), the unedited RAW images are used in most situations.[5] In difficult low-light situations, a pre-processing colour correction can be useful to enhance the reproduction of details in underexposed areas.

During the field work campaign, all models are processed with the SfM-software based on a reasonable balance between processing time and level of detail / resolution.[6] The 3D models are referenced by the GCPs and the models' accuracy is checked by additional control points. Several batch routines for the naming and conversion of files and the SfM-processing of models streamline this workflow as much as possible. The resulting high-resolution orthographic imagery and digital elevation models are loaded in the excavation project's GIS for further analysis.[7] The hand-held photographs are normally processed to a final ground resolution of ~72 dpi (GSD ~ 0.02 cm),[8] while the drone recordings can go as low as ~5 dpi (GSD 0.5 cm), as they are usually viewed and interpreted in smaller viewing scale.[9]

Benefits of 3D photogrammetry

3D imagery offers additional information, as compared to traditional excavation photographic documentation, where the photographer chooses the image extent, focal point, and exposure depending on the main subject of the image. After georeferencing, three-dimensional photogrammetry contains information about scale, orientation, extent, and volume of the documented archaeological record, information that cannot be obtained from normal excavation photographs without additional documentation such as field drawings and measurements. All this spatial information is easily accessible in CAD or GIS software and can be included in the excavation documentation as needed.[10]

Other technical approaches for the collection of 3D data are available and include laser scanning and structured light scanning. Structured light scanning is not suited for acquisition of high-resolution 3D imagery in bright daylight, but laser scanning / LiDAR yields good results.[11]

Compared to two-dimensional rectified photographs, 3D recordings are often easier to collect and more failsafe than the production of referenced orthographic imagery of complex archaeological structures.

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[5] See Westoby *et al.* 2012 for a comprehensive introduction to the technological background of SfM- photogrammetry.
[6] Several software bundles are available for processing SfM-models. An updated list is accessible at the website of the Technical University of Dresden, see Elias 2020.
[7] GIS: geographic information system.
[8] GSD: ground sampling distance.
[9] See Murtiyoso and Grussenmeyer 2017 for a detailed discussion of resolutions in photogrammetric heritage recordings.
[10] CAD: computer-aided design.
[11] LiDAR: light detection and ranging. The high cost of laser scanning equipment is prohibitive for most archaeological research projects, while SfM-photogrammetry can be carried out with equipment already available on many excavations.

Figure 2: *Regional overview of the Shahrizor plain.*

Furthermore, 3D spatial data includes height information accessible by 3D model or point clouds or represented by digital elevation models (DEM). This information is not readily available in 2D rectified photography.

Gird-i Shamlu excavations

Location / excavation history

Gird-i Shamlu is a *tell* settlement in the centre of the Shahrizor Plain, a fertile plain with a good water supply from karstic springs and mountain rivers (**Figure 2**).[12] Water drainage is blocked from its natural outflow at the southern extent of the Shahrizor Plain by the Darband-i Khan dam.[13] The first archaeological activities in the area in the late 1950s were rescue excavations by the Iraqi Directory of Antiquities, carried out before the completion of the Darband-i Khan dam in 1961 which flooded the southern part of Shahrizor Plain.[14] During this rescue excavation project, several sites in the centre of Shahrizor Plain were investigated, including Gird-i Shamlu, which was explored by a substantial search trench. New archaeological research at Shamlu began in 2012 during the 'Shahrizor Survey Project' under the direction of Simone Mühl and continued since 2015 within the scope of the 'Shamlu Archaeological Mission' (SAM).[15]

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[12] Altaweel *et al.* 2016, 345–346.

[13] Al-Husseinawi *et al.* 2018, 3.

[14] Excavations at another site, today known as Gird-i Hajji Hama Reza, were published by Kazem al Janabi under the name of Tell Shamlu, see Janabi 1961.

[15] Altaweel *et al.* 2012; Mühl 2020.

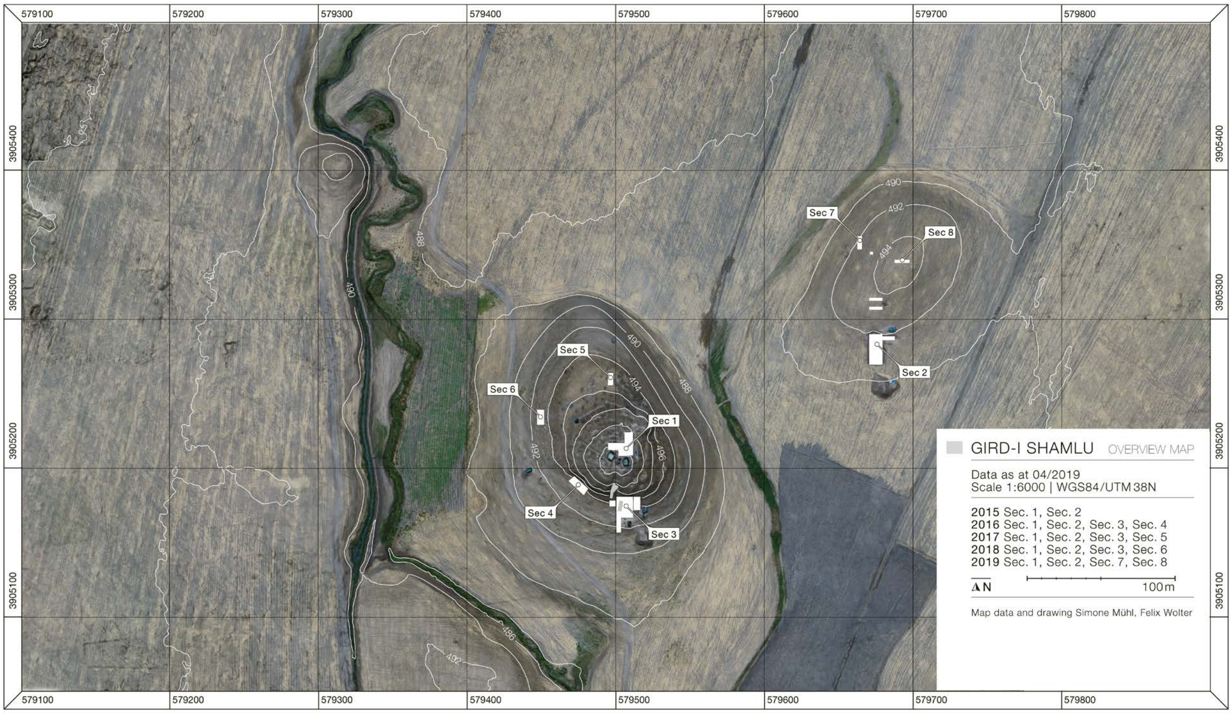

Figure 3: *Topographic map of Gird-I Shamlu and excavation areas (SAM).*

The archaeological excavations at Shamlu have been carried out in annual campaigns since 2015, and have yielded substantial remains from Late Chalcolithic, Early, Middle, and Late Bronze Age to Iron Age occupations.[16] Several mud brick buildings were excavated in eight sectors (see **Figure 3**), situated on the top of the main mound (Sector 1), its south-western slope (Sectors 3 and 4), and on a lower mound north-east of the main mound (Sector 2). Furthermore, smaller investigations were carried out at different locations on the main mound (Sectors 5–8, Sounding A, B). Additionally, magnetic prospections and environmental studies were conducted at Gird-i Shamlu and its vicinity.[17]

3D documentation at Gird-i Shamlu

3D photogrammetry was initially employed at Gird-i Shamlu as a documentation method. We expected a higher documentation resolution of the archaeological record and helpful printouts for plan-drawing purposes from this method. During the first field season, the difficulties in the identification of mud brick structures became obvious, due to their bad state of preservation. Because of this, we began experimenting with the use of 3D photogrammetric imagery for the identification of mud brick structures during the ongoing excavation process. The following paragraph will introduce this *ad hoc* 'remote sensing' methodology and give two examples for the possible benefits and limitations of 3D-assisted interpretation of archaeological deposits at Gird-i Shamlu. The conclusive recording of the archaeological interpretation was always carried out in annotated section and planum drawings, an informed documentation method which cannot be superseded by 3D photogrammetry.

16 Mühl (forthcoming).

17 Magnetic prospection: Mühl and Fassbinder 2016; Scheiblecker *et al.* 2019; Environmental studies: Mühl *et al.* 2018.

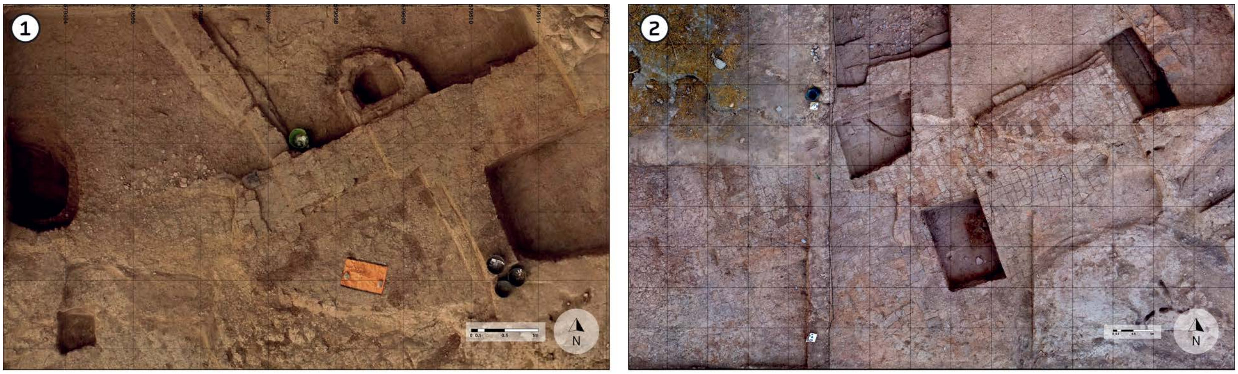

Figure 4: *Gird-i Shamlu, 1: Building 3-A 'oven building' 2: Sector 3 Building 3-B 'multicoloured building' (SAM).*

Sector 3

Two main mud brick buildings, dated to the Early Dynastic period, were excavated in Sector 3 (**Figure 4**).[18] The younger one, 'Building 3-A', consists of three excavated rooms, connected to each other by narrow doorways. Its use spans over several phases, the latest phase of use was ended by a fire event. The older one, 'Building 3-B', features a plastered round wall, made from differently coloured mud bricks, at which several small chambers lay on both sides.[19] While both main buildings share approximately the same orientation, their construction technique, material, and stratigraphical relation clearly indicates that 'Building 3-A' and '3-B' represent two different constructions.

Case study 1: Stratigraphical considerations in Building 3-A

Building 3-A was excavated during the campaigns of 2017 and 2018 at Gird-i Shamlu. The poor state of preservation complicated the identification of walls and their division from the surrounding mud brick debris of this building. While a central wall could be clearly identified, a smaller wall (stratigraphic unit 30068) which divided room 3-A/2 from 3-A/3 was poorly visible during excavation (**Figure 4.1**).

The presence of this dividing wall was already suspected *c.* 1 m above the floor level of the building on an early intermediate planum in 2016 (**Figure 5.1**), indicated by minor colour differences from the neighbouring fills.[20] Therefore, the wall was left standing and the rooms north of the main wall were excavated to the first floor. Even when this first floor was excavated, the existence of the dividing wall 30068 was still in question. Its presence was proven when the older floor of Building 3-A was reached in 2017. On this floor, room 3-A/2 features a calcinated reed mat layer, which touches the south-western face of wall 30068 in its northern half (**Figure 5.2**). The clear border of this deposit defined the final thickness of wall 30068, which is *c.* 40 cm wider than the wall that was left standing based on the detection in the area earlier.[21] Furthermore, it was possible to identify a doorway between the two rooms, following the debris on the older floor layer (**Figure 5.4**).[22] This doorway was intentionally closed with mud bricks during the later use of Building 3-A.

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18 Wolter 2020, https://skfb.ly/6SUrU 3D-model of Sector 3, Building 3-A (PG-3-099).
19 Wolter 2020, https://skfb.ly/6SUnP 3D-model of Sector 3, Building 3-B (PG-3-232).
20 Wolter 2020, https://skfb.ly/6SUnX 3D-model of Sector 3, Building 3-A during excavation 2016 (PG-3-018).
21 Wolter 2020, https://skfb.ly/6SUnT 3D-model of Building 3-A (detail) during excavation 2016 (PG-3-072).
22 Wolter 2020, https://skfb.ly/6SUnU 3D-model of Building 3-A (detail) during excavation 2017 (PG-3-101).

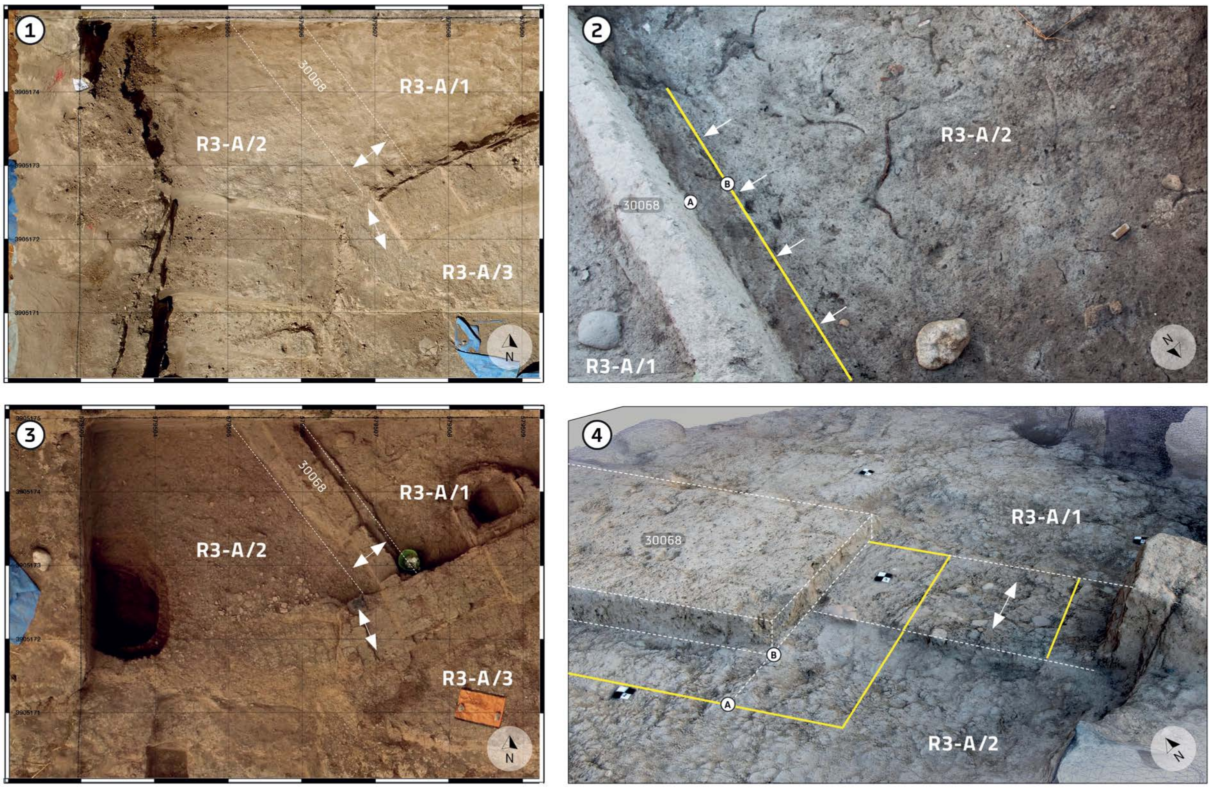

Figure 5: *Gird-I Shamlu, Building 3-A. 1: State of excavation of the northwest-corner of Sector 3 in 2016, 2: Calcinated reed mat remains in room 3-A/2. 3: State of excavation of the northwest-corner of Sector 3 in 2017, 4: Excavated (A) and reconstructed (B) extent of wall 30068 (SAM).*

Figure 6: *Gird-i Shamlu, partly flooded site, 1: Site during spring 2019 and flow direction of the lake's current, 2: Cross-section of a 'multicoloured' mud brick wall, erosion, and preservation (SAM).*

The possibility to 'travel through time' through the excavation process of Building 3-A with the aid of about 120 3D models, recorded during the two excavation campaigns, was crucial to the understanding of the building sequence in this area. The 3D models allowed a re-evaluation of earlier excavation phases, even if the archaeological deposits had already been removed. A combination of observations in the field with 3D imagery collected during the excavation can support the interpretation of archaeological deposits, in addition to traditional archaeological methods such as the post-excavation examination of sections.

Regular 3D recordings provide a valuable additional layer of documentation and can serve as a fallback system if important aspects of the archaeological deposits are not fully understood during excavation. However, several important archaeological observations are not possible through 3D imagery: The consistency of a deposit, its stratigraphical position, and colour changes during the day or with different light situations cannot be represented (fully) in 3D imagery and will always need close attention and documentation by the excavator during field work.

Case study 2: Identification of 'Building 3-B' mud brick architecture

Preservation of ancient structures and destruction

Sector 3, located at the southern slope of the main settlement mound, sometimes lies on the shoreline of the Darband-i Khan dam lake (see **Figure 6.1**). The level of the lake changes depending on the annual snowmelt and rainfall in the region and the demands of the dams' hydro station.[23] It varies by ~10 m over the year, usually peaking between April and July.[24] During this time, the water can reach Gird-i Shamlu from the southeast, causing erosion and destruction of the site.[25] The waves and the lake's current wash out loose deposits like fills and floors and leave the ancient mud brick walls partly exposed. Heavy rainfalls of up to 100 mm per month from November to April, combined with strong winds, intensify the erosion on the weather side of the settlement mound in the southeast.[26]

Adding to the erosion by rain and the lake's waves, the annual submersion of the archaeological deposits seems to affect the preservation of the upper 30 cm of the ancient architectural structures. Additionally, agricultural activities (ploughing) and planted and wild-growing vegetation add to the deterioration of the mud brick architecture in Sector 3. While the lower part of the walls are well preserved and individual bricks can be identified on the surface and in sections, the upper part consists only of hard but crumbly mud brick remains without any visible brick layout (see **Figure 5.2**). Even if the general orientation of the ancient mud brick architecture is partly exposed by these circumstances, it has proved difficult to distinguish the built structures from the surrounding soil due to the bad state of preservation and heavy erosion.

Building 3-B

During the 2018 campaign, substantial remains of a monumental building were excavated in Sector 3. Several walls, a few rooms, and a passageway have so far been identified (**Figure 4.2**). The full extent of the building is still unknown and awaits further investigation during future excavation campaigns. The building is constructed from five different types of mud bricks: Reddish dark-brown brittle, light-brown dense, yellowish-brown slightly brittle, medium grey brittle, and reddish-light brown mud bricks.[27] The multicoloured walls were difficult to distinguish from the surrounding soil during excavation of the upper brick layers, due to the bad state of preservation as described above.

[23] Al-Husseinawi *et al.* 2018, 4.
[24] Cordell 2006, 13–14.
[25] Wolter 2020, https://skfb.ly/6SUnN 3D-model of Gird-i Shamlu surrounded by water in spring 2019.
[26] World Weather Online 2020.
[27] The five types of mud bricks were sampled and mapped in the final plan of the building. Furthermore, magnetic measurements were taken of the different types by M. Scheiblecker.

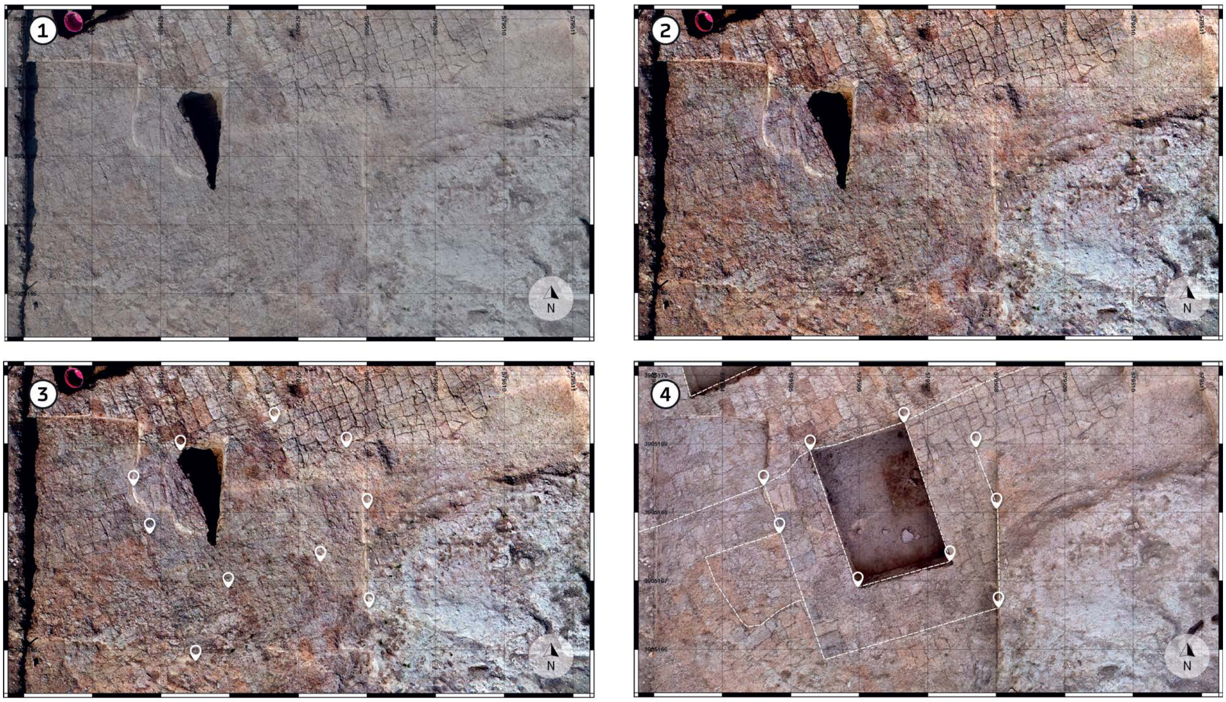

Figure 7: *Gird-i Shamlu, Building 3-B. 1: Orthophoto of the southern half of Sector 3, 2: Colour-corrected orthophoto of the same area, 3: Annotated orthophoto with POI, 4: Excavated room of Building 3-B. (SAM).*

3D photogrammetry and application

During the excavation work in Sector 3, 3D photogrammetric drone recordings were carried out regularly. However, having bird's-eye views does not necessarily make the structures more visible (**Figure 7.1**). Nevertheless, additional gradation changes and exposure settings applied to the high-resolution imagery proved to assist the identification of preliminary assessments of the extent of architectural features (**Figure 7.2**). No standard colour adjustment can be applied to the imagery, but experimentation with different colour settings, combined with close observation of areas in question and knowledge of the excavation realities on the ground, does sometimes support the identification of architecture in the imagery.[28]

Moreover, the light situation at the time of the photogrammetric recording is crucial for the visibility of mud brick structures in the 3D imagery. Early morning and sunset seem to be good times for documentation with good colour representation, but low-light environments can also make the recording more likely to be affected by quality problems such as low-exposure, grain, and motion blur. Also, the careful application of water with a pressure sprayer can temporarily enhance the visibility of different colours and the borders between different deposits.

Orthorectified 3D models allow the combination of all this different image material with a precise geo-location. This enables the excavator to compare views of the same archaeological deposit in the morning and in the evening, wet and dry, in real-colour and colour-enhanced and to pin certain points of interest (POI) for close inspection in the field (**Figure 7.3**). The POI mark places where differences in colour or

[28] A simple contrast enhancement by gradiation stretch as often provided as a standard setting in GIS or CAD software, can already be helpful. For the use of full-range image editing software the re-attachment of projection information will be necessary after the colour grading of the orthoimages.

linear structures are observed. As the coordinates of the POI are known from the geo-located imagery, they can be staked out with the measuring device on the next day in the field for on-site investigation and verification.

None of the above-described methods guarantee success in the detection of eroded mud brick architecture. Therefore, the results of the post-processing workflow need additional verification by archaeological investigation on-site. By the analysis of the 3D photogrammetric record, combined with a detailed on-site assessment of the POI, thin lines of plaster on wall faces or slight differences in consistency and colour of the mud bricks were detected. This finally led to the identification of several rooms of Building 3-B of which only the upper row of the preserved mud brick courses and one small chamber have been excavated so far during the latest campaign in Sector 3 in 2018 (**Figure 7.4**).

Conclusion / Perspectives

The experiences with 3D photogrammetry at Gird-i Shamlu have shown that this documentation method facilitates the detection, understanding, and interpretation of mud brick architecture in several ways. First and foremost, ortho-referenced 3D imagery is understood as a highly detailed, 'additional' layer of documentation, which can enhance precision and effectiveness of other documentation such as field drawing with measurements. The new perspectives that can be gained by a bird's-eye view, and the comparison of different recordings and colour enhancements assist the identification of archaeological features during ongoing excavation. Furthermore, 3D recordings can allow 'virtual' reinvestigation of certain deposits that need to be reviewed during post-processing of the excavation results, especially when different parts of the trench were excavated at different stages of time.

Other potentials of the 3D imagery lie in the visualisation of archaeological results and the combination of 3D models with other data such as volume analysis, weight and work calculations, or reconstruction approaches. Future advances in 3D recording techniques, like the use of HDR-imagery for photogrammetry and faster post-processing will further enhance quality and effectiveness of these approaches to documentation in archaeology.

3D recording must be understood as a valuable addition to the procedure of archaeological excavation and documentation, especially when used in interaction with the actual investigations on the ground. The assessment of detailed 3D imagery during on-going fieldwork can significantly reinforce the final interpretation of mud brick and other earthen features, architectural structures, and their stratigraphical sequence.

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An Overview of the Achaemenid Glazed Architectural Decoration

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Abstract

During the Achaemenid period, diverse techniques of production, styles, and motifs came to bear for the manufacture of glazed architectural decorative elements in the capitals of the Persian Empire. With strong governmental and financial support, a large number of glazed architectural elements were produced in the major Achaemenid centers. The three capitals Susa, Persepolis, and Babylon yielded glazed architectural decorations. The manufacture of glazed bricks continued throughout this period and reached a new level of quality and methods of production. The tradition of glaze manufacture for the Achaemenid glaze industry in the Persian period at Susa, Persepolis, Babylon, and Tol-e Ajori can be traced back to Susa and Babylon. Fundamentally, Achaemenid glazes were applied to siliceous (silica or quartz-based) bodies, to which various glazed colors were adhered. Glazed bricks from Tol-e Ajori and a minor percentage of the glazes from Susa were applied to terracotta (clay-based) bodies. The motifs were outlined with raised black/brown glazes to separate various glazed colors from each other. A wide variety of colors are involved in the glaze compositions, including: blue, dark blue, turquoise, green, yellow, orange-yellow, white, black, and brown (not red). Some bricks had a preliminary coating beneath the glaze.

Keywords

Glazed Artefacts, Major Achaemenid Sites, Persepolis, Iconography, Techniques of Production

Introduction

From the 14th century BCE onwards, the use of vitreous material such as glazed fired clay (terracotta) became widespread and encompassed such diverse objects as pottery, bricks, knobs, wall plaques, and wall nails.[1] Several sites of glaze production can be identified across the Ancient Near East, such as Nuzi, Tell Halaf, as well as Neo-Assyrian palaces and temples at Nimrud, Khorsabad, Nineveh, and Carchemish.[2] Recent excavations in Satu Qala in Iraqi Kurdistan and Tell Nebi Yunus in Nineveh have also yielded Assyrian glazed bricks, tiles, and wall pegs colored in light blue, yellow, white, black, and brown.[3] Glazed bricks famously came into production at Babylon in the Neo-Babylonian period to build

[1] The basic literature is provided by Moorey 1994; Caubet 2007; McCarthy and Paynter 2008; Schmidt 2019; Fügert and Gries 2019; 2020.

[2] See Shortland *et al.* 2017 on Nuzi; Langenegger *et al.* 1950 on Tell Halaf; and Caubet 2007, 85–99 on the Neo-Assyrian sites.

[3] See van Soldt *et al.* 2013, Figs. 4–5; Pappi 2018, 97–123 on Satu Qala. Information on recent finds at Tell Nebi Yunus was provided by personal communication from Prof. P. Miglus in November 2019.

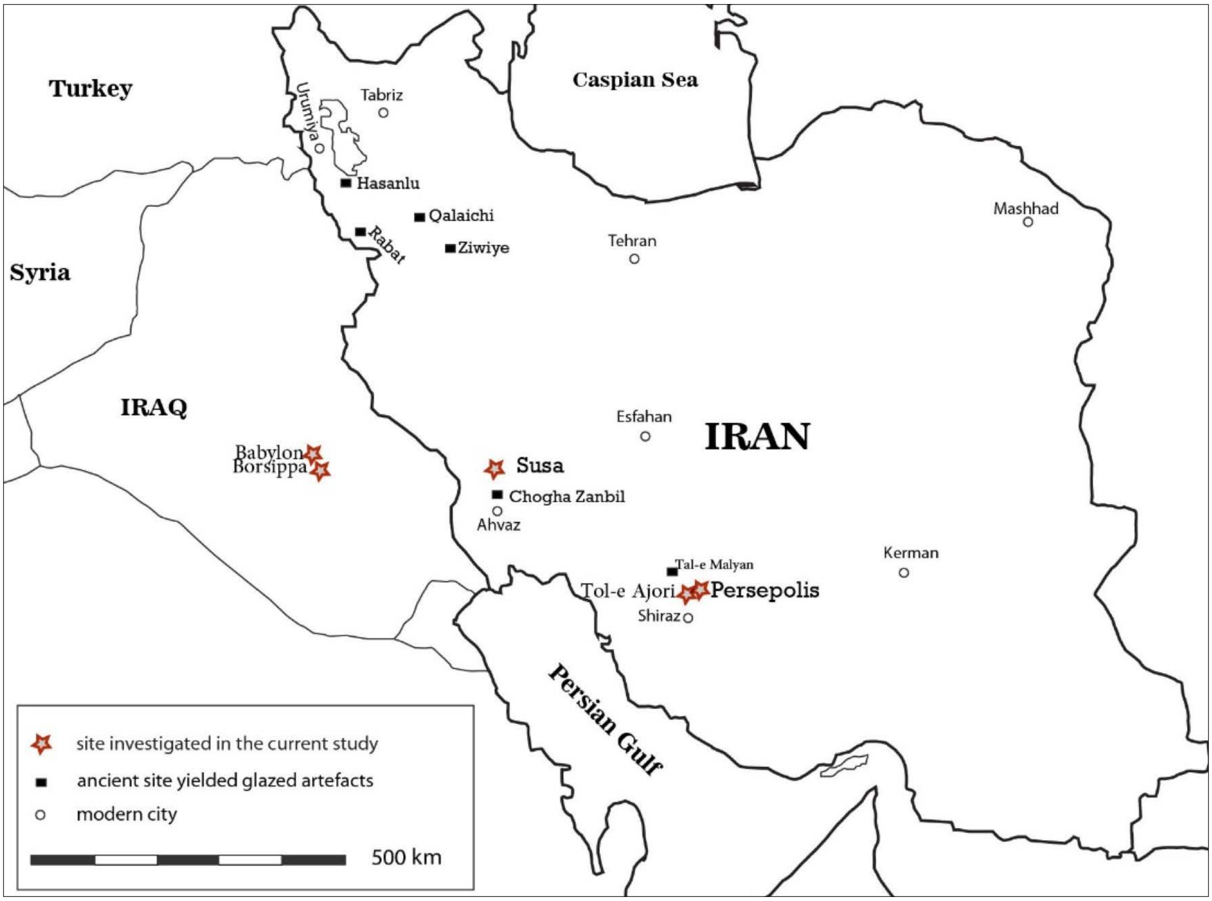

Figure 1: *Map showing Achaemenid and the other ancient sites mentioned in the text which produced glazed artefacts in the 1st millennium BCE (by N. Abdali).*

the rows of white and yellow life-sized lions, bulls, and dragons standing in molded relief against blue background on the walls of the Ishtar Gate and the Processional Way leading to it.[4] Beyond Babylon, H. Rassam's excavations at nearby Borsippa (1979–1982) also yielded glazed tiles and bricks.[5] In addition to Mesopotamia, in the Northern Levant in the Iron Age, sites such as Tell Afis in Northern Syria, 45 km south of Aleppo and Zincirli in Southern Turkey in the Islahye Valley yielded glazed artefacts.[6]

Fewer experts have so far focused on the technology of production of the architectural elements than on the glazes themselves. Some notable exceptions are quantitative or semi-quantitative technical analyses of glazes from Tell al Rimah, Babylon, and Amarna.[7]

The comparable study of glazed artefacts from Iran has also been relatively neglected. These come principally from three major regions (**Figure 1**). First, and most notable, is evidence from South-Western Iran (Khuzestan Province), predominately from sites such as Susa, Chogha Zanbil, and Haft

[4] Koldewey 1918.

[5] Reade 1986, 113–114; Kaniuth 2013; 2018.

[6] See Soldi 2019.

[7] See Pollard and Moorey 1982 on Tell al-Rimah; Fitz 1982 and Matson 1986 on Babylon; and Shortland and Tite 2000 on Amarna. More about the technique of production of the Near Eastern glaze/glass can be seen in: Brill 1999; Tite and Shortland 2004; Caubet 2007; Tite and Shortland 2008; McCarthy and Paynter 2008; Vandiver 2008.

Tappeh during the Middle-Elamite, Neo-Elamite, and Achaemenid periods.[8] The second center of glaze manufacturing is the lowlands of Fars, where early evidence has appeared for the production of vitreous material. Excavations at Tall-e Malyan level IV have yielded materials from the Middle Elamite period.[9] Later key sites which manufactured glazed materials include the Achaemenid sites Persepolis (Takht-e Jamshid/ Parsa) and Tol-e Ajori.[10] The third area in Iran which produced glazed artefacts comparable to those of Mesopotamia (especially Assur) and Elam is Northwestern Iran during the early 1st millennium BCE, which coincides roughly with the kingdom of Mannā. The materials occur mainly at two sites: Qalaichi and Rabat.[11] Finally, we can mention the sites of Hasanlu and Ziwiye, which have also yielded glazed artefacts.[12]

As comparative studies with Mesopotamia have shown, the Iranian cultures pioneered glaze technology applied to terracotta and siliceous bodies, that is, to silica/quartz-based bodies which consist of sub-rounded coarse particles of quartz bonded together by fused feldspar, lime, and clay material.[13] This glaze production in Iran already opens with the Middle-Elamite period of the 15thcentury BCE at Haft Tappeh, which has so far yielded the earliest known glazed faience architectural elements. Though it is difficult to draw clear technical or stylistic differences between Middle and Neo-Elamite glazed architectural elements, evidence suggests that Middle-Elamite artisans applied glazes to both terracotta and siliceous bricks as well as to other elements (bricks, tiles and knobs) at the archaeological sites under discussion.[14] During the 1st millennium BCE, foreign influence, likely from Mesopotamia, on the Neo-Elamite industry led to an expansion of the range of colors to include white, black to brown, yellow, and greenish glazes.[15] At Susa, on the eastern edge of the mound, the Neo-Elamite king Hallushu-Inshushinak (698–693 BCE) dedicated a temple to Inshushinak made exclusively of *uhna*-glazed siliceous brick.[16] Since these are today often severely weathered, the alkali content is usually lost.[17]

In recent years Ancient Near Eastern glazed elements of furniture and architecture increasingly have figured in material studies, which focus on the different vitreous kinds of artefacts and their coloring agents.[18] These early glazes belong to the silica-alkali-lime type, which form the majority of Near Eastern glazes prior to 300 BCE. In the original reports, several terms for these materials may be confusing. In her recent work, Daucé explores similarities and differences between faience, frit, glass, and glazed terracotta in their archaeological context and provides basic information about the terminology for vitreous material.[19]

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8 See Heim 1989; 1992 and Caubet 2007; 2010 on Susa; Amiet 1966, 354 and Ghirshman 1968, 48 on Chogha Zanbil; Ferioli and Fiandra 1979, 310–311 on Haft Tappeh. See also Caubet and Daucé 2013; Daucé 2018 for Achaemenid and Elamite glazed artefacts in Susa.

9 Carter 1996, 32–33.

10 Razmjou 2004; Askari-Chaverdi *et al.* 2017; Askari-Chaverdi and Callieri 2017.

11 See Kargar 2004; Abdali 2018 on Qalaichi; Heidari 2010 on Rabat. A full discussion of material from both sites is provided in the author's unpublished dissertation, Abdali 2018.

12 See Hakemi and Rad 1950; Dyson 1959, 14; Motamedi 1997; Stapleton 2011; Abdali 2018 and 2019.

13 See Caubet 2007; 2010; McCarthy and Paynter 2008, 194.

14 See especially Amiet 1966; Heim 1989; 1992; Moorey 1994; Caubet 1992; 2007; 2012; Caubet and Daucé 2013; Kaniuth 2013; Daucé 2018.

15 Kaczmarczyk 2007, 36; Caubet 2012, 157–158, 161.

16 See Heim 1989, 40–41 for sources.

17 Holakooei 2014, 766–770.

18 Moorey 1994; Kaczmarczyk 2007, 29–37; McCarthy and Paynter 2008; Schmidt 2019.

19 Daucé 2018, 570–571.

Figure 2: *Polychrome relief glazed bricks from Achaemenid period Susa housed in the Site Museum (Photo by N. Abdali, courtesy of Susa Site Museum).*

Achaemenid glazed artefacts

Susa

The most famous and splendid glazed brick decorations in Iran are doubtless those of Achaemenid Susa. The glazes at Susa from the Achaemenid period also represent the best studied examples of pre-Islamic glazed brick industry in Iran, where bricks, bas-reliefs, different shapes of wall knobs, door nails, figurines, statues, vessels and other small decorative artefacts were produced in local centers.[20]

Under Darius I (549–486 BCE), glazed friezes first appeared at Susa, and soon after at Persepolis.[21] In 1885, Marcel and Jane Dieulafoy discovered fragments of polychrome glazed bricks from Susa. They were shipped to Paris and reconstructed in the Louvre.[22] Restored pieces of the glazed bricks depicting guards were sent in the context of object exchanges from the Louvre to London, Berlin, and Tehran.[23] The derivation of nearly all glazed bricks from Susa from the post-Achaemenid layers indicates that they were re-used in later periods.[24] The author of this paper documented over forty fragmentary glazed bricks and tiles housed in the Susa Site Museum. Further investigation on the glazed artefacts from Susa and Persepolis museums is in process and will be published in due course. These glazed artefacts consist of polychrome fragments of flat and relief glazed tiles and bricks.[25] The motifs include human and animal organs, floral and geometric patterns. Some carry fitter-marks so that the geometric signs were carved or rarely depicted in a white glaze on the back side of the glazed artefact (**Figure 2**).

During the Achaemenid period, Susa witnessed the triumph of monumental compositions, with large figures assembled from siliceous bricks.[26] Achaemenid glazed bricks and tiles are decorated with rows of roaring lions, winged bulls, griffins, winged sun disks above the confronted sphinxes, ornately dressed

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[20] Heim 1992, 202; Caubet 2007; 2012. Analyses of the Achaemenid glazes from Susa have been published by Tite and Shortland 2004, 390 Abb. 12; Jung and Hauptmann 2004, 391; Holakooei *et al* 2017.
[21] Haerinck 1973, 120; Razmjou 2004, 384.
[22] Nagel 2010, 81.
[23] Nagel 2010, 97.
[24] Nagel 2010, 84.
[25] I would like to take the opportunity and express my gratitude towards those who helped with documenting glazed bricks from Susa and Persepolis/Parsa Site Museums. My appreciation goes to Dr. M. Amiri, the former director of Fars Cultural Heritage Organization, for the permission and Mr. Bazyar from the Parsa Museum, who helped document the Achaemenid glazes from Persepolis. In addition, Mr. R. Chenani, the former director of the Culture Organization at Shush (Susa), Mr. Y. Zalaghi, and Mr. M. Heidari-Nasab contributed their support in studying the Achaemenid glazes from Shush/Susa Museum.
[26] Caubet 2012, 158.

Figure 3: *Glazed bricks with geometric motif and cuneiform inscription from Persepolis housed in the Site Museum (Photo by N. Abdali, courtesy of Persepolis Site Museum).*

archers, and geometric and floral motives.[27] It is notable that some of the unglazed bricks from Susa also consist of siliceous paste and show precisely drawn reliefs.[28] The glazed bricks come in a wide variety of colors, such as, green, yellow, white, brown, black, blue and dark blue, azure, and turquoise.[29] In his Susa Foundation Inscription (DSf), Darius I describes the artisans who made the architectural decorations: he mentions Babylonians as brick-makers, and refers to Medes and Egyptians who adorned the walls.[30]

Persepolis

In 1892, Herbert Weld-Blundell was the first to acknowledge the existence of glazed bricks at Persepolis similar to those brought from Susa to the Louvre.[31] Glazed bricks at Persepolis were also uncovered during the excavations conducted by Ernst Herzfeld between 1931 and 1934 and Erich Schmidt between 1935 and 1939.[32] Fragments of glazed bricks were found particularly in the area in front of the Apadana, along the eastern façade, and near the northeast tower, while subsequent excavations also uncovered similar bricks in the southern part of the Apadana.[33] The architectural fragments of decorated walls excavated by Herzfeld are housed in the Freer Study Collection at the Smithsonian Institution.[34] At the Persepolis (Takht-e Jamshid/Parsa) Site Museum, the author of the current paper documented over eighty inscribed and uninscribed fragments of glazed bricks (**Figure 3**). Most of the inscribed ones, which were excavated in the vicinity of the Apadana by Schmidt, consist of white glazed signs on a turquoise background. The flat, uninscribed glazes comprise floral and geometric motifs in turquoise, green, yellow, and white glazes. Black glaze separates different glazed colors from each other. Three panels of the reconstructed glazed decorations from Persepolis exist (**Figure 4**), one in Tehran and two in the Persepolis Site Museum.[35]

In contrast to the glazed bricks from Susa, those from Persepolis generally show less variety in the iconography. The glazed motifs at Persepolis are limited to geometric and floral designs and cuneiform inscriptions similar to those at Susa. The different geologies of Susa and Persepolis ultimately may have led to discrepancies in the decorative materials. Susa is located in a plain without stone resources.

27 See Caubet 1992, 224–239; Caubet and Daucé 2013, 301–310.
28 Caubet 2010, 410.
29 Jung and Hauptmann 2014, 391.
30 See Kuhrt 2007 and the further bibliography therein.
31 Nagel 2010, 91.
32 Schmidt 1957; Nagel 2010.
33 Nagel 2010, 125–126.
34 Aloiz *et al.* 2016, 1.
35 Nagel 2010, 126.

Figure 4: *Reconstruction of the glazed architectural decorations excavated at Persepolis in the Site Museum (Photo by N. Abdali, courtesy of Persepolis Site Museum).*

Therefore, to adorn the palaces, the inhabitants concentrated on the development of glazed bricks instead of stone. Unlike Susa, Persepolis was built on a rocky promontory. Here, the craftsmen preferred to use stone reliefs to decorate the different palaces.[36]

Tol-e Ajori

During their investigations in the Bagh-e Firuzi area, 3 km west of Persepolis, Ann Tilia and William Sumner identified the site of Tol-e Ajori (mound of bricks) and recognized glazed brick fragments in their survey.[37] Recent excavations at Tol-e Ajori have yielded remarkable discoveries of glazed bricks in yellow, white, and brown colors.[38] Unlike Persepolis and Susa, the glazes at Tol-e Ajori were applied to a terracotta body. Motifs on each brick form a larger scene when placed together horizontally in the structure. With respect to their motifs, the glazes can be divided into four groups: monochrome glazes, polychrome glazes, glazed relief bricks, and unglazed relief bricks with traces of color on some bricks.[39] Monochrome and polychrome flat glazed bricks were found *in situ* whereas the relief glazed and unglazed bricks were always revealed in the accumulation layers, but never *in situ*. The assemblage

[36] Razmjou 2004.

[37] Tilia 1978, 84–85; Sumner 1985.

[38] See Askari-Chaverdi *et al.* 2013, 19, Figs 17–19, 24–27; Askari-Chaverdi *et al.* 2017; Askari-Chaverdi and Callieri 2017.

[39] Askari-Chaverdi *et al.* 2017, 232.

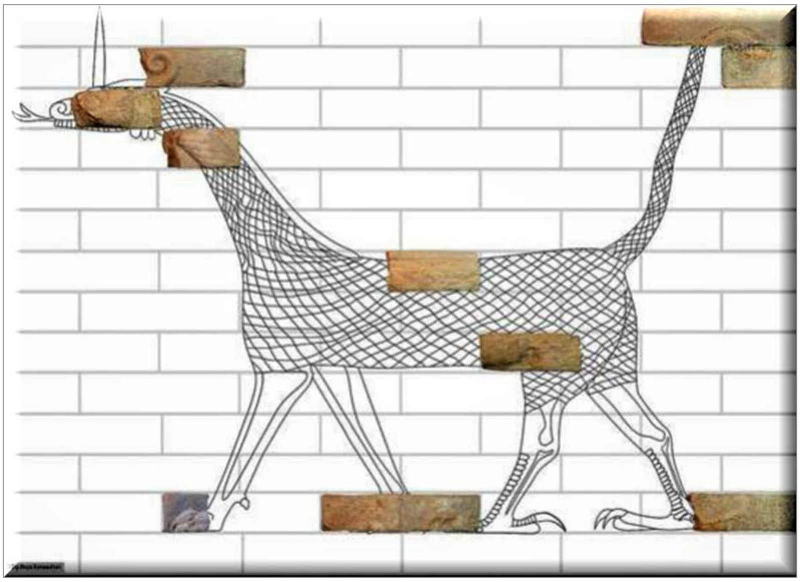

Figure 5: *Reconstruction of the glazed bricks in Tol-e Ajori depicting a mušḫuššu (after Askari-Chaverdi* et al. *2017, 251, Pl. 10b).*

displayed parts of two panels of bulls and dragon-snakes closely resembling the Neo-Babylonian *mušḫuššu* of the Ishtar Gate (**Figure 5**). Moreover, geometric and floral motifs illustrated in the bricks are more similar to the Neo-Babylonian ones than their counterparts in Persepolis and Susa. In addition to the aforementioned motives, four fragments of glazed bricks with cuneiform inscriptions have been found in Tol-e Ajori from 2012 to 2015.[40]

Babylon

After the Achaemenid conquest of Babylon, Achaemenid-style glazed wall decorations also developed in Mesopotamia. While the first Achaemenid kings simply moved into the Babylonian palaces, Artaxerxes II was the first Achaemenid king to order the construction of a small palace.[41] External walls of the palace were adorned with panels of glazed bricks, depicting life-sized and half life-sized immortals which originally belonged to the ceiling and the stairways. Additional iconographic patterns used to decorate the small palace included cuneiform inscriptions, geometric, and floral motifs (**Figure 6**).[42] The iconographic patterns entirely differ from those of the Ishtar Gate. The range of colors — including black, white, yellow, green, blue, and brown — are also more diverse than the Neo-Babylonian glazed bricks. The Achaemenid glazed bricks at Babylon thus not only reflect an iconographic tradition distinct from their Neo-Babylonian counterparts, but also a different manufacturing technique. According to Ernie Haerinck, the aforementioned glazes do not adhere to a terracotta-based bodies, as did the Neo-Babylonian glazes, but were applied to siliceous-based bodies in a way very similar to the glazed bricks from Persepolis and Susa. Furthermore, the motifs are almost exactly identical to those of the glazed bricks at Susa and Persepolis.[43] The scattered glazed brick fragments, which were found not *in situ* in rooms of the Neo-Babylonian South Palace, were also assigned to the Persian Period and might indicate a reconstruction phase within the same time period.[44]

[40] Basello 2017.
[41] See Koldewey 1931, 127; Haerinck 1973; 1997.
[42] Haerinck 1997, 29.
[43] Haerinck 1997, 30.
[44] Koldewey 1931, 122–124; Pedersén 2020, 108.

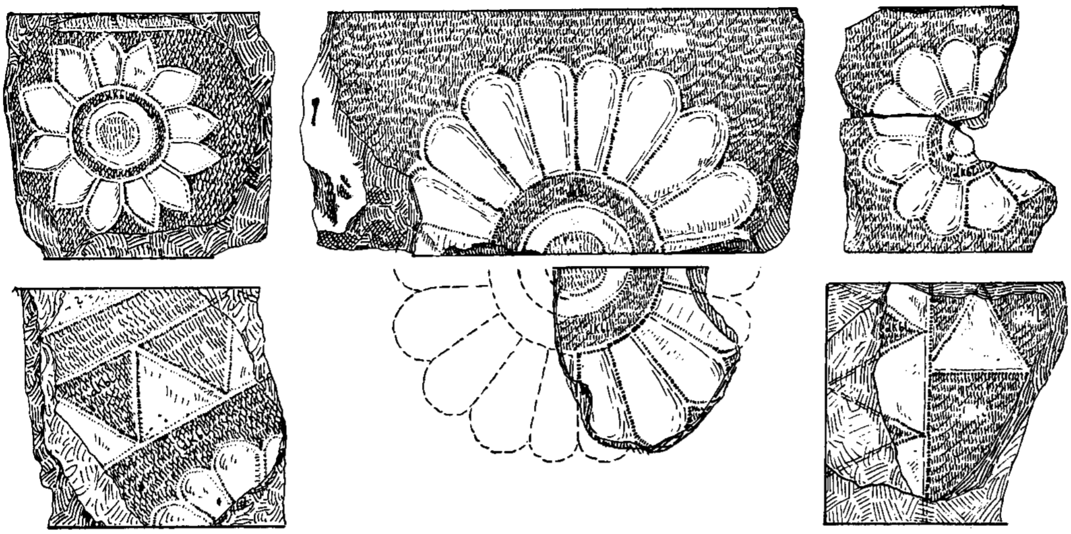

Figure 6: *Achaemenid decorative glazed brick from Babylon (after Haerinck 1997, 31, Fig. 10).*

Borsippa

While the Ezida temple at Borsippa was dated to the Neo-Babylonian period by Koldewey and Andrae, later investigations conducted by the Austrian study group at Innsbruck University have suggested that the relevant monuments are generally not older than the Achaemenid period.[45] Furthermore, the detailed measurements and reconstruction of the glazed bricks of the façade at Borsippa and the proportions of the bull-motif from the Ezida temple housed in the *Vorderasiatisches Museum* in Berlin show certain similarities with those from Achaemenid Susa.[46] As suggested by Kai Kaniuth, the reliefs from the Ishtar Gate seem to provide a more comparable match to those of Tol-e Ajori than those from Borsippa.[47]

However, Julian Reade's re-evaluation of Rassam's excavation reports on the Ezida temple has noted that fragmentary enamelled bricks which originally belonged to the decoration of a room were shipped to the British Museum.[48] These fragments consisted of glazed bricks with yellow and white colors, which measure 33.0 × 8.5 × 17.5 cm, and a glazed corner brick, which measures 16.5 × 18.5 × 8.5 cm with the same colors but with traces of dark blue in the background. Both are illustrated with guilloche patterns (**Figure 7**). In room 5, two glazed tiles with geometric and floral motifs were identified, which Reade assigns to the group of Neo-Babylonian glazed wall-tiles.[49] This room also contained a hand-sized tablet, likely to be identified as a Borsippa copy of a lexical text, dated to the first year of Cyrus the Great at Babylon in 538 BCE. The bricks from Borsippa more closely resemble the Achaemenid glazed bricks from Susa and Persepolis than those from Babylonia.[50]

[45] See Koldewey 1918; 1931; Kuntner and Heinsch 2013.
[46] See Kaniuth 2013; 2018, 347.
[47] Kaniuth 2018, 349.
[48] See Reade 1986, 107.
[49] Reade 1986, 110, Pl. XV a, b and p.
[50] Reade 1986, 110.

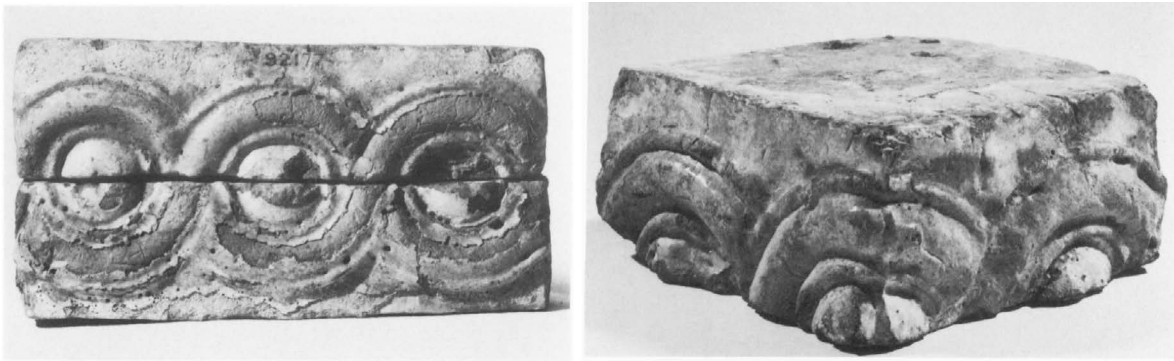

Figure 7: *Achaemenid-like glazed bricks probably from Borsippa (after Reade 1985, Plate XIV b, c).*

Discussion

According to the excavators, the building at Tol-e Ajori can be most appropriately compared with the inner section of the Ishtar Gate at Babylon, just as the decorative glazed bricks most closely resemble those from Babylon.[51] Similarity with the Ishtar Gate in the monumental building in Tol-e Ajori is not only limited to the size and motifs of the glazed bricks, but also to the architecture and plan of the gates, which recall the monumental gate of the Ishtar Gate complex.[52]

For epigraphic reasons, Basello explains how the inscribed bricks at Tol-e Ajori are more closely linked to the inscription of Nebuchadnezzar II on the Ishtar Gate instead of the Achaemenid royal inscriptions.[53] Basello thus assigns the inscribed glazed bricks at Tol-e Ajori to the early Achaemenid period.[54]

Amadori *et al.* carried out compositional analyses of the bricks and studied their provenance, based on 32 brick samples from Tol-e Ajori and 39 soil and clay samples from six different areas between Persepolis and Pasargadae.[55] Their investigation suggests a local provenance of the raw clay material.[56] Though Babylonian craftsmen may thus have been responsible for manufacturing the glazed bricks at Tol-e Ajori, they were thus produced locally. While the Neo-Babylonian glazed architectural decorations provide the best comparison for the glazed bricks from Tol-e Ajori in terms of motifs, scale, and the body texture which is terracotta, it differs essentially from those glazed decorations at Persepolis and Susa in terms of their matrices: silica-based bodies in Susa and Persepolis versus clay-based bodies in Tol-e Ajori.

In Elam, pre-Achaemenid glaze production could draw on a lengthy tradition beginning in the Middle and Neo-Elamite periods. In the Middle Elamite period, under the Shutrukid dynasty, Chogha Zanbil witnesses a remarkable experimental development in the production of large, glazed knobs of clay. In the 12th century BCE, the Middle-Elamite king Shutruk-Nahhunte I could even proclaim that he invented a new technique of making bricks with a high silica component.[57] Another Middle Elamite city,

[51] See Askari-Chaverdi *et al.* 2017.
[52] Askari-Chaverdi *et al.* 2017.
[53] As argued in Basello 2017, the cuneiform sign inscribed on the fragmentary glazed brick from Tol-e Ajori, TAJ Inv. 143, shows the Elamite sign NU, but the inscribed glazed brick TAJ Inv. 144 seems to show the logogram KÁ, which is used to write the word *bābu*, 'door/gate' in Akkadian. The sign KÁ is also attested in the Behistun/Bisutun inscriptions. On links between Tol-e Ajori and the Ishtar gate, see in particular Basello 2017, 270.
[54] Basello 2017, 272.
[55] See Amadori *et al.* 2018.
[56] Amadori *et al.* 2018, 141.
[57] Heim 1992, 202.

Susa, also first shows the double innovation of large wall panels as well as a new type of bricks with siliceous matrix during the reign of Shilhak-Inshushinak (mid-Shutrukid/Middle Elamite III; 1150–1120 BCE).[58] Their successors in the Neo-Elamite period (1000–646 BCE) continued to practice this method of using silica-based glazes and expand its use also to polychrome bricks, tiles, and knobs. Caubet even suggests the possibility of Elamite inspiration for the production of wall panels in the Neo-Assyrian period.[59] Nevertheless, a small proportion of the glazed decorations at Susa employ terracotta matrices illustrating winged bulls, lions, or lion-griffins similar to those produced in silica-based bricks. These clay-based glazed bricks might be attributed to the contribution of the Babylonian tradition of glaze production.[60] Despite the generally common notion that glazed bricks with silica/quartz-based bodies were produced exclusively in Iran, the Achaemenid palace at Babylon yielded glazed bricks with both terracotta and siliceous matrices.[61] Furthermore, in addition to their distinctive matrices, Achaemenid glazes at Susa and Persepolis were outlined by a black glaze, by which the colored glazes were separated from each other. These thin, black lines prevent the intermingling of the glazes and enable craftsmen to apply more detailed and elaborate motifs, including the immortals and mythical creatures at Susa.

Regarding the techniques of production, an important factor which must be taken into consideration is the brick texture itself, to which the glaze adheres, rather than the glaze alone. Similar thermal expansion coefficients of the silica-rich glazes (up to 80 wt. % SiO_2) and silica-based bodies ease the adhesion of the glaze to its body and reduce the risk of glaze crazing significantly, by which cracks or glaze crazing develop in the glazed structure during the firing process.[62] In the case of the siliceous-based bodies, that is in the Elamite and Achaemenid glazes from Susa and Persepolis and on silica-rich brick bodies, glazes interact with the bodies without forming an intermediate layer. Glaze and body were perfectly matched together, so that the glaze is synthesized with and penetrates into the quartz-based body. This technique represents a major development in the technology of glaze manufacturing in the Ancient Near East.[63]

The most remarkable factor in the composition of these glazes in comparison to the Mesopotamian ones is reflected in the opacifiers, what make the glaze less transparent, and in the rather high level of lead constituent in the glaze. Tite and Shortland and Jung and Hauptmann reported the use of sodium antimonate (Na-Sb) as an opacifier for white glaze in Achaemenid Susa.[64] The use of sodium antimonate as an opacifier agent, alongside other opacifiers, agrees with the results of the investigations reported by other scholars on the glaze composition at Persepolis.[65] These phenomena are again unique when we compare them with the composition of glazed artefacts from Mesopotamia.[66] On the other hand, sodium antimonate appears to have been used as an opacifier in the composition of almost all northwestern Iranian glazes in the excavated sites at Hasanlu, Qalaichi, Rabat, and Ziwiye.[67] Furthermore, the high level of lead constituent (over 15 wt. % PbO) in the composition of the yellow glazes can only be compared with the early 1st millennium BCE Mannaean glazes at the site of Qalaichi and Ziwiye.[68]

As reported in other studies for the ancient Near Eastern glazes, yellow glazes are both colored and opacified by lead antimonate. The ratios of the lead (Pb) content vary between the different sites.

58 Caubet 2012, 158; Potts 1999, 205.
59 Caubet 2012, 159.
60 Caubet 2010, 410–411.
61 See, for example, McCarthy and Paynter 2008, 193; Koldewey 1931, 127, Fig. 7; Haerinck 1973; Pedersén 2020, 108 and 119.
62 McCarthy and Paynter 2008, 194.
63 See Tite and Shortland 2004; Caubet 2010; Fügert and Gries 2019; 2020.
64 Tite and Shortland 2004, 389; Jung and Hauptmann 2004, 391.
65 Holakooei *et al.* 2017.
66 Matson 1986; Freestone 1991; Caubet 2007; McCarthy and Paynter 2008.
67 Stapleton 2011; Holakooei *et al.* 2017; Abdali 2018; 2019.
68 Abdali 2018.

Achaemenid yellow glazes from Susa and Persepolis associated with high Pb ratios, 19.5 and 17 wt. % respectively.[69] Similarly Qalaichi and Rabat yellow glazes are also identified with high lead amount respectively 19 and 14 wt. %, Stapleton also reports up to 30 wt. % Pb in Hasanlu yellow glaze.[70] In Chogha Zanbil, Pb level in the yellow glaze lies below the detection level. Whereas, the Neo-Elamite Susa glaze and Rabat yellow glazes comprises 3.0-5.0 wt. % Pb. Antimonate at around 1.0-5.0 wt. % accompanies Pb in the yellow glazes. Stapleton reports calcium antimonate (Ca-Sb) and sodium antimonate (Na-Sb) in the composition of the yellow glaze/glass from Hasanlu in addition to lead antimonate (Pb-Sb).[71] The Achaemenid glazes show further heterogeneous opacifiers such as group suggested by Holakooei or the presence of lead-antimonate alongside with Calcium-antimonate in the composition of white glaze from Persepolis.[72] Such differences may result from different workshops and different craftsmen who produced glazes over the vast Achaemenid territory and period.

Conclusion

The recent discovery of significant glazed architectural decorations inspired by Neo-Babylonian traditions of art, crafts, and technology has opened a new chapter in the study of the early Achaemenid industry of glaze production. While the Iranian-Italian team insists on the evident Babylonian origin of the glazed decorations, the new investigation shows the possible local origins of the texture of the bricks from the site of Tol-e Ajori.[73] It seems that the glazed ornaments at Tol-e Ajori, which pre-date the reign of Darius I, were manufactured by Babylonian craftsmen working within the Neo-Babylonian traditions of glaze production, reflected both in the glaze matrix and iconographic style. The Babylonian-style glazes which were produced in the early stages of the Achaemenid period were subsequently applied to the public buildings in Susa up to the early years of Darius I.[74] The reign of Darius I also established an imperial art which, as in the case of the glazed artefacts, represented a triumph in both iconography and techniques of production in the Achaemenid period. This is particularly reflected in the material at Susa. The more prevalent use of glaze as architectural decorations at Susa in comparison with Persepolis can be ascribed to the distinct geologies of the Susiana plain and the area surrounding Persepolis, which offered access to different materials.

The use of a siliceous-based body instead of a clay-matrix at Susa and Persepolis represented a significant development with respect to the counterparts in Mesopotamia and Northwestern Iran. As we see in the Elamite and Achaemenid glazes, the interaction between the glaze and body and the glaze adhesion is considerably stronger than that of terracotta bodies. In contrast, the compositional elements of the glazes at Susa and Persepolis also reflect various production techniques, which to some extent differ from the Mesopotamian ones. Such differences and variations in the composition and techniques of production of the Achaemenid glaze industry may result from different workshops and different craftsmen who produced glazes throughout the vast Achaemenid territory and throughout the period.

Finally, the utilization of sodium antimonate as an opacifier and involvement of a greater proportion of lead content in comparison with Mesopotamian counterparts, especially in yellow glazes, can only be compared with the early 1st millennium glazes from northwestern Iran. It can be hypothesized that this

[69] Abdali 2018.
[70] Stapleton 2011, 89.
[71] Stapleton 2011, 98.
[72] Holakooei 2014.
[73] Askari-Chaverdi *et al.* 2017; Askari-Chaverdi and Callieri 2017; cf. Amadori *et al.* 2018.
[74] Kaniuth 2018, 352.

tradition may have been transferred from the Mannaean area through the Medes, as suggested by the Susa Foundation Inscription (DSf) of Darius I.

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Monitoring Damage to Cultural Heritage Sites Using Open Source Sentinel-1 and Sentinel-2 Data

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Abstract

Since the early 2000s, the archaeological heritage of the Near East has faced increasing threats from a multitude of sources, including looting, destruction, militarization, and random urban expansion encroaching on archaeological sites. The vast expanses of land along which these sites are distributed, as well as the remoteness of many, mean that physical monitoring is not an option. In recent years, the availability of Very High Resolution (VHR) satellite imagery, with relatively short revisit times, opened the door to monitoring a large number of sites from space; however, this approach comes with a hefty price tag that could be beyond the reach of many researchers as well as of local authorities. The approach presented in this paper attempts to bypass the expensive VHR images by combining the data from open source High Resolution Optical Images from the European Space Agency's (ESA) Sentinel-2 with Microwave Remote Sensing Data from ESA's Sentinel-1. The result is a coherence map which highlights areas of recent disturbances on known archaeological sites, and allows for better planning and investigation of specific areas, and for subsequent devising of long term monitoring policies.

Keywords

Synthetic Aperture Radar, Archaeological Destruction, Cultural Heritage, Open Source, Change Detection

Introduction

Artifact looting and the destruction of cultural heritage sites have long been a common feature of the archaeological scene in the Near East, and have been on the rise since the 1990s.[1] Since the 2000s, the violent situation on the ground in Iraq, and subsequently in Syria, has prevented authorities from protecting or even monitoring many archaeological sites, leaving us with little to no information on their condition.[2] This lack of information drove archaeologists towards Remote Sensing techniques in order to obtain the much sought after information. Although Remote Sensing techniques fall into two major categories, Optical Sensors and Microwave Sensors, archaeologists have vehemently favored the

[1] Daniel and Hanson 2015.
[2] Casana and Laugier 2017.

former. The majority of studies focusing on looting and destruction activities in Syria,[3] Iraq,[4] and Egypt[5] rely primarily on Very High Resolution (VHR) satellite images acquired from an ever-increasing number of commercial satellites such as WorldView 1–4, GeoEye, and others. The same is true of the many projects that were established to monitor and assess the damage incurred in inaccessible archaeological sites, such as the Endangered Archaeology in the Middle East and North Africa (EAMENA) Project, which focuses on using VHR imagery to track the looting and destruction of archaeological sites in the Near East and North Africa,[6] TerraWatchers, which uses crowdsourcing to detect looting holes using Google Maps VHR images,[7] and the American School of Oriental Research's (ASOR) project, as well as countless others.[8] The ever-increasing ground resolution (WorldView-4: 0.31 m ground resolution for panchromatic images), coupled with a high temporal resolution of a 4.5 day revisit period, undeniably provide the best way to remotely assess the destruction of a site.[9] However, this data is weighed down by its high price, which places it beyond the reach of many local authorities, as well as that of many researchers. Using Google Maps and Bing Maps can provide a free alternative to access VHR data. However, as these platforms are not updated frequently, they lose their value as a source for an up-to-date assessment tool on the status of archaeological sites and do not portray the current situation on the ground.

The majority of the studies named above rely on the visual inspection of True Color VHR images to detect looting holes and the destruction of archaeological sites, whether through urban and agricultural expansion, or through outright bulldozing; while this is an effective method, it is also time consuming. Other approaches using optical sensors aim to move away from visually monitoring archaeological sites and instead use image products to highlight and enhance the archaeological areas that are being destroyed. One such approach to detect damage to archaeological sites relies on image textures in order to highlight recent ground changes (represented by pixel changes). This approach was applied with good results to map the destruction of Palmyra, Syria, as well as Nimrud, Iraq,[10] and Sirwah, Yemen.[11] While this method does not eliminate the high price tag that comes with up-to-date VHR images, it certainly proves a step above simple visual inspection. Other methods rely exclusively on open source data in order to increase their reach, impact, and applicability. One such approach was applied in Cyrene, Libya, where the authors relied on the unsupervised classification of multispectral pixels from Landsat-5-TM and Sentinel-2 to map the expanding urban areas encroaching on the archaeological site.[12] A more targeted approach utilizes the fact that ground changes are accompanied by changes in reflectance. This property was exploited in order to calculate the cumulative square root change over all Sentinel-2 Bands between successive acquisitions over the same area. Pixels which present a band change value above the threshold are considered pixels of interest.[13] Another method, applicable to open source data, consists of a texture-based method to automatically extract looting induced features (Automatic Looting Feature Extraction Approach, ALFEA) from VHR imagery, especially from Google Earth images.[14] This method allows for the accurate mapping of looting features, such as looting holes, which in turn allows for a better assessment of incurred damage.

[3] Casana and Laugier 2017; Casana and Panahipour 2014; Casana 2015; Cunliffe 2014.
[4] Stone 2004.
[5] Parcak 2015.
[6] Bewley *et al.* 2016.
[7] Savage *et al.* 2017.
[8] Casana and Laugier 2017.
[9] Digital Globe 2017.
[10] Cerra *et al.* 2016.
[11] Cerra and Plank 2020.
[12] Rayne *et al.* 2017.
[13] Rayne *et al.* 2020.
[14] Masini and Lasaponara 2020.

In order to increase reach and accessibility, this paper proposes a method that uses Open Source Data from the European Space Agency's (ESA) Copernicus Program Sentinel-1 and -2 constellations to detect ground disturbances in near real time. This approach is effective in detecting changes on the surface in the order of magnitude of the microwaves emitted from the satellite and can be used as an initial phase after which high resolution satellite images could be obtained or a site visit organized to inspect the damage. This would dramatically cut the need for the constant flow of VHR Satellite imagery and significantly reduce the costs of monitoring archaeological sites. Similar approaches have been used for a myriad of scientific applications such as volcanology,[15] earthquake damage monitoring,[16] as well as countless other applications for monitoring earth deformations. More recently, the approach has also been used to monitor the destruction of cultural heritage.[17]

The sensors

The proposed method relies mainly on two types of satellites, Synthetic Aperture Radars (SAR) (Sentinel-1) and Multispectral Optical Sensors (Sentinel-2), using a combination of their characteristics to highlight areas of terrain change attributed to site destruction and looting. The use of SAR in archaeology is still rare compared to the use of Optical Sensors, despite its cloud penetrating capabilities.[18] This is mainly due to the higher technical expertise needed to process and extract relevant information from SAR images. However, several studies have already demonstrated the importance of SAR in archaeology,[19] especially in desert regions where long wavelength SAR could be used to image sub-surface features such as in North Sinai, Egypt,[20] and Sabratha, Libya.[21] For this research, SAR products are obtained from the Sentinel-1 constellation, which includes two Satellites, Sentinel 1A and 1B, carrying a C-Band Synthetic Aperture Radar at 5.405 GHz, which corresponds to a 0.055 m wavelength (λ). The temporal resolution is dictated by the satellite revisit cycle, which is set to 12 days for each individual satellite. However, combining both Sentinels 1A and 1B reduces the temporal resolution to six days.[22] The temporal resolution is not affected by cloud coverage as the SAR is an active sensor, thus guaranteeing an acquisition every six days. Multispectral Optical Images are provided by the Sentinel-2 constellation, consisting of Sentinel 2A and 2B Multispectral Instruments, which samples 13 spectral bands at a maximum ground resolution of 10 m. The temporal resolution of the Sentinel-2 constellation is five days; however, in contrast to Sentinel-1, the usefulness of the resulting images depends on cloud coverage.[23] The data provided by these sensors (as well as others within the Sentinel family) is freely accessible through the Copernicus Open Access Hub.

Methodology

Data processing is divided into two main steps: Interferometric SAR (InSAR) Coherence and Normalized Difference Vegetation Index (NDVI) map generation (**Figure 1**). The first step includes the acquisition of two SAR Single Look Complex (SLC) products from a period of general stability on the chosen site, these will be referred to as Base SLC Pair. A coherence map generated from these two images will act

15 Rosen *et al.* 1996.
16 Fielding *et al.* 2005; Lu *et al.* 2018.
17 Cigna and Tapete 2018.
18 Tapete and Cigna 2019.
19 Stewart 2017; Chen *et al.* 2015.
20 Stewart *et al.* 2016; 2018.
21 Chen *et al.* 2015.
22 European Space Agency 2019a.
23 European Space Agency 2019b.

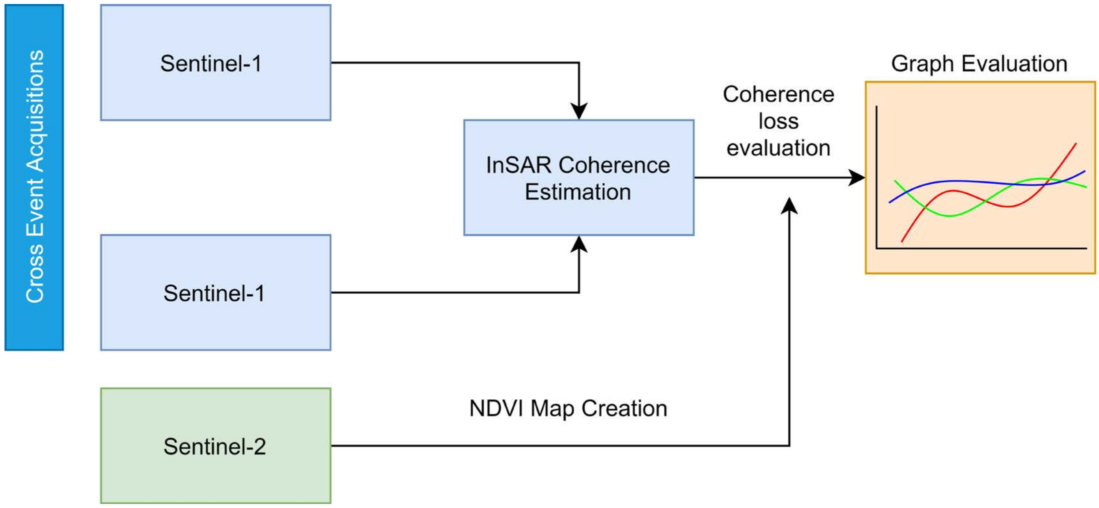

Figure 1: *Schematic workflow of the proposed approach.*

as the control image. A new SLC acquisition, referred to as Target SLC Product, containing the desired site is acquired every six days and a new coherence map is generated from the Target SLC Product and one of the Base SLC Products. The second step is to acquire a multi-spectral image from a time period coinciding with the Base SLC Pair acquisition period, as well as another that corresponds to the time period of the Target SLC Product. The NDVI is calculated for both of these images which highlights the areas with healthy vegetation, one of the sources of volumetric decorrelation. By inspecting these NDVI index maps we can better understand the processes at the origin of the decorrelation within the coherence maps. If a low coherence patch coincides with an area of heavy vegetation, then we can assume the latter as the cause of the decorrelation. On the other hand, if patches of decorrelation are present around an archaeological site with no vegetation, one can assume that the origin of this decorrelation is a change on the ground. In this case, we are assuming that both baseline and thermal components of coherence are negligible, attributed to the difference in orbit position at each pass and inherent noise in the system, respectively. It is not possible to establish more precisely the nature of the ground change, which could be related to numerous activities, including looting and destruction.

InSAR Coherence Map

Before moving forward with our discussion, a short definition of SAR is essential. SAR is an imaging radar principle which was developed in 1951 by Carl Wiley, who suggested using the movement of the imaging platform (Doppler Shifts) in order to reconstruct a large antenna by calculation.[24] The main principle of SAR is the synthesis of a very large array of radars by combining the echoes received at different positions in order to reduce the azimuth range.[25] Coherence is a sub-product of InSAR, which harnesses the phase information contained in the SAR SLC product to identify differential variations in the signal due to terrain shifts between two given instances. In order to better understand the nature of the changes we hope to detect in this project, we need to look at the nature of the phase interaction between the microwaves and the surface. This can be best represented in the equation below, where is the total phase, is the phase associated with the travelled distance and is the phase associated with the interaction between the sign and the ground target.[26]

[24] Nicolas and Adragna 2008, 32.
[25] Nicolas and Adragna 2008, 33.
[26] Adragna and Nicolas 2008, 282.

$$\Phi = \Phi_d + \Phi_{Object}$$

The first term in the equation above is related to the distance traveled by the wave from the sensor and back, while the second term is related to the reflection of the signal off the object. The second phase is random in nature but can be replicated if another acquisition is taken from the same satellite position in cases where there is no change in terrain geometry. The interferometric approach relies on this principle to calculate the position of a point on the ground. By calculating the phase difference between two acquisitions from different satellite positions, one can eliminate the object phase and obtain a measure proportional to the range difference between the two acquisitions.

In general, phase changes between acquisitions are always present and can be attributed to several sources, such as the difference in look angle and the position between acquisition one and two, temporal decorrelation, which is what we aim to detect and is in our case presumed to be related to archaeological destruction, and volume scattering, which is primarily related to vegetation and its effects, which we are trying to dampen by masking vegetated areas using Sentinel-2 acquisitions. This change in phase information can be estimated using the local coherence (γ) calculated using the normalized cross-correlation coefficient of the SAR image pair estimated over a small window once all the deterministic phase components have been accounted for.[27] This can be done using the equation below, where is the coherence [0-1] and s1 and s2 are the signals acquisitions at t1 and t2.[28]

$$\gamma = \left| \frac{< s1s2^* >}{\sqrt{< s1s1^* >< s2s2^* >}} \right|$$

A high coherence, close to 1, indicates that there is no physical change between the two acquisitions, while a low coherence, close to 0, indicates the opposite.

NDVI Index

As mentioned in the previous paragraph, volumetric scattering caused by vegetation is one of the main sources of error in the coherence maps generated over the desired sites. The reason for such an error lies in the nature of vegetation, which is highly susceptible to change. Wind, rain, growth, and countless other factors affect the geometry of plants, especially leafy ones, in an order larger than the wavelength of the Sentinel-1 wavelength (λ). These vegetated areas appear in the coherence maps as low coherence areas (γ close to 0) and must be eliminated in order to better detect the temporal decorrelation resulting from looting or destruction. Pixels with healthy vegetation can be easily detected using the Normalized Difference Vegetation Index (NDVI), calculated below, where NIR is the Near Infrared Band, Sentinel-2 Band 8 (λ = 832.8 nm) and RED is the Red Band, Sentinel-2 Band 5 (λ = 664.6 nm).[29]

$$NDVI = \frac{NIR - RED}{NIR + RED}$$

The NDVI index varies between -1 and 1, where the lowest value indicates the total absence of healthy vegetation, and the highest one indicates a high amount of healthy vegetation. Creating masks with the use of the NDVI value allows us to better understand the decorrelation patches that are generated by volumetric decorrelation, with plants at its source.

27 Fletcher 2007, A-26.
28 Adragna and Nicolas 2008, 282.
29 Campbell and Wayne 2011, 483.

Figure 2: *Tower tombs in Palmyra, Syria (James Gordon, CC BY 2.0).*

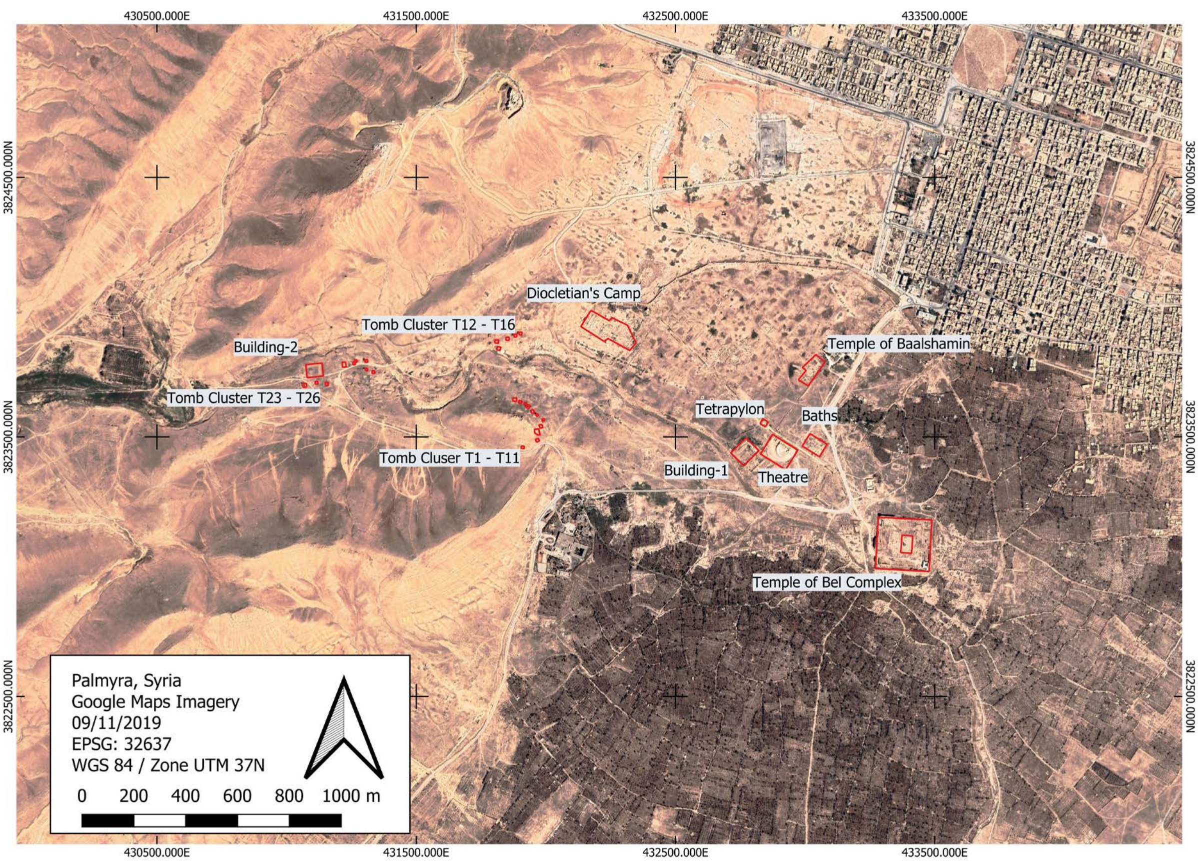

Figure 3: *Satellite images showing some of the monitored buildings in Palmyra (Google Earth CNES/Airbus).*

Satellite	*Acquisition Date [dd/mm/yyyy]*
Sentinel-1	11/06/2015
Sentinel-1	23/06/2015
Sentinel-1	05/07/2015
Sentinel-1	29/07/2015
Sentinel-1	21/08/2015
Sentinel-1	22/08/2015
Sentinel-1	02/09/2015
Sentinel-1	14/09/2015
Sentinel-1	26/09/2015
Sentinel-2	09/07/2015
Sentinel-2	17/08/2015
Sentinel-2	16/09/2015

Table 1: *Platforms and acquisition dates of the data used in the case of Palmyra.*

Case studies and discussion

The method above is demonstrated below on two different archaeological sites in the Near East. The first is the UNESCO World Heritage Site of Palmyra, Syria, which was destroyed by ISIS in August 2015. The other site is Qornet ed-Deir, Lebanon, the location of a research excavation project.[30] While the first site is large, situated in a mostly sandy desert region, the second is a small site and located within a densely vegetated area. The contrast between the two sites is mostly noticeable in the degree of terrain change that we are hoping to detect. While large monuments in Palmyra were destroyed, thus altering the Satellite-Terrain distance by tens of meters, the change in Qornet ed-Deir, resulting from a scientific excavation project is much smaller, and difficult to distinguish from the surrounding volumetric decorrelation due to the difference in the land cover.

Palmyra, Syria

The archaeological heritage of Palmyra was systematically destroyed by ISIS in the time period between May and September 2015,[31] and then again in 2017 with the destruction of the facade of the theater as well as parts of the tetrapylon.[32] In this section, we are mainly concerned with the damage incurred in 2015, which included the destruction of the Temple of Bel, several Tower Tombs (**Figure 2**), and numerous other architectural features within the Palmyra archaeological site. A subset of the archaeological structures in Palmyra is shown in **Figure 3**. In order to assess the data, multiple Sentinel-1 images as well as Sentinel-2 data were acquired (**Table 1**).

From the Sentinel-2 NDVI image (**Figure 4**), we can clearly see that the majority of the archaeological area can be classified as bare soil or very low vegetation. It is only along the southern side of the site

[30] Fischer-Genz *et al.* 2018.

[31] Cuneo *et al.* 2015.

[32] BBC 2017.

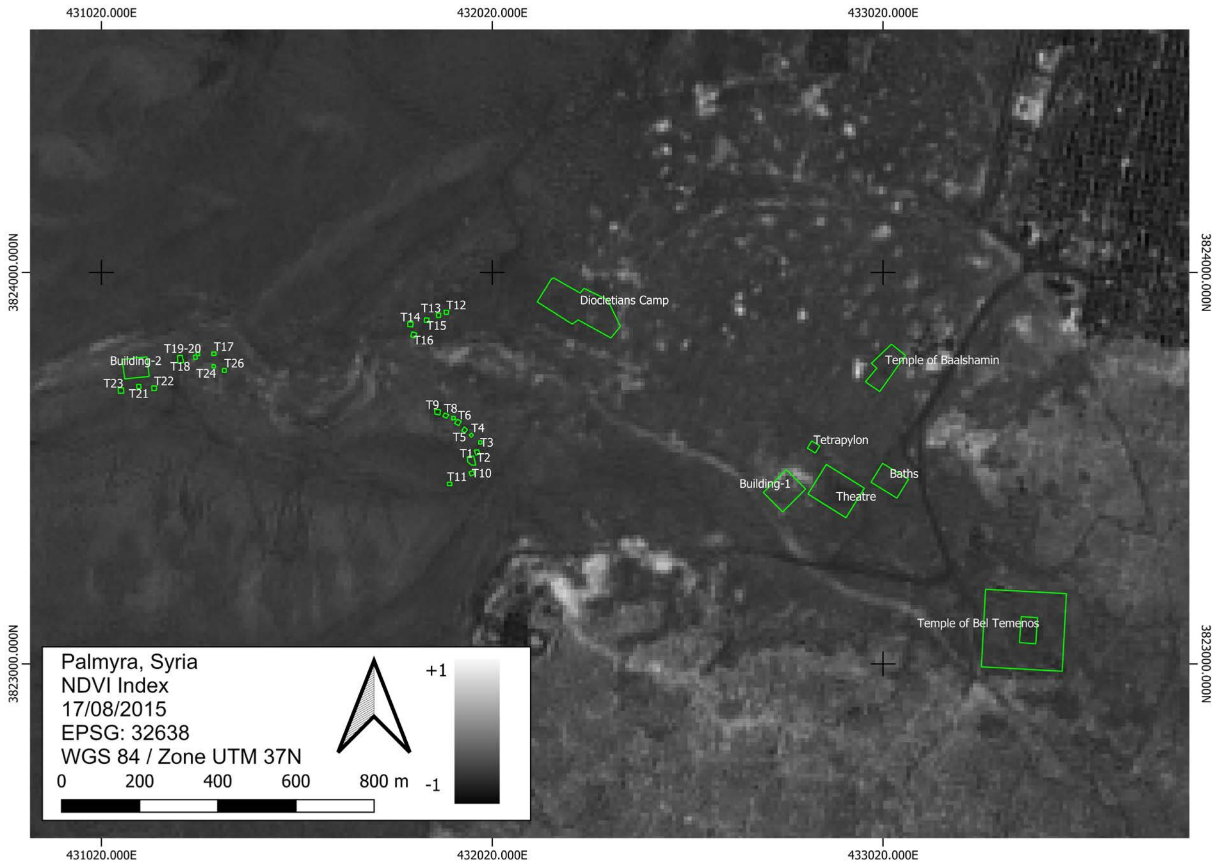

Figure 4: *NDVI Index map around Palmyra.*

that a large, densely planted area is present, as well as north of the Temple of Bel and along a small river that passes through the site. As is apparent in Figure 5, these areas generate high volumetric decorrelation. The fact that the majority of the area within the archaeological park can be characterized as bare soil makes detecting ground change simpler, as we do not need to account for false positives that are generated from vegetation.

By generating coherence maps from consecutive pairs of Sentinel 1 acquisitions, we can clearly see periods of stability and periods of destruction in the Temple of Bel as well as the tower tombs to the west. The upper map in **Figure 5** shows an example of a coherence map from a period of general stability, while the lower map in the same figure shows a coherence map from a period when the temple and tower tombs were destroyed. After the destruction of the archaeological building, we can clearly see hot-zones, characterized by low coherence and red pixels, around the Temple of Bel, tomb cluster T-6, 7, 8 as well T-21 which indicates destruction incurred at these locations. This is verified by VHR imagery from GoogleEarth which shows a subset of the destroyed tombs, as well as the Temple of Bel before (left) and after (right) their destruction (**Figure 6**). We then infer the date of the destruction from the dates of the pairs of Sentinel-1 acquisitions that show the lowest coherence at the site, in this case 21/08–02/09/2015. The date of the destruction of Palmyra is widely known, as ISIS boasted about their actions in their propaganda videos. However, countless other sites are constantly destroyed and looted, away from cameras and without any records, which could benefit from this approach.

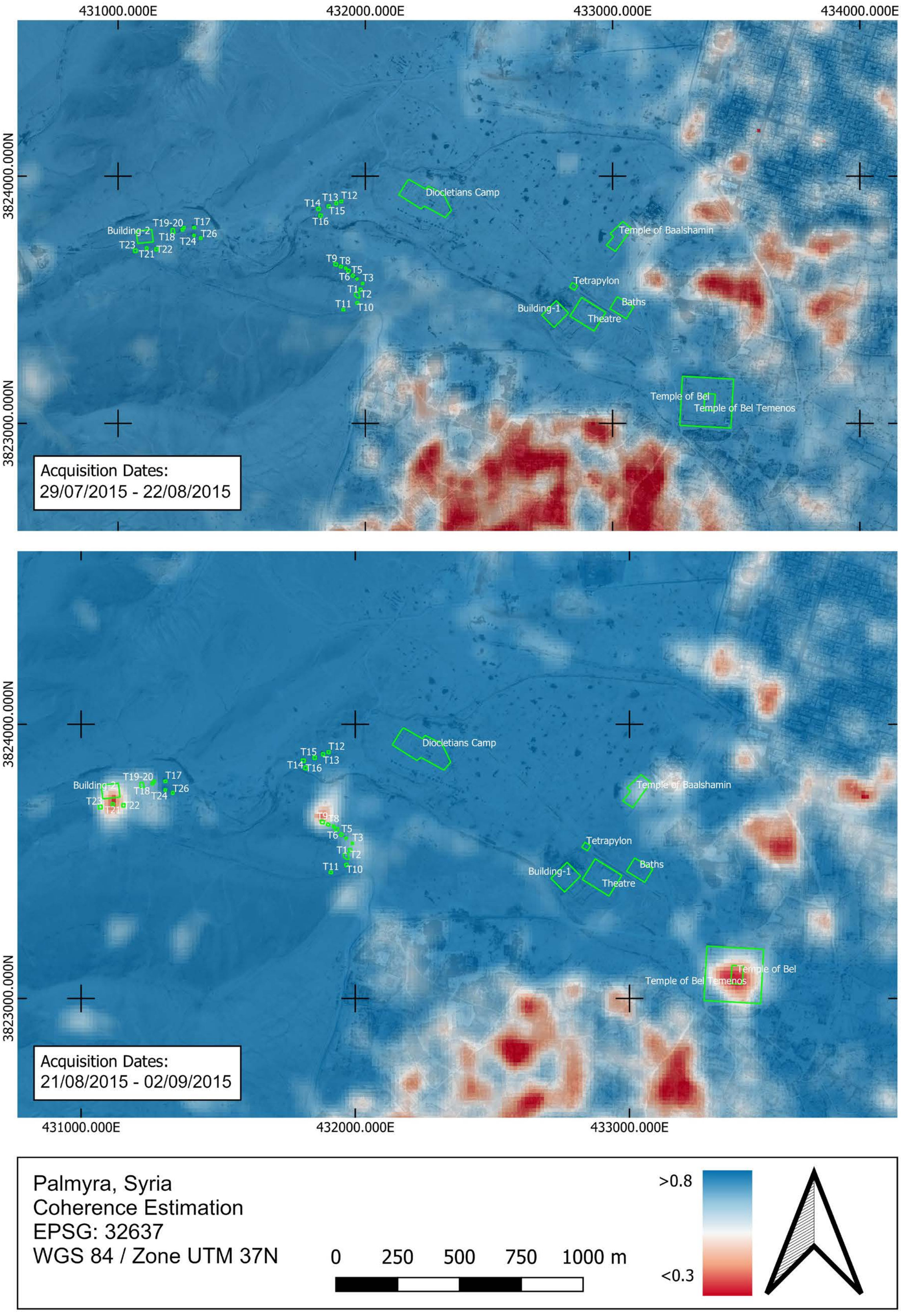

Figure 5: *Coherence Estimation map around Palmyra.*

Figure 6: *Google Earth Imagery showing before and after photos of the destruction T-22 and the Temple of Bel (Google Earth CNES/Airbus).*

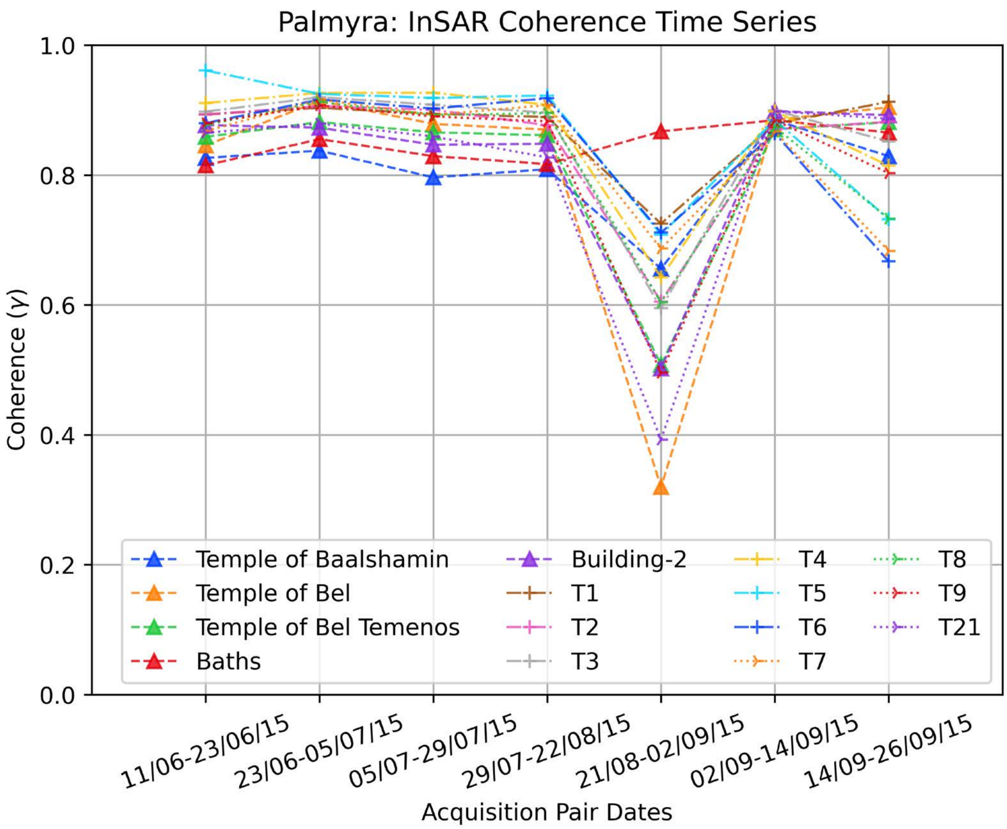

Figure 7: *Graphs showing the average coherence values within each polygon of the monitored buildings.*

In order to better understand the changes, we calculate the average coherence values from within the bounding boxes of each of the marked archaeological features. These values are then plotted as a time-series showing the evolution of the average coherence within each bounding box. The graphs in **Figure 7**, representing a subset of the monitored areas, show a sizable drop in the average coherence on many of the features of interest which corresponds to destruction events between 21/08 – 02/09/2015, some reaching up to a 50% decrease in coherence. In addition to the major drop in coherence, we notice smaller drops in T-5, -6, -7, and -8 between 14/09 – 26/09/2015 which could possibly be related to clearing activities on the site after the destruction. Alternatively, the drop could also be related to sifting through the rubble of the destroyed buildings looking for valuable artifacts, though this cannot be confirmed. Elsewhere, areas that were intact during this period, such as the Baths, show a constant coherence value throughout the time series (**Figure 7**).

Such time-lines could be used as a measure of the stability of the site during the monitoring period and are considered as the primary product one needs to look for in order to assess the level of terrain variations at the site. Once a large or abnormal change is detected, a site visit, if possible, can be organized to check for any incurred damage. Alternatively, localized VHR satellite images can be acquired to investigate these changes.

Qornet ed-Deir, Lebanon

In contrast to Palmyra, Qornet ed-Deir is small and located in a densely vegetated area. The disturbances incurred at this site are mainly related to a research excavation season, which was conducted between 11/08/2018 and 31/08/2018. The relatively low amount of ground disturbances generated by the small sounding excavations, coupled with high vegetation density on and around the site make extracting the decorrelation patches resulting from the excavation almost impossible. This case shows the limitation of this approach in detecting ground change at archaeological sites within dense vegetation. The collected data cover the whole duration of the excavation and can be seen in **Table 2**.

The aerial photo of the site (**Figure 8**) shows the site nested within an area of high vegetation. Efforts were made to clear the excavation region of vegetation, which is reflected in the low NDVI values (**Figure 9**). However, the site was still covered with dead vegetation (see **Figure 8**, green insert) which does not appear on the NDVI map, but will lead to an increased volumetric decorrelation.

Satellite	*Acquisition Date [dd/mm/yyyy]*
Sentinel-1	18/07/2018
Sentinel-1	30/07/2018
Sentinel-1	11/08/2018
Sentinel-1	22/08/2018
Sentinel-1	03/09/2018
Sentinel-1	16/09/2018
Sentinel-2	04/08/2018
Sentinel-2	27/08/2018

Table 2: *Platforms and acquisition dates of the data used in the case of Qornet ed-Deir.*

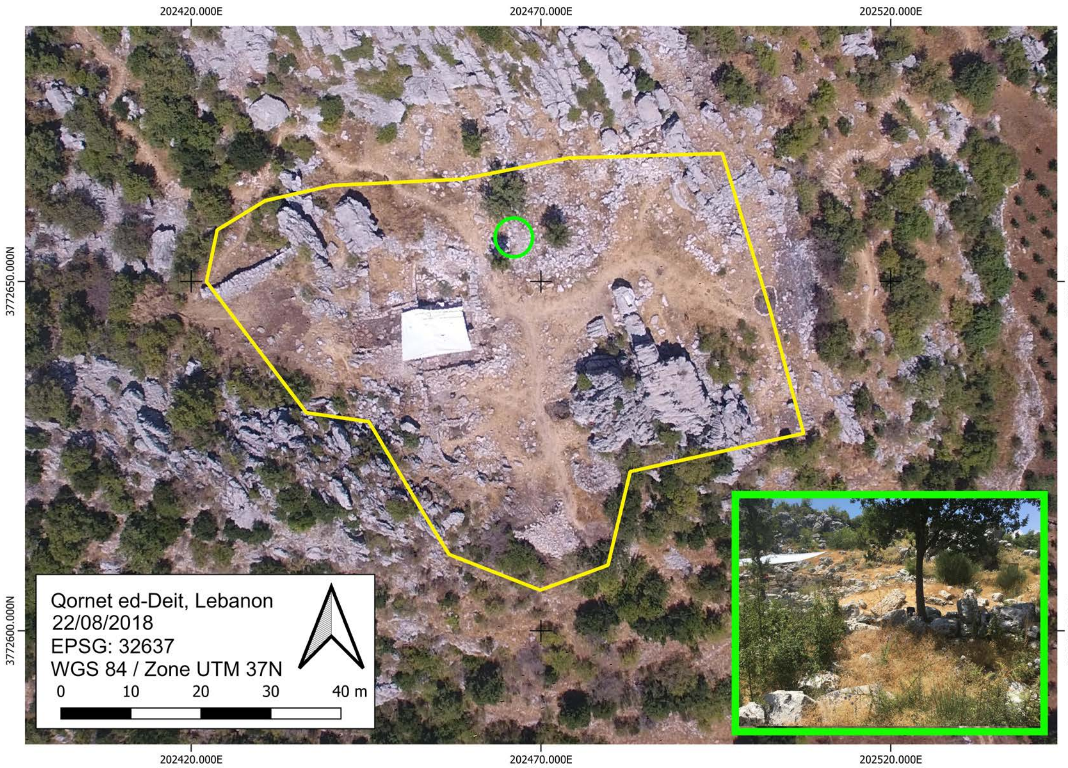

Figure 8: *Aerial view of Qornet ed-Deir, with a view of the ground vegetation in the green insert (taken by the author).*

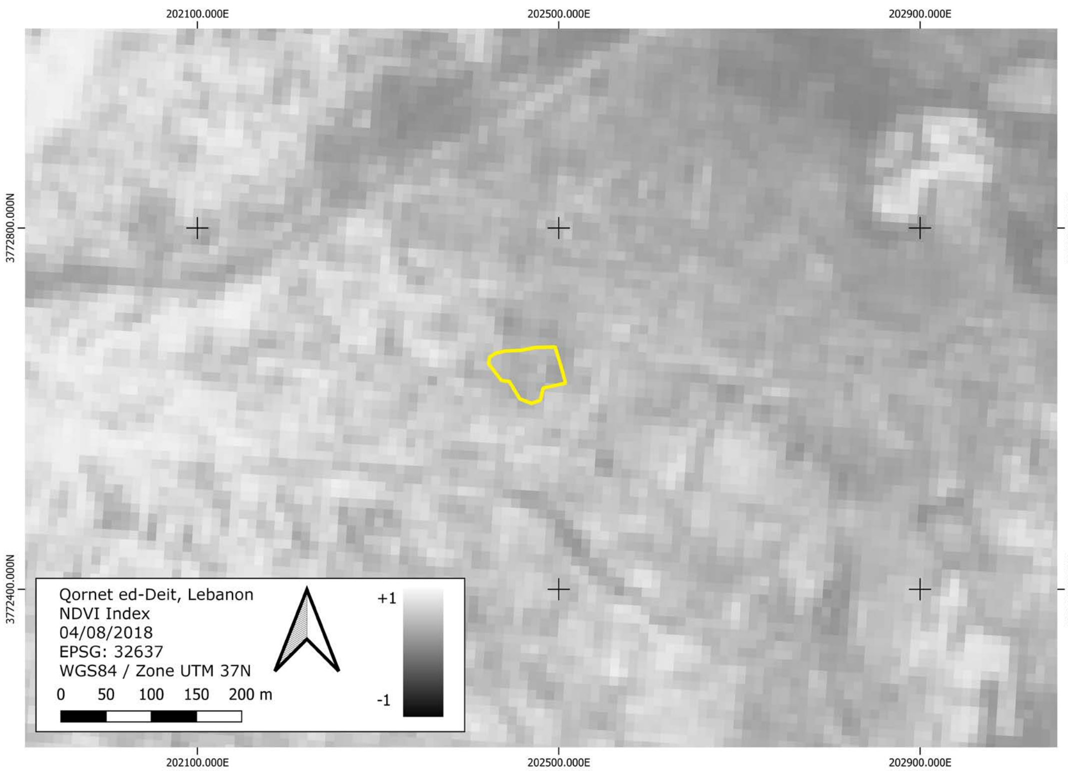

Figure 9: *NDVI Index map around Qornet ed-Deir.*

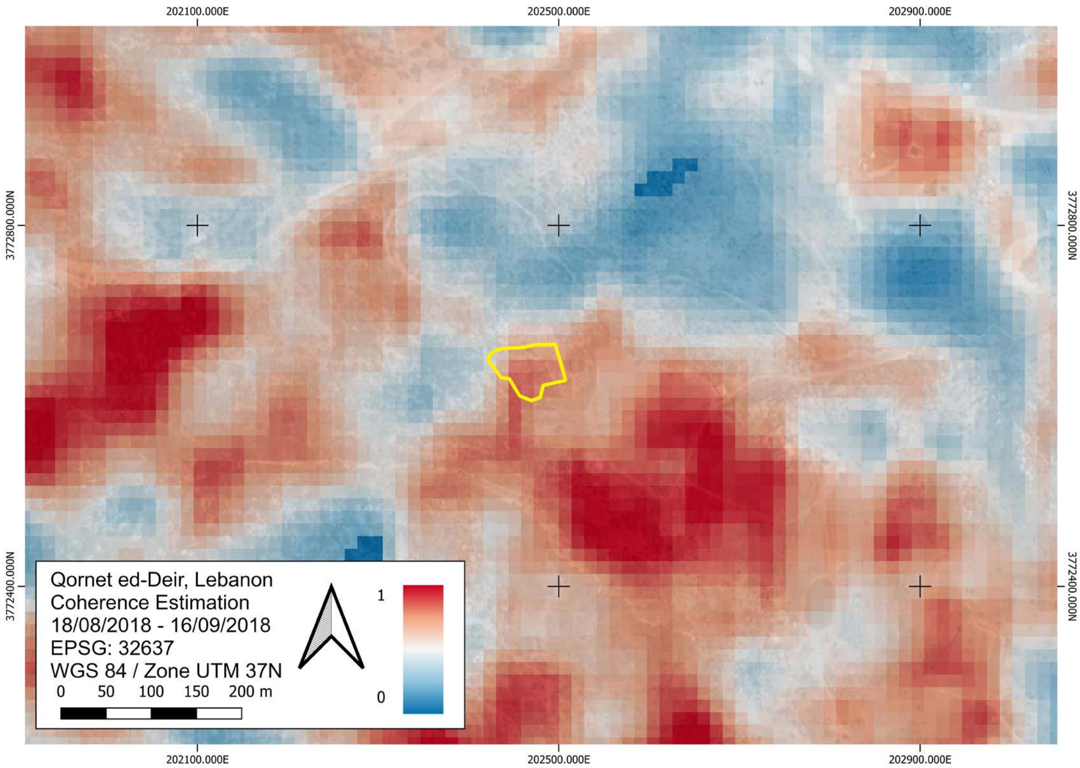

Figure 10: *Coherence Estimation map around Qornet ed-Deir.*

When it comes to inspecting the coherence maps generated from acquisitions before the excavations, as well as those cross-excavation, we come across highly noisy results, with no clear decorrelation that we can relate to the ground activities on the site. This can be explained by several reasons. The first reason could be the relatively small amount of ground change resulting from the excavation works, as well as the small areas that were excavated compared to the relatively large resolution of the coherence map (13.25 x 13.25 m). That means that even though the changes occurred, they were not large enough to create a significant enough difference to stand out in the coherence map. This indicates one of the limitations of this approach.

In fact, small disturbances, such as digging a single looting hole, are unlikely to change the pixel coherence value enough to make it stand out from the regular noise in the system, especially when a target area is located within a vegetated region. The relatively large spatial resolution is one of the downsides of this approach, and thus make it only suitable for larger scale looting and destruction events, such as a large grouping of looting holes on the one hand, or the destruction of an architectural structure (with a footprint larger than one pixel) on the other. In addition, the abundant presence of vegetation on and around the site help to create high decorrelation values that are not attributed to ground changes. This stands in the way of our ability to identify, with confidence, the decorrelated pixels that are attributed to ground change. This is clearly seen in **Figure 10**, where the coherence map generated from acquisitions during and after the excavation shows a large decorrelation patch that extends beyond the site limits. It is certain that some of the decorrelation was generated by the excavation itself (i.e. digging, moving stones and soils, etc.), but it is impossible to separate this from volumetric decorrelation that is generated by the vegetation around the site.

Regional monitoring and the move towards automation

The above examples demonstrated the applicability, as well as the limits, of this approach on a single site scale. However, the real advantage of this approach is its ability to scale to large regions and automatically monitor countless sites effectively with every Sentinel-1 pass. The swath width of the Interferometric Wide Swath Mode, which is used in this approach, is 250 km. This means that every single product download covers a significant area, including a very large number of sites. Monitoring hundreds of sites manually is certainly not efficient and would require a staggering amount of screen time to go through VHR images of each site on a regular basis. The proposed approach allows for the automation of the process, and only requires human intervention when a site is disturbed. Its average coherence thus drops below a certain threshold. This simple criterion acts as an 'early' warning system to give the authorities a heads up and point them towards the areas that are most affected by systematic as well as random looting and destruction. As shown above, this approach relies heavily on the environmental nature of the archaeological site and will not provide reliable results when the sites are located within highly vegetated areas. Instead, this approach is efficient in monitoring sites located within desert regions and thus can prove helpful in monitoring sites across many Near Eastern countries. In addition, the scale and nature of the change significantly affect detection ability. As has been shown in the case of Qornet ed-Deir, small scale changes such as highly concentrated earthwork are indistinguishable from the surrounding noise, especially in a vegetated area. This means that this method is not expected to detect single exploratory looting holes, but can be useful in detecting events of such large concentrated activity represented by digging a large number of looting holes, as well as large scale destruction events, such as the destruction of a building or the bulldozing of a part of the site.

Conclusion

The recent and on-going events in the Near East have fueled a wave of unprecedented looting and destruction of archaeological sites akin to nothing before. This phase in the history of the Near East should be managed carefully if we hope to retain some of the cultural richness that the area presents to the world. A majority of sites under threat are currently located beyond the reach of archaeologists, and thus Remote Sensing approaches are the most suitable to assess and track any damage inflicted on the site.

The approach presented above removes the reliance on expensive VHR images in favor of open source data, mainly SAR images and High Resolution Multispectral Imagery from Sentinel-1 and -2 respectively. This approach relegates VHR data from being a main source to becoming a validating source, which would only be called upon when a low coherence anomaly is detected within an area of interest. Furthermore, the move towards automating the process from data acquisition to damage detection will pave the way for a continuous and sustainable monitoring of archaeological sites for a prolonged period of time, and eventually the creation of a comprehensive database of damage to archaeological heritage. The example of Palmyra shown above demonstrates the full capacity of such an approach: here, the monitored objects were relatively large buildings and the damage consisted of almost total destruction. This resulted in a very distinguishable drop in InSAR mean coherence. On the other side of the spectrum, the example of Qornet ed-Deir showcases the limits of this approach, where we are not able to certainly identify ground changes due to their scale and the site's land cover.

Although the damage to Palmyra was highly publicized for ISIS propaganda reasons, as well as due to the fact that the site is on the list of UNESCO World Heritage Sites, countless other small sites are being destroyed and looted all over the Near East with little to no media coverage. Scaling up this approach leads to better monitoring capabilities, and also allows us to map destructive activities both over large regions and at relatively small sites, and subsequently devise better conservation and protection policies in the future.

Acknowledgments

This work has been carried out using the resources made available by the Copernicus Research User Support (RUS) service (http://rus-copernicus.eu). RUS is a free service which aims at promoting the uptake of Copernicus data by providing cloud-based working environments customised to users' needs, together with the support of technical and thematic experts as well as dedicated training resources. The service is funded by the European Commission, managed by the European Space Agency, and operated by CS SI and its partners.

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Ink Recipes from the Islamic Era: Texts, Manuscripts, Ink Replication, and Scientific Analyses

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Abstract

An interdisciplinary approach can be extremely beneficial to the study of material culture, and of technical literature in particular. This paper focuses on a research project that combined Arabic studies, archaeometry, codicology and practical replication to the study of recipes of black inks in the Arabic language. Among the goals of the project were the identification of the purpose and use of the recipes, the treatises and the manuscripts in which they survive, especially in connection to the actual usage of inks on written artefacts. The project consisted of several steps. First, ink recipes were collected from written Arabic sources, their feasibility assessed and some of them were reproduced. These samples were then artificially aged and analysed through an array of analytical techniques, mostly non-invasive and non-destructive. Some of the manuscripts containing these recipes were examined for their codicological characteristics and analysed with the same scientific methods. The results proved the effectiveness of such an interdisciplinary approach.

Keywords

Archaeometry, Arabic Studies, Codicology, Technical Literature, Interdisciplinarity

Introduction

Ink recipes can often be found in Arabic manuscripts. They may be included in treatises of diverse subjects — from handbooks for secretaries or calligraphers to books on arts and crafts, to alchemical and astrological essays. Recipes can also appear, with or without relation to the main text in the manuscript, in the form of lists or collections or even added in empty spaces as single entries. Despite the abundance of sources and the importance of the written dimension in the Arab world, little research has so far focused on the study, edition, and translation of this specific technical literature.[1]

The study of ink recipes can also have a practical application, as knowing the composition of inks is of great help when it comes to preserving and repairing manuscripts. Materials can be identified through the application of scientific analyses — such as X-Ray Fluorescence (XRF), UV-NIR Reflectography, Fourier Transform Infrared Spectroscopy (FTIR), and Raman Spectroscopy, to mention only non-destructive methods. In order to fully evaluate the results obtained with these techniques, however, it is

[1] For an overview of the secondary literature: Griffini 1910; Levey 1962; Grohmann 1967; James 1989; Zerdoun Bat-Yehouda 2003; Schopen 2004; al-ʿAbbādī 2005; Fani 2013; Raggetti 2016; 2019.

beneficial to know what ingredients and production processes were used when the artefact in question was made. This information is only partially available for Arabic materials.

In this paper I will present an innovative approach to the research on ink recipes, combining the study of the texts with the replication of the recipes and the scientific analysis of inks in both manuscripts and mock-ups. The research questions of this study follow three main lines of inquiry. The first concerns the feasibility and practical use of the recipes: this was assessed through the analysis of their texts and the actual replication of some recipes.[2] The second regards the purpose of the recipes; the identity of the authors, readers and potential users of these texts and of the manuscripts in which they are written; and the way the recipes are related to each other. These topics were investigated through the textual analysis of the works that include the recipes and the codicological examination of a selection of the manuscripts containing those texts. The third aims at determining the degree of identification that can be obtained by applying the aforementioned techniques (i.e. Is it possible to differentiate only formulations of different ink types, or can formulations of the same ink type but with different ingredients also be distinguished?) and it was tested on mock-ups (before and after ageing) and a small number of manuscripts. It is not the aim of this paper to present an exhaustive and detailed study of the entirety of the results and techniques used; instead it is meant as an accessible introduction to the subject matter.[3]

To answer the research questions, a corpus of 260 formulas of black inks was collected from primary and secondary literature, although the real number is likely to increase when more manuscripts containing these texts are researched. The term 'formula' is used instead of 'recipe' in order to include variants in which changes of ingredient, quantity or procedure appear. It is difficult to date the formulas: according to the life of the most famous compilers, their date varies between the 9th and 15th centuries CE, but in many cases their origin can be traced to older authorities, eras and cultures, such as the Roman and Hellenistic traditions.[4] On the other hand, the manuscripts preserving the texts are much more recent, with dates ranging between the13th and 20th centuries CE. While this later dating does not, in itself, mean that the recensions are corrupted, the characteristically fluid tradition and transmission of this kind of literature is bound to introduce changes and alterations to the texts. In fact, the presence of variants in recipe texts and treatises (including omissions and additions of entire recipes) shows that the compilers and copyists had the liberty to change and reshape authoritative works, thus basically creating new formulas in the process. This phenomenon is not seen as a disrespectful act towards the sources but, on the contrary, it is done in an attempt to dignify and increase the value of new materials by associating them with the name of an authoritative figure.[5]

Similar considerations should be applied to the provenance of the recipes. The authors came from different areas of the Islamicate world (al-Andalus, Maghreb, Tunisia, Sicily, Egypt, Syria, Iraq, and Yemen), while the titles and texts of some recipes mention al-Andalus, Maghreb, Egypt, Persia, India, and even China as their area of origin. Again, due to the fluid tradition, the texts were modified during their transmission and it is extremely difficult to locate both the original text and the variants. It is also true that these recipes often became part of a shared cultural background and, therefore, that their origin, as well as the provenance of their author, is mostly irrelevant. However, some specifics can still

[2] The author is aware that some recipes may no longer be understandable in our times, as we may have lost the meaning of technical terms or code names used to identify certain ingredients. Even the mere translation of terms indicating plants and minerals can be an issue, as is the case with the term vitriol, discussed in Colini 2021, 141–146. This scenario is considered when assessing the feasibility of a recipe.

[3] An in-depth treatment of the topic can be found in the PhD dissertation of the present author; Colini 2018.

[4] In this respect, the studies conducted in the framework of the ERC project AlchemEast, will highlight this connection even further.

[5] Examples of this phenomenon can also be observed in books of other topics that contain recipes; Raggetti 2015, 165–166.

be found in the works of authors coming from peripheral areas of the Islamic world. For instance, al-Qalalūsī and al-Marrākušī, who came from al-Andalus and the Maghreb, are the only ones who mention recipes or variants from these regions. These recipes have no parallel in any other texts, especially concerning the ingredients used, and can be considered an original product of these areas.[6]

Keeping in mind the complex scenario in which these texts were produced and transmitted, this paper will discuss three research directions — the feasibility of the recipes, their purpose, and the effectiveness of the scientific analysis — along with their methods and results, in order to show how beneficial this interdisciplinary approach was in investigating ink recipes. An explanation of the ink typology as understood by Arabic authors and their corresponding modern ink types will also be provided.

Ink typology in Arabic

Essentially, two Arabic terms were used to identify black inks: *midād* and *ḥibr*. The latter, *ḥibr*, is used to indicate iron gall inks, which are obtained by mixing iron ions with gallic acid in a water-based solvent, with the addition of a binder, normally gum arabic. The source of iron ions is mainly vitriol (a mixture of iron, copper and other sulphates) but filings, slags, nails, and pieces of iron were also used. The best source of gallic acid is gall nuts, but the organic compound can also be obtained by cooking or macerating various classes of vegetal matter rich in tannins (e.g. tree bark, fruits and fruit rind, leaves, etc.). Iron gall inks comprise 53% of the formulas collected (**Figure 1**).

The term *midād* is used mostly for carbon inks, which are obtained by mixing charcoal or soot with a binder dispersed in a water-based solvent, and represent 23% of the total. *Midād* is also often used to indicate the few plant inks collected (3%): they consist mainly of tannins obtained by cooking or macerating plants, and, unlike the European recipes for plant inks, gall nuts are never used as the only source of tannins for these inks.[7]

Other inks can be obtained by mixing inks from the previous two types. How these variations were perceived by authors and compilers, however, differs greatly as can be seen by the names used to describe them. Mixed inks are, in fact, an elusive category even today, since their characteristics align with those provided by the main component. However, at least two categories should be defined: mixed carbon-plant inks (mixed C-P in **Figure 1**) and mixed carbon-iron gall inks (mixed C-IG in **Figure 1**). Authors and compilers always referred to mixed carbon-plant inks as *midād*, probably because their outcome is very similar to carbon inks. Their formulas represent only 6% of the total, but the data likely reflects their textual stability rather than a limited spread of the recipes. Mixed carbon-iron gall inks are instead called *midād* or *ḥibr*, depending on whether the characteristics of the resulting formulation are closer to carbon inks or to iron gall inks. The only exception is al-Marrākušī, who specifically names them 'composite inks' (*midād murakkab*). Representing 14% of the collected formulas, their textual tradition seems to start around the 13th century CE, while the other types were in use, according to written sources, at least since the 9th century CE. The percentage of mixed inks (cumulatively, 20% of the total) is already an extremely interesting datum. In fact, inks of these typologies are considered rare and are only sporadically identified in manuscripts.[8]

6 Fani 2013, 114–115, 124, 126, 139–140, 172, 184.

7 Schopen erroneously attributed the term *ḥibr* to plant inks. The misunderstanding is due to the fact that he ascribed an incomplete recipe of iron-gall ink to the category of plant ink; Schopen 2004, 125; Colini 2021, 134–136. There are cases of plant inks called *ḥibr*, however, for instance a preparation made with the juice of the damascene mulberry (*tūt aš-šāmi* which corresponds to *Morus nigra*) with the addition of gall nut solution and gum arabic; Fani 2013, 97; Levey 1962, 20a.

8 The limits concerning the detection of this type of ink expressed by the current protocols and equipment used in ink identification are discussed in Colini *et al.* 2018 ; the application of a new protocol is described in Colini *et al.* 2021.

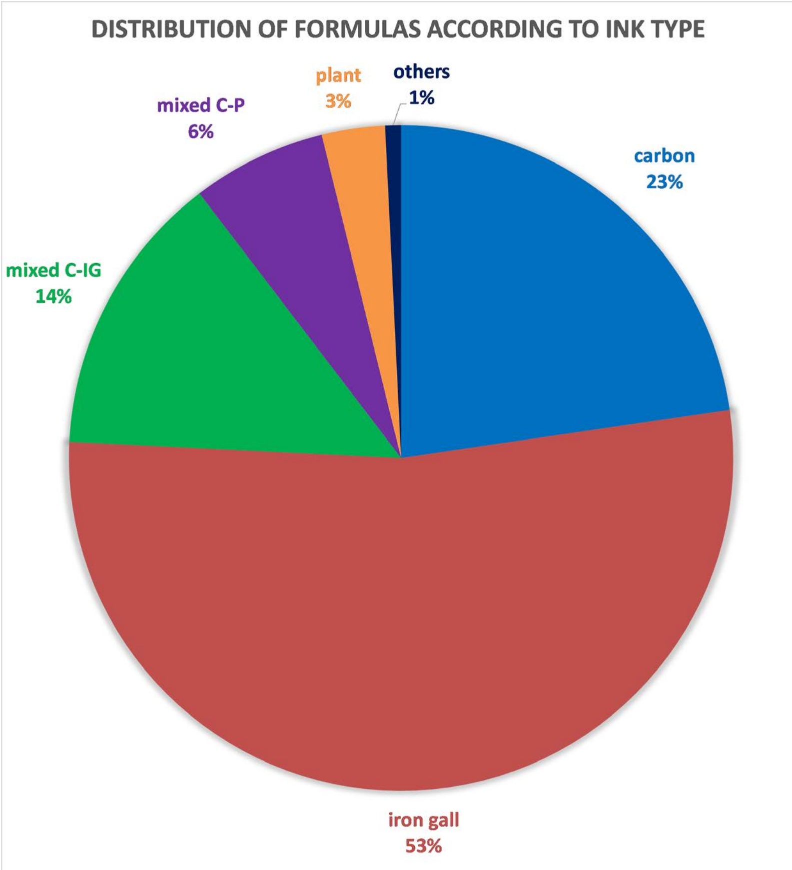

Figure 1: *Distribution of the 260 formulas according to the black ink typology (Graph: Claudia Colini).*

The ingredients necessary to obtain a dark medium, however, are not the only ones listed in the recipes. Many more are mentioned, and they serve various purposes — from preservatives to biocides, from colour to gloss enhancer, from perfumes to viscosity modifiers. Sometimes their function (real or perceived) is explained in the texts, but most of the times it is not mentioned. Unfortunately, it is not always possible to identify the exact purpose of each additional ingredient.

Feasibility of the recipes

The formulas have been studied through an analysis of their structure and composition. The framework of a recipe consists of a list of ingredients and a set of instructions to follow in order to obtain the final formulation. The list of ingredients can be placed at the beginning, with a schematic layout or in discursive form, or it can be embedded in the procedural description. In both cases, the exact amount of the ingredients is not always given. The amounts can be expressed in units of weight, in parts, or even according to empirical observation (i.e. add vitriol until the liquid becomes black); in several cases, a combination of systems has been observed.

Around this bare-bones structure, several elements can be added, including: a title identifying the recipe, sometimes locating it in a certain geographical area or ascribing it to a specific person; a praise or invocation of God; a declaration of testing by the compiler; and comments, suggestions, and tips added by the compilers to explain difficult passages or to clarify the meaning of specific terms, especially if they are unusual ingredients, obsolete units of measurement or uncommon equipment. Some of these elements played a key role in the assessment of the feasibility and purpose of the recipes.

However, replication experiments are the best way to check if the formulas are doable; therefore, 30 of them were selected and tested.[9] In general, following the instructions of the formulas resulted in usable inks. A certain degree of interpretation was required, as some key passages were omitted, possibly because they were perceived as obvious and redundant by the authors of the recipes and the compilers of the treatises. This is particularly true for carbon ink recipes. The few non-reproducible inks resulted from formulas containing errors, mainly omissions, place inversions or other mechanical errors introduced during some phase of copying.[10]

The clarity of exposition and the amount of details vary greatly depending on the authors and the treatises. It is likely that the recipes were meant for different audiences: the clearer and more detailed ones were likely meant for unexperienced users, such as students and apprentices, while the more succinct ones were geared toward learned readers skilled in the arts of the book or in alchemy, such as secretaries, scribes, teachers, physicians, and literate members of the courts, among others.

Purpose of the recipes

As mentioned in the introduction, ink recipes have been found in various types of treatises — from texts about magic and astrology to *manāfiʿ* and *ḫawāṣṣ* (later incorporated into encyclopaedias, collections of *mirabilia* or *ʿaǧāʾib*) to technical handbooks addressed to the various professionals involved in manuscript production, such as calligraphers, scribes and secretaries, and even street performers and tricksters.[11] However, ink recipes only assume an important role and position in the text of technical handbooks on topics related to the production of written artefacts (be they artistic writings, books, letters, or writings used to play tricks on an audience). The recipes often occupy several sections of these texts and are frequently organised according to their typology for a clearer exposition.

Five of these treatises have been studied in more detail to assess their purpose, and, consequently, the purpose of the recipes included there. Of particular interest were the introduction; the chapter divisions and the selection of recipes in the groups; and the presence of explanatory chapters or subchapters concerning ingredients, equipment, or procedures common to several recipes.

The following treatises were considered:

- *Zīnat al-kataba* ('The ornament of the scribes') by Abū Bakr Muḥammad b. Zakariyyāʾ al-Rāzī, (d. 925 or 935 CE);[12]
- *ʿUmdat al-kuttāb wa-ʿuddat ḏawī al-albāb* ('The staff of the scribes and implements of the wise men') by al-Muʿizz b. Bādīs at-Tamīmī aṣ-Ṣanhāǧī (d. 1062 CE);[13]
- *al-Muḫtaraʿ fī funūn min aṣ-ṣunaʿ* ('The findings on the techniques of craftsmanship') by al-Malik al-Muẓaffar Šams ad-Dīn Yūsuf b. ʿUmar al-Ġassānī (d. 1294–1295 CE);[14]

[9] Details concerning the replication phase and the benefits of replication in textual analysis can be found in Colini 2021; 2018, 59–95. A similar approach was followed by Raggetti to test a golden ink; Raggetti 2019, 228–238.

[10] As mentioned in note 2 of the present paper, when an ingredient could not be determined due to the now-lost meaning of a technical term, it was not counted as an unfeasible recipe.

[11] See the list of sources in Schopen 2004, 19–32. For the analysis of ink recipes in *manāfiʿ* and *ḫawāṣṣ*: Raggetti 2016, 323–327. For the inclusion of the latter in encyclopaedical works: Raggetti 2015, 162.

[12] Goodman 2012; Brockelmann 1898–1902, I, 233–235; 1937–1942, I, 417–421; Zaki 2011.

[13] Talbi 2012; Brockelmann 1898–1902, I, 268; 1937–1942, I, 473; Ibn Bādīs 1988.

[14] Smith 2012.

- *Kitāb al-azhār fī ʿamal al-aḥbār* ('The most beautiful flowers on the production of inks') by Muḥammad b. Maimūn b. ʿImrān al-Marrākušī al-Ḥimyarī (13th century CE);[15]
- *Tuḥaf al-ḫawāṣṣ fī turaf al-ḫawāṣṣ* ('The gifts of the wise men on the curiosities of the substances') by Abū Bakr Muḥammad b. Muḥammad al-Qalalūsī al-Andalusī (d. 1308 CE).[16]

According to analysis of these texts, teaching was the declared intent of al-Malik al-Muẓaffar and al-Qalalūsī, while, in the case of al-Marrākušī, the same aim can be inferred from his writing style and the structure of his treatise. Ibn Bādīs and al-Rāzī, on the other hand, appear to write for an already experienced reader, as their recipes are succinct, and details are scarce. The intended audience, as clearly declared in the introductions by some authors, was the *kātib* — a class comprehending clerks, secretaries and scribes, be they apprentices or professionals — and, by extension, scholars and courtiers. Artisans are added to the list of intended readers only in one recension of *al-Muḫtaraʿ fī funūn*.[17] The absence of all the tips and tricks and manners related to a real craftsman's activity, such as the correct posture that an ink maker should keep to speed up the work and suffer less fatigue, suggests that this kind of knowledge was, most likely, transmitted orally.[18] Calligraphers' training was seemingly based entirely on oral teaching. In fact, despite the existence of treatises dedicated to calligraphy — which sometimes contain ink recipes — the education of these artists was based mainly on the observation and reproduction of the gestures of their masters, including those performed during the preparation of inks.[19]

These treatises are traditionally considered part of the *adab* literature.[20] They share several features with other works in this genre, including an encyclopaedic vibe (epitomised in the work of al-Malik al-Muẓaffar), a goal of completeness (to which Ibn Bādīs especially aspires), an authorship attributed to a ruler, and their circulation in a court setting. Nevertheless, they lack the moralising subtext, the anecdotal structure, the quotations and the refined language that are otherwise typical of this kind of literature.[21] It is possible that these treatises were born as technical manuals and only later became part of the cultural baggage for secretaries and courtiers.[22]

By looking at the treatises' transmission, however, it is clear that their texts were modified and amended by compilers and scribes, who copied them until the 20th century CE. For example, the structure and order of the treatises were changed; recipes or entire chapters were omitted, added or shifted to another part of the text; and the recipes themselves were modified (e.g. by substituting ingredients or changing quantities and proportions, omitting passages thought as superfluous, or adding comments and suggestions). These emendations cannot be attributed merely to the intervention of a copyist dealing with an unreadable model; rather, they often reflect the competencies in ink making possessed by the

[15] al-Marrākušī 2001, 41–54.
[16] Brockelmann 1898–1902, II, 336 (although his name is given as al-Qallūsī); al-Qalalūsī 2007.
[17] Fani 2013, 161.
[18] Fani 2013, 163.
[19] James 1989, 164 and 174.
[20] The concept of *adab* has several components. From the early Abbasid period it meant *humanitas* or culture in a broad sense, including scientific subjects and pleasant erudition, but centered especially on man. It was considered the necessary general culture expected of any man of superior education. Even in the Abbasid epoch, however, it already included a narrower sphere that can be summarised as the necessary knowledge expected by men holding offices and social function, such as secretaries and viziers, for instance. The concept progressively lost its wide, humanistic breadth to fit into the narrower and more rhetorical sphere of *belles-lettres*; Gabrieli 2012.
[21] See, for example, the book of secretaries by ʿ*Abdallāh* al-Baġdādī, which consists of a work including a history of writing, lists of famous secretaries, quotations from renown secretaries and information over the formation of secretaries; Sourdel 1952–1954.
[22] Fani 2013, 192.

compilers and scribes copying these texts. This fluid and active transmission hints at a living tradition, which, in my opinion, cannot be completely detached from practice.

Another way to assess the purpose of the recipes is to investigate the characteristics and use of the manuscripts in which such texts have been recorded. Consequently, a selection of 20 manuscripts and facsimiles, including the aforementioned treatises but also other texts with ink recipes, were studied. They mainly belong to the *Staatsbibliothek zu Berlin* (SBB), the *Bibliothèque Nationale de France* (BNF), and the *Dār al-Kutub* in Cairo.[23] These manuscripts are common books, not particularly refined, with little aesthetic value, with no or only functional decorations and few comments, corrections and annotations, mostly in the hand of the same copyist. The treatises (which are rarely copied in their entirety) are often part of multiple text manuscripts (MTM) or of composite manuscripts built around a central core or production unit.[24] The selection of the accompanying texts reinforces the idea that the customer possessed high technical competencies, since the ink treatises were mostly joined by texts of scientific-alchemical subject. The fact that the original ink treatises are incomplete or summarised suggests that they were selected to satisfy the specific needs of the commissioner. The combination of these characteristics additionally suggests that they were personal manuscripts, possibly used by the copyists themselves as self-learning instruments, but the absence of comments, notes or corrections points towards an occasional use.

Only one of the studied manuscripts — Berlin, SBB, Pm II 30 — references the teaching of a work about writing techniques entitled *Lamḥat al-muḫtaṭif fī ṣināʿat al-ḫaṭṭ aṣ-ṣalif* ('A fleeting glimpse on the art of splendid writing').[25] This text is placed at the beginning of a composite manuscript containing mainly recording lectures about *ḥadīṯ*. At fol. 17r, at the end of the aforementioned work, its scribe copied the note found in his exemplar, which stated that the copyist of that manuscript, ʿImād ad-Dīn Ismāʿil b. ʿAlī b. Muḥammad al-Buqāʿī aš-Šāfiʿī, and his friend, Burhān ad-Dīn Ibrāhīm b. ʿAlī al-Ḥimṣī al-Ḥanbalī, heard the work from the author Ḥusain b. Yāsin b. Muḥammad al-Kātib in 1379 CE in the Ṣāliḥiyyah district of Damascus.

A few other manuscripts are more personalised and show some traces of practical use. For instance, the manuscript Berlin, SBB, Lbg 637 — a 19th century copy of *ʿUmdat al-kuttāb* — shows green traces left by fingertips in the margins and fore-edge of the pages corresponding to the description of coloured inks (**Figure 2**), suggesting that somebody leafed through the pages with their hands dirty. Thanks to the application of the analytical methods described in the next section, the main components of the colour were identified as orpiment and indigo, which are the same ingredients mentioned in a recipe of a green ink (*līqa*) located in fol. 17v, on the opposite side of the more evident stain. While this might be a coincidence, it can also suggest that the user was searching in the manuscript for the recipe corresponding to the colour they were preparing.

Similarly, grey metallic flakes were found at the end of Berlin, SBB, Spr 1918 (**Figure 3**), the only manuscript recording the text of *Kitāb al-Iṣāba fī lawāzim al-kitāba* ('Book on the Art of Penmanship') attributed to Šams ad-Dīn b. al-Ǧazarī (1350–1429 CE).[26] Mercury and a small amount of silver were

[23] For the complete list of the manuscripts and their detailed descriptions, see Colini 2018, 7, 30–33 and 45–47.

[24] 'This term [multiple text manuscript (MTM)] designates a codicological unit "worked in a single operation" (Gumbert) with two or more texts or a "production unit" resulting from one production process delimited in time and space (Andrist, Canart, Maniaci). On the other hand, "composite" seemingly is already established in the sense as used by Gumbert and others and refers to a codicological unit which is made up of formerly independent units.', Friedrich and Schwarke 2016, 15–16.

[25] Ahlwardt 1887, 5, nr. 2. The author of the text is recorded as Ḥusain b. Yāsin b. Muḥammad ad-Dimašqī in Brockelmann 1937–1942, III, 1033.

[26] According to Ahlwardt, the text is incomplete. Since it is the only copy of this text that survived, it is hard to say what, if anything, is missing; Ahlwardt 1887, 6, nr. 6. For more information about this text: Raggetti 2019, 201–206.

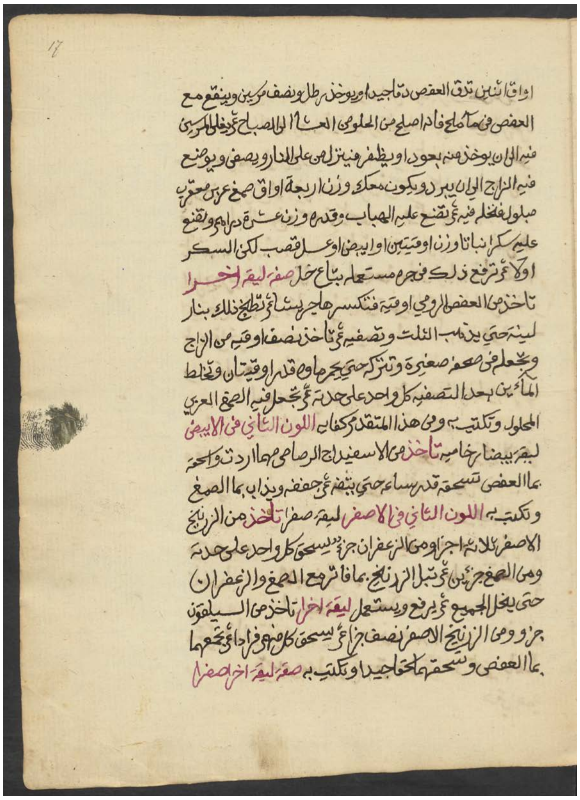

Figure 2: *Green fingerprint on the left margin; Berlin, SBB, Lgb 637, fol 17r (© Staatsbibliothek zu Berlin - Preussischer Kulturbesitz, Orientabteilung, Landberg 637).*

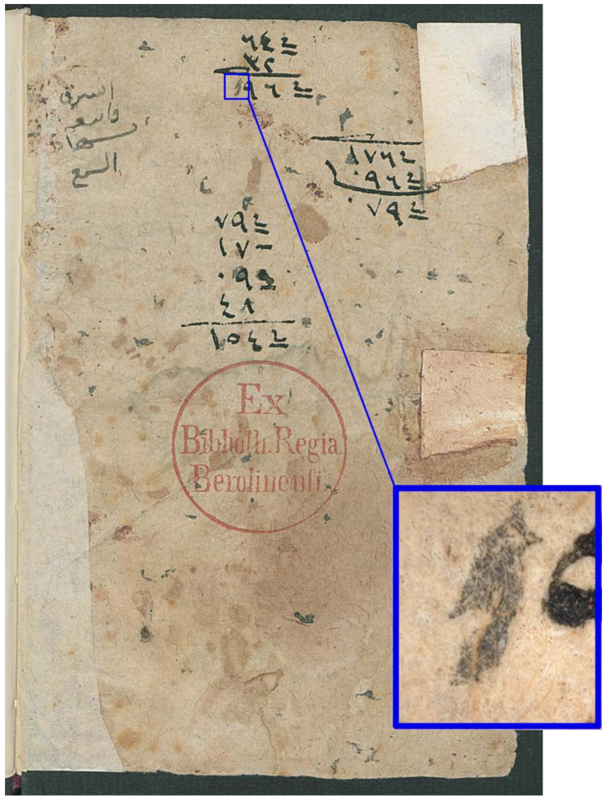

Figure 3: *Grey metallic flakes and, in the blue box, close-up of one of the flakes; Berlin, SBB, Spr 1918, fol 27v (© Staatsbibliothek zu Berlin - Preussischer Kulturbesitz, Orientabteilung, Sprenger 1918).*

detected in the flakes, and recipes for making metallic inks that include these ingredients can be found in the treatise.[27]

It is possible that the manuscripts were consulted as mnemonic aids during the process of ink making — a role that is even more plausible for the collection of recipes, another form in which recipes can be found in manuscripts. They are personal notes for ready use, characterised by being simple, short lists of recipes. They may vary in length, from one page up to several leaves, although they rarely exceed a single quire. The lists have no title or author, and they do not include an introduction or chapter divisions, although the individual recipes are introduced by a title, usually highlighted with a different colour. They are the result of an operation of collection and selection by a compiler, who decided which and how many recipes were worthy of being copied and kept.[28] For example, the recipes on fol. 183rv in Berlin, SBB, Pet 684 seem to represent a very personal selection of favourites, extracted from *al-Muḫtaraᶜ fī funūn* but organized according to a subjective order that completely disregards the original one. These collections were often part of a multiple text manuscript or were copied on loose leaves or single quires that were later inserted into composite manuscripts. The relation between those lists and the other texts can vary from close to non-existent.

[27] Raggetti 2019, 213–226.

[28] On the methods of formation of recipes books see Baroni and Travaglio 2016, 33–51. They describe methods of aggregation and of reduction of texts. In the case of the collection of recipes I dealt with, reduction methods are applied more often, while on the formation of the treatises both types can be observed.

Scientific analysis

The inks obtained from the replication of the 30 selected recipes were studied with several analytical techniques in order to assess the degree of identification allowed by those techniques and their limitations. To better compare the characteristics of the mock-up samples to those of the historical manuscripts, it was necessary to submit the samples to artificial ageing. The test was performed in an ageing chamber (WK11-180/40 by Weiss Umwelttechnik GmbH), with the conditions of T=80°C and RH=65% for 49 days, with a pre- and post-conditioning of 24 hours at T=20°C and RH=50%.[29] The samples were placed in paper stacks of ten folios with polymeric tiles covering the top and bottom of the pile in order to simulate the structure of bound books.[30]

The selection of these analyses fell on non-destructive methods performed with portable equipment, since the final goal is to analyse cultural heritage items. In particular, the following techniques were applied:

- UV-NIR Reflectography (two wavelengths: 940 and 395 nm), DINO Lite microscope (model AD413t-i2v), to discriminate between pure classes of inks;
- Multispectral Imaging (MSI), MegaVision EurekaVision™ E7, to observe the behavior of the inks at multiple wavelengths in UV and NIR;
- Colorimetry and Vis spectrometry, SpectroEye SPM 100 (Gretag-Imaging AG company), to record the CIE*l*a*b coordinates and observe changes in colour after the ageing of the samples;
- X-Ray Fluorescence (XRF), ArtTAX 800 Spectrometer (Bruker Nano GmbH), to detect the elements present in the inks;
- Fourier Transform Infrared Spectroscopy (FTIR) in Diffuse Reflectance (DRIFTS), ExoScan 4100 Spectrometer (Polytec GmbH), to detect the organic components of the inks;
- Raman Spectroscopy, i-Raman plus spectrometer (BWTEK), to discriminate between types of inks and particularly to identify the carbonaceous components.

They have been complemented with a few invasive and destructive analyses and with bench equipment in order to overcome some of the intrinsic limits of the chosen techniques and instruments:

- 3D microscopy, microscope Keyence VHX-5000 (bench equipment), to observe the characteristics of the inks and the damages occurred after ageing;
- FTIR in Attenuated Total Reflectance (ATR), ExoScan 4100 Spectrometer (Polytec GmbH), to detect the organic components of the inks (invasive technique).
- Raman Spectroscopy, inVia Raman spectrometer (Renishaw GmbH, UK), to discriminate between types of inks and particularly to identify the carbonaceous components (transportable equipment).
- pH analysis, carried out with two instruments, one invasive – Laqua twin B-712 (Horiba) – and one destructive – Amel Instrument pH meter with a combined electrode 6 mm Ag/AgCl and a flat electrode (Crison Instrument), to evaluate the acidity of the inks;
- High-Performance Liquid Chromatography (HPLC), HPLC Thermoquest (Shimadzu) with the detector UV-Vis SPD-10A and controller SN4000 (Thermo Scientific Inc.), and the column C18 PINNACLE II (RESTEK), to detect the organic components of the inks (destructive technique).[31]

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[29] Strlič and Kolar 2005, 40–43. The test was performed by Michael Bücker. For the climate chamber specifics: name = WK11-180/40 by *Weiss Umwelttechnik* GmbH.

[30] Strlič and Kolar 2005, 105–106; for other experiments with a similar configuration: Carter *et al.* 2000; Bülow *et al.* 2000.

[31] For the description of techniques, instruments and protocols used: Rabin 2015, 27–30; Colini 2018, 23–28 and 103–105. Special thanks to the colleagues who performed some of the analysis and with whom the results were discussed, in particular:

In addition to the mock-up samples, four manuscripts of the SBB that include ink recipes (Lbg 637, Spr 1918, Pm II 30 and Pet 684) were analysed to identify the inks used. In this case, only the standard protocol for the analysis of inks was applied. This protocol consists of non-destructive and non-invasive methods performed with portable equipment: UV-NIR Reflectography (Dino Lite), XRF (ArtTAX 800), FTIR in Diffuse Reflectance (ExosScan 4100) and Raman Spectroscopy (i-Raman plus).[32] The standard protocol was developed at the *Bundesanstalt für Materialforschung und -prüfung* (BAM) and has since been applied to manuscripts produced by several cultures, areas and times.[33]

This explorative study points out the limits of the techniques and equipment employed concerning the precise identification of ink formulas. For instance, only semi-quantitative studies can be conducted with XRF, thus the discrimination between recipes consisting of different amounts of the same ingredients is not possible. Volatile ingredients, such as perfumes, or ingredients added in small quantities, such as preservatives and colour enhancers, are seldom identifiable, as they diffused in the air, were deposited in the inkwell, or did not show enough signal to be collected by the detector of our XRF, FTIR, and Raman spectrometers. Some specific ingredients, in particular tannins extracted from various vegetal sources, can be differentiated using FTIR in ATR (**Figure 4**) and with HPLC.[34] Once tannins were used to prepare inks and applied to the writing support of the mock-ups, however, they could be detected only occasionally in ATR, as they diffused in the writing support; the resulting spectra are therefore heavily influenced by the components of the paper or of gum arabic.[35] Similarly, as shown in **Figure 5**, the chromatograms obtained through HPLC from inks applied on paper (in black) were weaker in intensity and less detailed than those obtained from liquid inks (in blue). None of these techniques could be applied to the ink used in the manuscripts because they are destructive or invasive, and the ink strokes were too thin to be analysed with DRIFT.

The selected techniques proved very useful in the discrimination of the ink types, with the important exception of mixed inks, which could explain why this class of inks is only seldom recognised in manuscripts.[36] In fact, tannins are extremely difficult to identify non-destructively and with mobile equipment, especially when mixed with a conspicuous amount of carbonaceous material. Because tannins have the property of quenching fluorescence, a clear sign of their presence is a stronger contrast in the UV between the background and ink when one compares images taken with UV and VIS reflectography. In addition, they show a change of opacity in NIR, disappearing around 900 nm (or above 1200 nm, if tannins are bound to iron as in iron gall inks). Carbon, however, can mask both effects because it does not show any change in opacity in NIR nor any change in contrast in UV. In addition, it remains on the surface of the writing support while tannins penetrate and diffuse in it. Consequently, tannins were not detected through ATR and Raman spectroscopy in those samples with a percentage of the carbon component higher than the 50% of the ingredients of the recipe. The presence of iron in XRF can at least be used to identify mixed carbon-iron gall inks, but the clear results obtained on the mock-

Ivan Shevchuk for MSI, Olivier Bonnerot for Raman, and the Analytical Chemistry team at Tor Vergata University, Rome, Italy directed by Laura Micheli for pH and HPLC analysis.

[32] The analyses were performed in 2017 with the assistance of Olivier Bonnerot and under the supervision of Oliver Hahn. For a thorough description of techniques, equipment and their application to ink studies: Colini 2018, 23–27 and 123–124.

[33] Rabin *et al.* 2012; Rabin 2015, 27-30; Ghigo *et al.* 2020.

[34] The interpretation of the ATR spectra is consistent with the one found in Diaz Hidalgo *et al.* 2018. Raman spectroscopy was not performed on the single ingredients, but only on the inks applied to paper.

[35] Comparing the results obtained by the current research and those obtained by other studies using FTIR spectroscopy in transmission mode (destructive) and bench Raman spectrometers on both mock-ups and historical sampled materials (Bicchieri *et al.* 2013, 2717–2720; Diaz Hidalgo *et al.* 2018) our equipment could not differentiate tannins on the inks applied to the writing support. The application to manuscripts is therefore problematic and needs further studies.

[36] An extensive analysis of the limitations of the current protocol for the identification of mixed inks can be found in Colini *et al.* 2018.

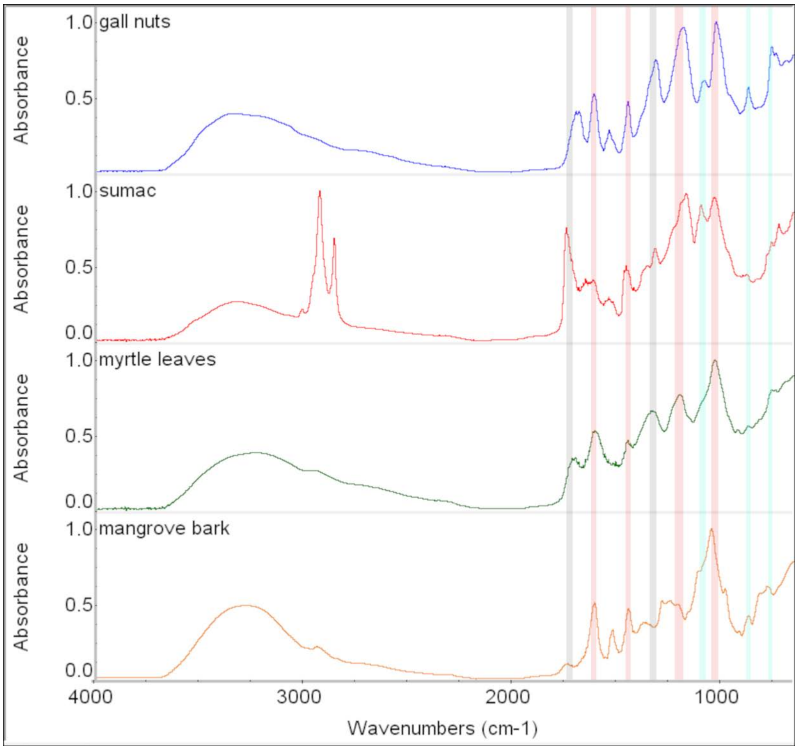

Figure 4: *ATR spectra of tannins extracted by various vegetal: gall nuts, sumac fruits, myrtle leaves and mangrove bark. The absorbance scale has been normalised. Highlighted in pink: the four strong common band of tannins; in grey: the vibrational bands presented by hydrolysable tannins; in green: distinctive bands for gallotannins (Graph: Claudia Colini).*

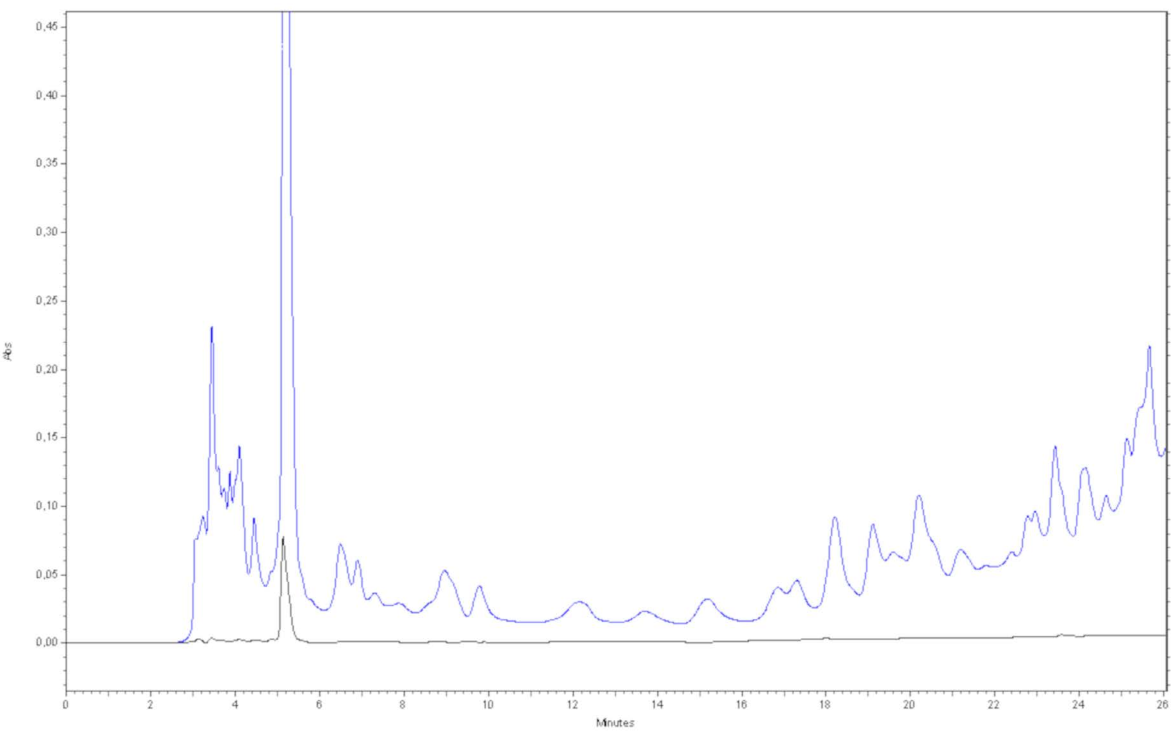

Figure 5: *HPLC chromatogram of a liquid iron gall ink (in blue) compared to the chromatogram of the same ink applied on paper (in black) in which only the peak of the gallic acid was detected. The gallic acid was obtained from gall nuts (Graph: Laura Micheli).*

ups were not as easily obtained on Arabic manuscripts, due to a high and heterogeneously spread iron content in the writing supports.

To respond to the limitations observed in the current protocol, our team is expanding it with additional equipment and techniques that would enable the detection of mixed inks. For instance, NIR Reflectography (wavelength range 900–1700 nm), performed with a camera reaching higher wavelengths in the infrared (Apollo, Opus instruments), was already added to the techniques used for ink analysis, enabling the detection of mixed carbon-iron gall inks. Other techniques, requiring micro-sampling, are currently being evaluated in order to identify the various species of tannins (and thus mixed carbon-plant inks), the most promising being the Atmospheric Solids Analysis Probe Mass Spectrometry (ASAP-MS) performed with Xevo G2-XS QTOF Spectrometer (Waters Corporation).[37]

Conclusions

This research shows how an interdisciplinary approach is of great benefit to the study of ink recipes. By associating the replication phase to the study of the recipes texts, it was possible to assess their feasibility: most of the inks are reproducible, although the amount and clarity of information provided in the recipes varies depending on the authors and the purpose of the texts. It was also possible to understand the genesis of some errors and variants.[38]

The use and purpose of the recipes, and of the manuscripts in which these texts are copied, were studied by combining the information collected from the texts — e.g. the author's intentions and expected audience, the structure of the treatises or of the recipe collections, and the presence or absence of additional material (suggestions, comments, explanations) — with the observations on feasibility and ease of execution obtained by replication, and with the codicological examination of the manuscripts. In some cases, scientific analyses were added to the codicological inspection and proved to be a valuable source of information. According to this comprehensive analysis, the recipes are most likely the result of a living tradition connected to their use. A small number of manuscripts also shows signs of personal and active use, possibly as a memory aid during the preparation of the recipes.

Finally, the texts of the recipes and their assessment is essential to contextualise and guide the scientific analysis of inks. For instance, a sub-type of iron gall ink was noticed in Coptic manuscripts originating from the Cathedral of Thi(ni)s and dating from the 7th to 10th century CE. This ink is characterised by the presence of iron, while other metals frequently associated with vitriol, such as zinc and copper, are absent. It was theorised that metallic iron was used instead of vitriol, but proof of this hypothesis only came after a small number of Arabic recipes, mentioning the use of iron filings or nails instead of vitriol, documented the existence of this sub-type of iron gall ink from at least the middle of the 13th century CE.[39]

The production of mock-ups based on the ink recipes gave the opportunity to analyse a number of ingredients and preparations, which enriched the database of standards that are used as a comparison

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[37] The expansion of the protocol with NIR Reflectography is discussed in Colini *et al.* 2021; while the application of ASAP-MS on inks is discussed in Ghigo *et al.* 2020, 5 and 11–12.

[38] Some examples can be found in Colini 2021, 134–141. The exploration of a sound philological approach based on neo-Lachmannian philology and tailored to technical texts in connection with replication is being developed by the ERC Project AlchemEast.

[39] Ghigo *et al.* 2020, 6-7. For the Arabic recipes, see Colini 2021, 146–149.

for historical manuscripts. This is particularly true for the evaluation of the plants used as precursor of tannins and gallic acid.

In addition, these samples allowed for testing the limits of the scientific analyses normally employed to identify inks using known materials, albeit prepared according to traditional recipes and artificially aged. The results showed that the typology of mixed inks cannot be detected with certainty by the current protocols, possibly resulting in erroneous attributions. The findings prompted new investigations into the applications of additional techniques and equipment.

Acknowledgments

My gratitude goes to the head of the Oriental Department Christoph Rauch and the personnel of the Staatsbibliothek zu Berlin, who permitted access and supported my work. I am thankful to Sara Fani, Lucia Raggetti, Cornelius Berthold, Beate Wießmüller, and Tilman Seidensticker for the fruitful discussions concerning the Arabic text of the recipes. My special thanks go to the members of the BAM and Mobile Lab team of the CSMC, whose support was essential for the completion of this study: Oliver Hahn, Ira Rabin, Sebastian Bosch, Olivier Bonnerot, Ivan Shevchuk, Tea Ghigo, Zina Cohen, and Kyle Ann Huskin. I am also grateful to Laura Micheli and her team at the University of Tor Vergata, Rome, for the analyses conducted in their laboratories and the fruitful discussions. The research for this paper was funded by the *Deutsche Forschungsgemeinschaft* (DFG, German Research Foundation) under Germany's Excellence Strategy — EXC 2176 'Understanding Written Artefacts: Material, Interaction and Transmission in Manuscript Cultures', project no. 390893796 and under the SFB 950 'Manuskriptkulturen in Asien, Afrika und Europa'. The research was conducted within the scope of the Centre for the Study of Manuscript Cultures (CSMC) at the Universität Hamburg.

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Session 5 — Which Continuity? Evaluating Stability, Transformation, and Change in Transitional Periods

Cultures 'In Transition'. Interpreting Time, Persistence, and Changes in the Archaeological Record[1]

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Abstract

This paper offers some reflections on the use of the term 'transition' in archaeology and its theoretical implications. Since any historical development consists of continuous 'transitions', as normal processes of change, the application of the term only in some cases raises the question of what is meant to be highlighted by using it. This leads to the main problem of chronological classification and periodization in archaeology, and the methods used to separate segments of the historical continuum in order to analyse them. 'Transitions' are indeed the norm, while the exceptions are revolutions and abrupt changes. However, even progressive transformations had different degrees of gradualness and accelerations. The understanding and 'measure' of these differences in the temporal extension of change processes, though not easy, are crucial. They imply a rigorous identification and recording of 'real contexts' in stratigraphic succession, the understanding of the destruction events, a careful reflection on absolute dating procedures and methods, and the study of the dynamic of changes in material culture. These methodological issues are analysed by using different developments in two contemporary long-living sites as examples, located in different sections of the Turkish Euphrates valley: Arslantepe and Zeytinli Bahçe.

Keywords

Time Measure, Periodization, Archaeological Methods, Processes of Change, Arslantepe and Zeytinli Bahçe

Some methodological and theoretical remarks

The first question to be addressed when we deal with the topic of 'transitions' is what we mean by this term and whether this concept makes any sense when applied to the relentless passage of time in history. The first theoretical, epistemological, and terminological problem concerns the way in which we define the 'periods' and 'phases' into which we break up the continual flow of events and processes of change, and to which we refer when establishing this intermediate category of 'transitional' stages

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in the passage of time.[2] Both conceptual categories, 'periods' and 'transitions', are indeed obviously two sides of the same coin.

Even though we naturally need to recognise different 'segments' of reality in order to analyse, describe and classify the object of our study — as a logical procedure in any analytical process — it is by no means trivial to ask in what cases, with regard to what distinctive elements, and with what degree of approximation to reality we can correctly divide the flow of history into meaningful temporal blocks, the 'periods', on which we then base our knowledge and understanding. Are there any breaks in the flow of history that can be discretely identified, and which separate a 'before' from an 'after'? And if they do exist, what do they represent? Are they the result of the combination of accelerated, related, and contemporary changes in many areas of social and political life, sometimes leading to profound and even radical discontinuities that can allow for and justify a recognition of different 'periods' marked by breaks between them? And furthermore, do these 'discontinuities' occur as more or less regular events marking the passage of time, or are they occasional 'revolutionary' turning points resulting from the extraordinary combination of various and concomitant factors of change that accelerate the continuous flow of time and history? And, finally, is it only the existence of these abrupt discontinuities that may legitimate the identification of clear divisions between distinct periods?

In other words, what are we identifying when we draw regular distinctions between one period and another —which is a common archaeological practice — in the absence of any radical break or revolution? I think that what we see are only peak moments, revealing the final outcomes of long and gradual processes of change; that is to say, we separate out the mature phases of each developmental process,[3] neglecting the poorly recognisable, and in many cases archaeologically invisible, intermediate stages leading to these mature outcomes. This becomes even more evident when we analyse long periods covering millennia, such as pre-and proto-historic periods, for which we lack detail and have little knowledge of each individual step in the development path.[4]

By focusing on the essential features of the form and structure of societies at the peak of their maturity, we recognise the essential stages in the developmental trajectories and processes of change, contrasting and comparing them, and laying the bases for analysing, interpreting, and understanding the paths of historical development.

But the methodological problem of recognising all the intermediate steps along these trajectories is not easy to solve. If, when using the term 'transitions', we mean these moments of gradual transformation, then they are not special phases occurring in particular conditions and circumstances, as we sometimes present them, and above all they are not true periods in themselves, as they are often defined — the so-called 'transitional periods'. They should conversely simply be an intrinsic aspect of the flow of history, a standard feature of every development process. If this is so, the search for moments of transition should be a constant aim of all historical research, the essential tool for analysing stages in the transformation processes which lead to the formation of different types of societies which, in their final form, constitute the marker of our 'periods'.

But how can we identify, distinguish and analyse these changing and evolving time spans which connect the identified 'periods', if this is even possible? Both the epistemological and the methodological difficulties of identifying these passages, which distinguish them from more clearly-recognised 'phases'

[2] Frangipane 2012a.

[3] By 'mature phases' I mean the final moment of a long process of change in which the different innovative drives that have gradually and contentiously supplanted traditional relationships combine and integrate into a more or less balanced system, that mitigate conflicts and contradictions, before they explode again.

[4] Marro 2012; Campbell and Fletcher 2010; Shea and Lieberman 2009.

and 'periods', is all the more complicated in the case of archaeological research because of the limits and the specific methodological tools of the discipline. The first difficulty stems from the fact that, unlike historical research and other social sciences, archaeology must restrict its analysis to limited categories of data, capable of being preserved through time, all referring to what is known as 'material culture'. This constraint is further compounded by the fact that research is limited to fragmentary — and sometimes extremely fragmentary — material remains of human activities, of which the degree of conservation depends on various contingent factors.

Another specific aspect of archaeological data which influences and significantly complicates the reconstruction of entire chronological pictures and historical processes, is the fact that the material remains subjected to archaeological study come down to us in stratigraphic/temporal sequences which, by their very nature, are made up of many fits and starts. For what remains of every dwelling or occupation level is the final moment in its life, or the moment of the 'death' of that context when its destruction buries it forever in the ground (**Figure 1a**). Even when these moments of destruction are followed immediately by a new anthropic occupation built above it, the whole lifespan of these new buildings also evades us, and what remains of them in the archaeological record is once again the material evidence of their final moment, namely, the moment immediately preceding their destruction and death. By its very nature, every sequence of archaeological levels is made up of broken fits and starts, which cannot reflect the integrity of the historical development as it would actually have been, but only reflect one single moment in the life of the community under study. What we see in our archaeological investigations, even when we are dealing with the longest and most continuous sequences, are therefore only endpoints, while we cannot envisage the flow of life in continuous transformation that took place in the interval of time between one building level and the next, which has left no traces behind and which we can only indirectly imagine through a vague and bleary reflection projected backwards by its final outcomes.

There are two main aspects that can help us to fill the gaps in the chronological and historical sequences under study:

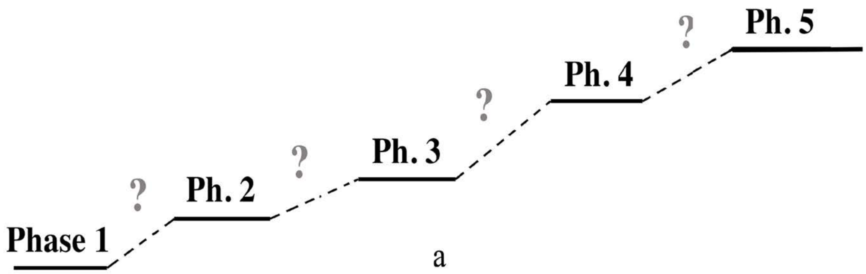
1. The first aim we must pursue, as I see it, is to try to identify the chronological duration of the intervals separating the archaeological phases we have identified (namely, the unknown gap between the destruction of one level and the destruction of the next one), starting from the assumption that each 'phase' did not automatically have the same duration as the other. Defining periods does not imply a regular partition of time into equal segments. The actual evolution of historical time is obviously not like this, as we clearly perceive if we just look at the succession of ages in modern and contemporary history.
2. The second aim, which is closely linked to the first, is to analyse and understand the nature and the possible causes of the destructive events leading to the end of life of the settlements or archaeological contexts under study.

Identifying possible dramatic or violent phenomena can also help us, for instance, to attribute a hypothetical duration to the processes of change and help to explain the sometimes very close, or even overlapping, radiocarbon datings of successive levels, offering further support for the assumption that events had occurred in rapid succession. C-14 datings indeed frequently overlap, since the calibration range is usually quite broad. At a high level of confidence and probability, it may range from between 40–50 and 200–250 years for one single dating, often disappointing archaeologists by seeming to cast doubt on all previous certainties.[5]

[5] Bronk and Lee 2013; Reimer *et al.* 2013.

The problem has to be addressed by using the tools of archaeology. We must ask ourselves: What had actually happened when a far-reaching change is attested? Was it the result of a war, an earthquake, a rebellion, an abandonment? Answering these questions entails investigating, first, how deep and radical the changes we observe between one phase and the next actually were, and then the ways in which they occurred. Understanding these crucial aspects may indeed also give us a rough idea of the possible approximate measure of the time that may have elapsed. For instance, it might have been longer in the event of abandonment than in the case of a war or population rebellion. In addition to the use of Bayesian curves to correct the C-14 sequences by matching them with the actual stratigraphic succession of levels, the archaeological interpretation of the 'reasons and nature of the changes' may therefore provide yet another effective tool for reading and interpreting chronological events.

Since every moment constitutes a transition to another, and it is therefore difficult to fix the flow of this passage of time, the challenge for archaeology is to try to identify the remarkable features and stages in the process of change. The difficulty is obvious, but the flow of history is not like the flow of water. History moves forward with accelerations, slowdowns, obstacles, fractures, crises and collapses due to precise causes which we can try to identify: social struggles and tensions, encounters between different cultures and communities, economic and political competitions, etc. This requires us to recognise in the material remains in our possession traces of these paths, struggles, tensions, political conflicts, and processes of cultural integration that had led human societies to change on a more or less continuous basis, but at different paces, and in different ways.



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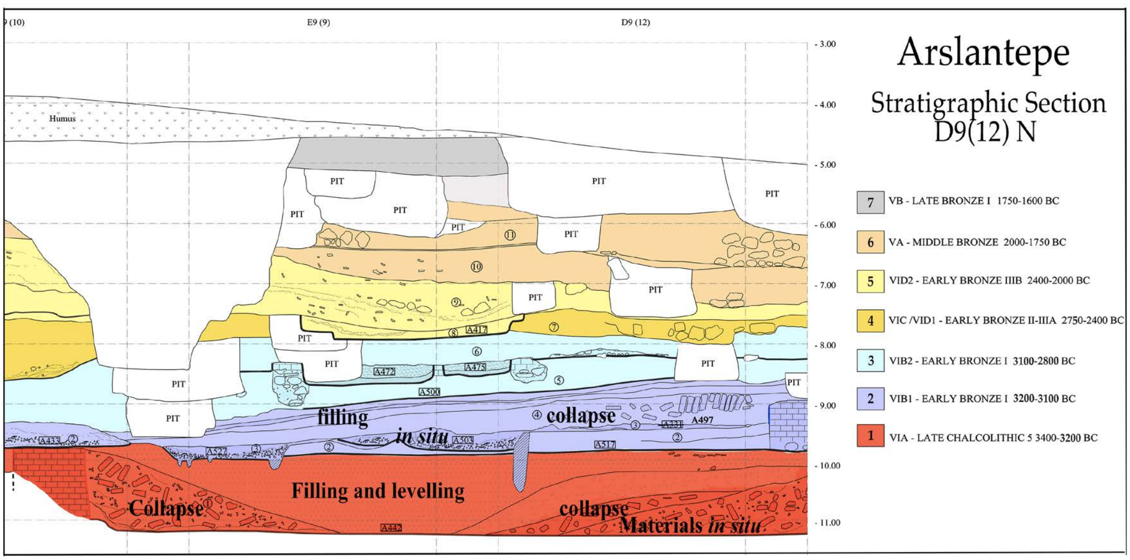


b

Figure 1: *a. Schematic graph symbolizing the unknown time intervals between an archaeological level and the other; b. Drawing of a stratigraphic section from Arslantepe (Malatya-Turkey).*

The starting point for such an analysis, I believe, should be the rigorously stratigraphic excavation of individual sites, drawing a clear distinction between materials that actually belonged to the phases of use in the investigated settlements and materials belonging to secondary deposits, even those that were laid immediately after the destruction of the buildings and sometimes intrude into them (the result of filling, removal, levelling operations for preparing new settlement) (**Figure 1b**). The reconstruction of 'contexts' and coherent material assemblages is the essential basis for recognising homogeneous cultural settings and consequently for analysing the extent and nature of changes, as well as their temporal span.

The goal is also to investigate not only how much and how quickly things change, but also 'what' changes. Since the main focus of our analyses, as archaeologists, are necessarily the material results of actions, hence the 'objects' and their contexts of use, the basic questions should concern the type and nature of changes recognisable in the repertoire of objects. Were these changes clear-cut and radical or faint and gradual? Were radical changes in material culture necessarily the result of a long-elapsed time? To answer these questions, we have to address new ones: Did these changes concern minor or more substantial features in the objects? Were they purely aesthetic and formal or functional changes? And in the latter case, has the object changed because its use in everyday life has changed, or has it acquired a new social and symbolic function? Did the object change because it was emulated from the outside and has been modified and adapted to the culture and repertoire of the local community, or has it changed because people's daily habits have changed over time? Finally, how many and which kind of objects were modified simultaneously? In other words, are they indicative of overall changes or of innovations in specific aspects of community life?

With all these questions in mind, we can correlate the changes observed in the material culture to changes occurring in society, creating the basis for interpreting the reasons and nature of these changes and the possible duration of the processes leading to them, thus at least hypothetically filling in the gaps.

Two exemplary cases with differing developments and 'transition' evidence in Southeastern Anatolia: Zeytinli Bahçe and Arslantepe

Let me offer a few examples from two sites at which I led the excavations myself, both in Southeastern Turkey: **Zeytinli Bahçe**, in Urfa Province, and **Arslantepe**, in Malatya Province.

Although these two sites both lie in the Turkish Euphrates valley and are relatively close to each other, and even though they both largely belonged to the same peri-Mesopotamian world, they are separated by the Taurus mountains and had widely differing histories. The timing, the manner, and the radicality of the transformations that occurred during their millennia-long histories differed profoundly. Zeytinli Bahçe may be taken as an example of continuous cultural development and very gradual change, whereas Arslantepe is an almost extreme example of radical changes occurring at different times, in various way and forms, and with different causes of change.

The long, continuous cultural development at Zeytinli Bahçe, Urfa

Zeytinli Bahçe is a small *tell* on the eastern bank of the Euphrates, with a long sequence of superimposed settlements ranging from 4th millennium BCE to the Byzantine period. Excavation operations were necessarily limited in extension and scope, because it was a salvage excavation with tight deadlines. However, by adopting targeted strategies, we succeeded in investigating virtually every major period on the site, albeit to a limited extent. Whereas the remains of the most recent periods (the Iron, Roman and Byzantine ages) were very fragmentary and concentrated in the upper part of the mound, we were able to investigate in greater detail the levels from Late Chalcolithic 3 (the beginning of the 4th millennium) to the Middle Bronze Age (the beginning of the 2nd millennium), reconstructing a more or less continuous sequence by opening several trenches at different heights along the western slope of the mound (**Figure 2**). The history of the site during all these periods was closely linked to contemporary developments in the northern Syro-Mesopotamian regions.

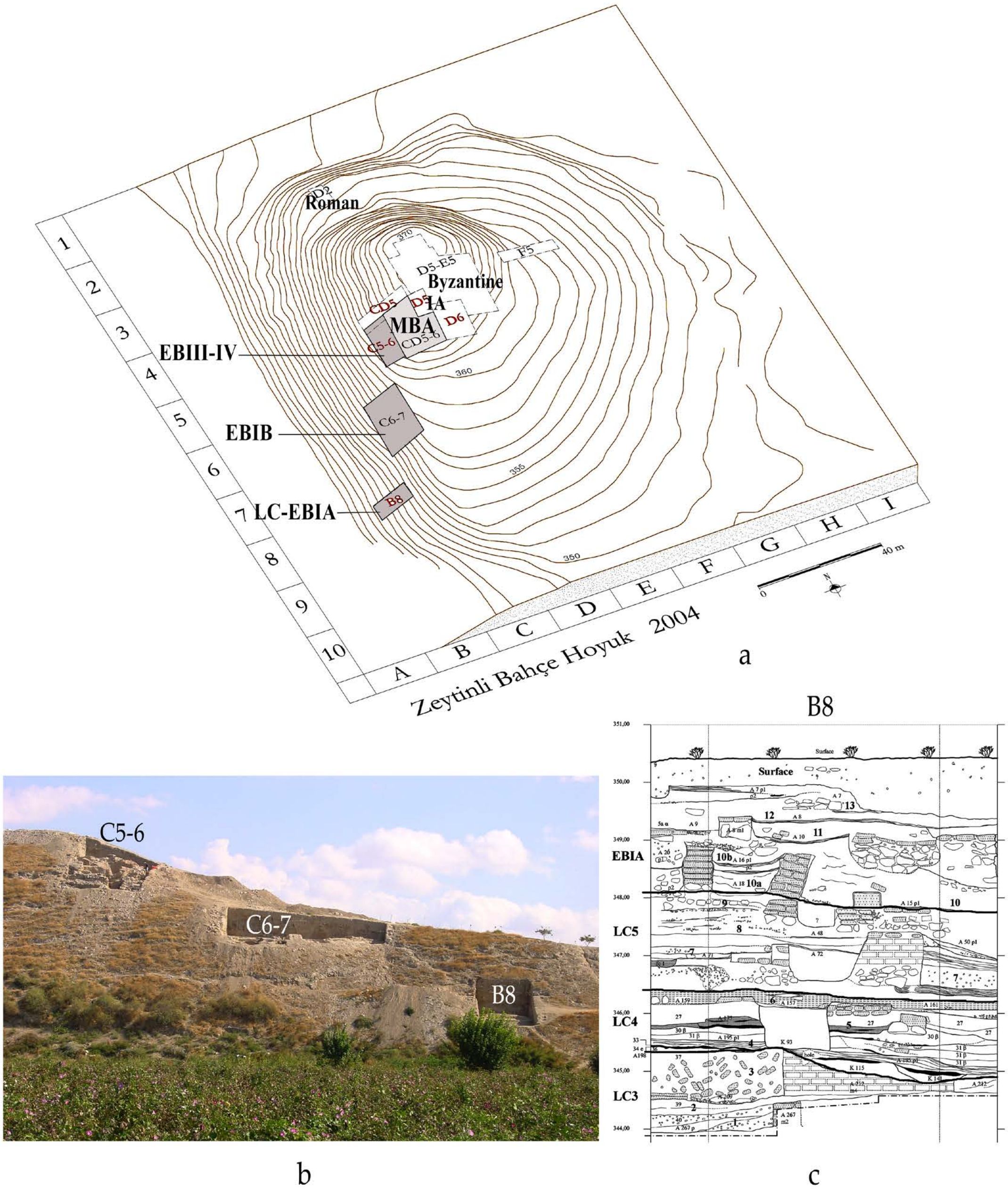


Figure 2: *Zeytinli Bahçe (Urfa- Turkey). a. Plan of the mound with the excavated areas; b. The trenches opened along the slope; c. Stratigraphic section in trench B8 with Late Chalcolithic and Early Bronze I levels.*

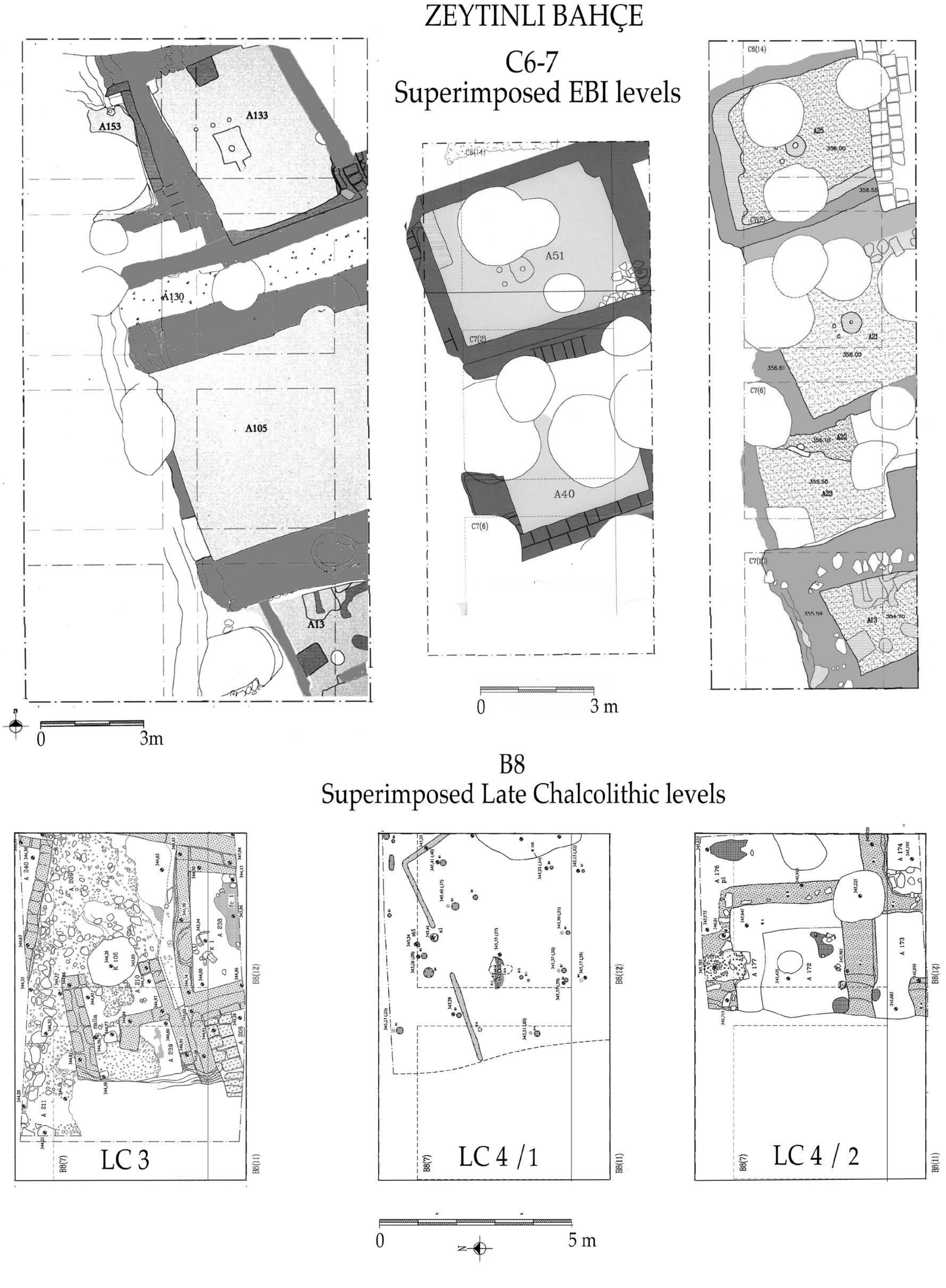


Figure 3: *Zeytinli Bahçe. Superimposed domestic buildings from Late Chalcolithic and Early Bronze I levels.*

Figure 4: *Zeytinli Bahçe. Pottery from Late Chalcolithic and Early Bronze I levels.*

Numerous settlement levels followed continuously one after the other with no apparent breaks or upheavals in the overall organisation of this community, which always remained essentially a village community (**Figure 3**). The materials found clearly reflect this continuity, with only one single abrupt change in pottery production in the Middle Uruk period, between what are known as LC 3 and LC 4 (**Figure 4**).[6] This coincides with the period in which other sites in the region have shown evidence of the presence of foreign groups, the so-called 'Middle Uruk colonies', who either founded 'new' settlements, as in the case of Sheik Hassan,[7] or settled in small groups in sites occupied by local communities, as at Hacinebi and Tell Brak.[8] But, except for a change in pottery, no major novelty is recognisable in the LC 4 domestic dwellings found at Zeytinli Bahçe, which, in the small area excavated, proved to be architecturally even less substantial and more short-lived than had been the case in the previous LC 3 and the following LC 5 periods (**Figure 3**). What the material evidence shows is a rather quick introduction of new pottery types in the Middle Uruk period, which were adopted, assimilated, and gradually re-elaborated in the following periods, creating a new tradition that became typical of the Middle Euphrates region and even spread as far as the Upper Euphrates, at least during Early Bronze I (**Figure 4**). At Zeytinli Bahçe and throughout the Middle Euphrates region, this tradition, with its pottery repertoire and its aesthetic, formal, and functional features, persisted until the Early Bronze Age III and the Middle Bronze Age (**Figure 5**).

There does not appear to have been any clear political or social change at Zeytinli Bahçe connected with this moment of radical change in the material culture, particularly in ceramic production, that occurred around 3600 BCE. Neither did we detect any stratigraphic breaks, or phases of 'transition' there. Everything happened rapidly and apparently without dramatic events, with the 'sudden' introduction of new manufacture techniques, models, and tastes which would become deeply entrenched in the region and which soon formed part of the customs and practices of the local community. This heritage was to be basically maintained with extraordinary continuity and very gradual transformations for almost two millennia.[9]

How might we therefore interpret the change that brought all this about at Zeytinli Bahçe? This problem also arises when we move to interpret more generally the reasons and nature of what is known as the Uruk 'colonisation' in the whole of Upper Mesopotamia, and the ways in which it took place. Indeed, the diffusion of the Uruk or Uruk-influenced type of repertoire affected the local cultures throughout the whole northern area of Greater Mesopotamia in the second half of the 4th millennium, almost everywhere becoming a common heritage that was assimilated and appropriated by the local communities, albeit with varying degrees of hybridisation and re-elaboration.[10] The Uruk phenomenon, with its dense network of interactions over a large geographical area, had an equally powerful influence on the transformation of the political and economic structures of the local communities in the whole region, but a distinction must be drawn between the effects on the large, dominating centres and those visible in small sites and villages, such as Zeytinli Bahçe.

In conclusion, a sudden change is recorded in the material culture at Zeytinli Bahçe, bound up with the interaction with outsiders at a regional level, with no gradual 'transition' recognisable in the archaeological record, and without any significant impact on the local way of life and political organisation. Everything that happened subsequently was conversely a slow process of continuous 'transition' and gradual transformation in the material culture, in which it is difficult to detect any breaks. The stratigraphic continuity of the many building levels identified in detail at Zeytinli Bahçe

[6] Frangipane 2007; 2010; Frangipane *et al.* 2004; 2011.

[7] Boese 1995.

[8] For Hacinebi see Stein 1999a; 1999b. For Tell Brak, see Oates 2002; McMahon and Oates 2007; Oates *et al.* 2007.

[9] Frangipane 2007.

[10] Stein 1999a; 1999b; Rothman 2001; Butterlin 2003; Frangipane 2009; 2018; McMahon and Crawford 2014; Wright 2016.

Zeytinli Bahçe - Early Bronze IB

Early Bronze III-IV

Figure 5: *Zeytinli Bahçe. Pottery from final Early Bronze (III–IV) and Middle Bronze Ages.*

as for the Late Chalcolithic and Early Bronze I periods, taken in conjunction with a series of temporally very close C-14 datings, enables us to recognise many proximate moments (the destruction phases in each settlement levels) in this gradual, uninterrupted process of change.

Interrupted developments, crisis and abrupt changes in the history of Arslantepe, Malatya

The case of Arslantepe, a much longer and more thoroughly investigated site, is completely different. Here, the long sequence of settlements brought to light over vast areas covers more or less the same periods as Zeytinli Bahçe, although with a greater continuity until the Late Bronze and Iron Age (**Figure 6**). This continuous, or almost continuous, succession of occupations was, however, very discontinuous in terms of the cultural and political developments recorded at the site, some of which underwent abrupt and radical changes, and was consequently uneven also in terms of the duration of the individual phases in this long history.

This discontinuity in the history of Arslantepe may be ascribed to two main factors:

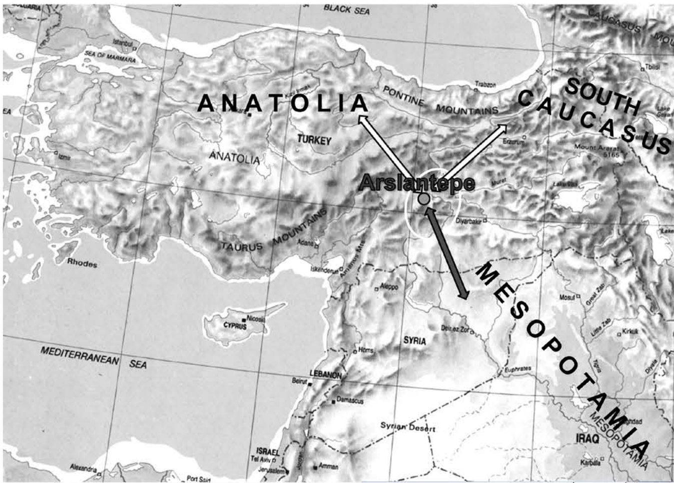
1. The site's geographical position, at a crossroads between different regions and civilizations (**Figure 6a**): The Malatya plain was connected to the Mesopotamian world through the Euphrates valley, while being at the same time separated from it by the Taurus mountains; moreover, it was also closely linked to other northern mountainous environments, both to the west, towards Central Anatolia, and to the east, towards Eastern Anatolia and the Caucasus.[11]

2. Arslantepe's dominant and pivotal political role in its region. This role, precisely enhanced by the site's position on a cultural and geographic border between different worlds and civilisations, was based on dominating and controlling different economic, and perhaps also ethnic, groups living in and moving around this highly diversified geographic environment (made of mountains, hills, valleys, and plains), who were basically itinerant pastoralists and non-urbanised sedentary farmers.

The thorough analysis of all the levels and periods brought to light on the site has revealed moments of long duration and cultural continuity, and other moments marked by fractures and crisis, followed by the emergence of new, radically changed, social, political, and economic systems. It is not possible to summarise the long and complex history of Arslantepe here, and I will simply refer to two important phases in the life of this community which are of particular relevance to the subject discussed in this session. The first period refers to the crisis and collapse of the Early State system that developed in the second half of the 4th millennium BCE taking shape in the Arslantepe Palace, which was destroyed by a violent fire, never to be rebuilt (**Figure 7a**).[12] The second period I will deal with is that of the Early Iron Age developments at Arslantepe following the collapse of the Hittite Empire in Central Anatolia, which did not show any sign of the crisis that is presumed to have occurred in the peripheral regions.[13]

The destruction of the 4th millennium Palace put an end both to the system of economic control over staple goods and labour, and to the political authority governing it. Groups of transhumant pastoralists then settled on the ruins of the palace with seasonal occupations, evidenced by few wattle and daub huts, repeatedly abandoned and newly built, with broad, fenced open areas used for livestock (**Figure 7b**).[14] One single large mud-brick building, probably for community use, was built exactly on the earlier

[11] Palumbi 2008.
[12] Frangipane 2018; 2019.
[13] Manuelli 2012; 2016; Frangipane *et al.* 2018.
[14] Palumbi 2010; Frangipane 2012b; 2014.



a

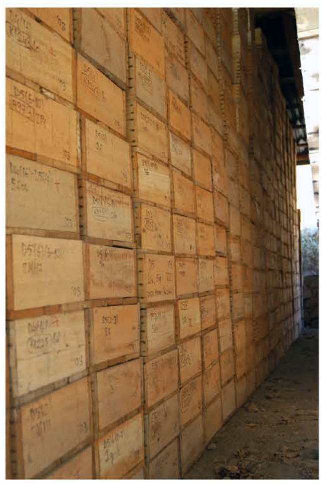
b

c

d

ARSLANTEPE SEQUENCE	CAL. CORR. C14	RELATED / CONTEMPORARY
Period III – Iron Age	1100-712 BC	Neo-Hittite kingdoms
Period IV – Late Bronze II	1500-1200 BC	Hittite Empire
Period VB – Late Bronze I	1750-1500 BC	Old Hittite Kingdom
Period VA - Middle Bronze Age	2000-1800 BC	Paleo-Assyrian colonies
Period VID – Early Bronze III	2500-2000 BC	Malatya-Elazig culture
Period VIC – Early Bronze II	2800-2500 BC	Local Gelincik culture
Period VIB1 and 2 – Early Bronze I	3250-2880 BC	Kura-Araxes cultures Post-Uruk M. Euphrates cult.
Period VIA – Late Chalcolithic 5	3450-3250 BC	Late Uruk Central Anatol. LC
Period VII – Late Chalcolithic 3-4	3900-3400 BC	Early and Middle Uruk
Period VIII – Late Chalcolithic 1-2	4400-3900 BC	Terminal and Post-Ubaid

e



f

Figure 6: *Arslantepe, Malatya. a. Location of the site; c. Aerial view of the mound; d. Plan of the tell with the excavated areas; e. The general chronological sequence; b and f. Two images recalling the large amount of archaeological materials found at the site.*

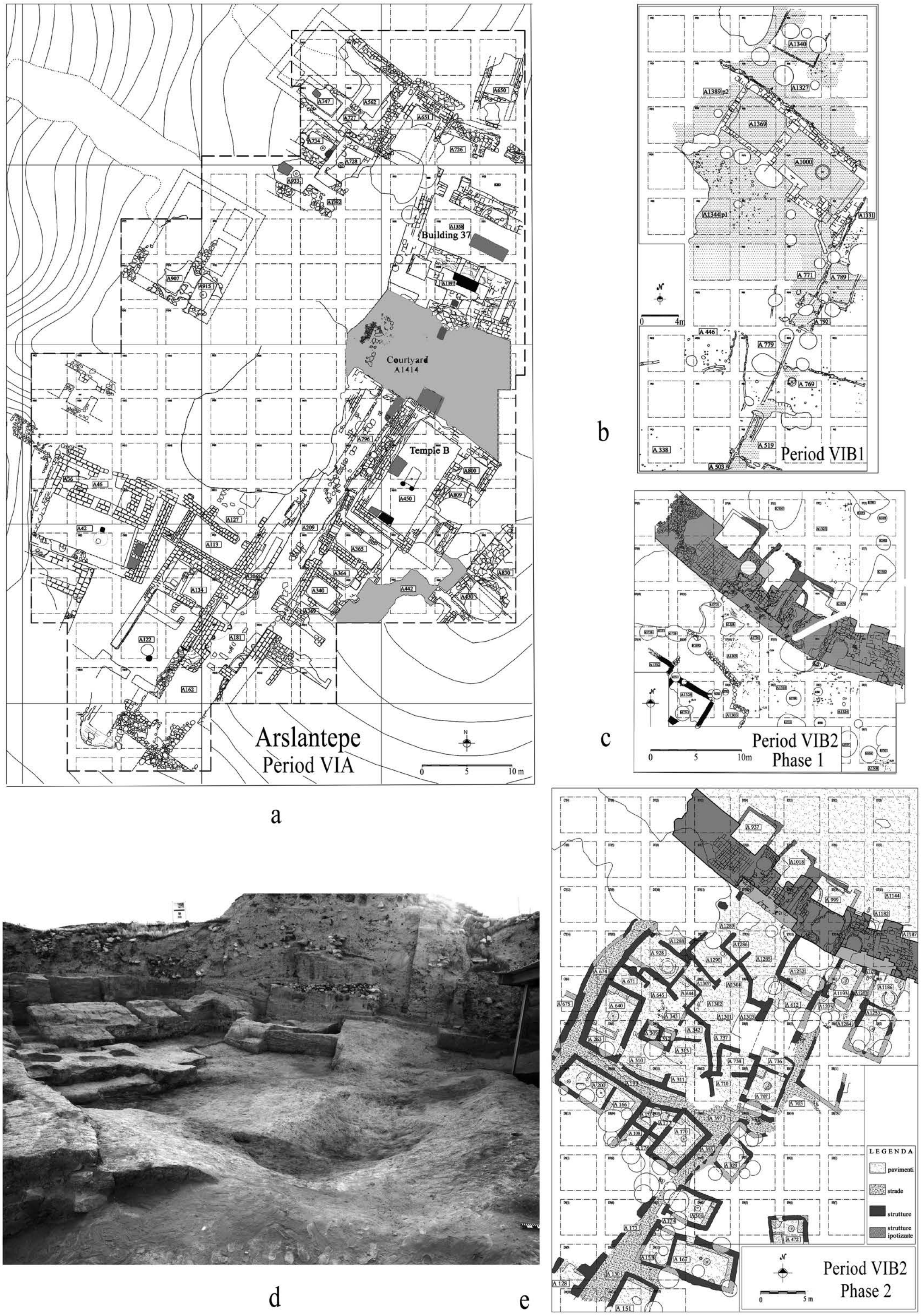
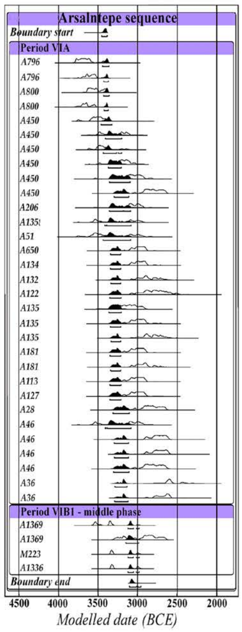


Figure 7: *Arslantepe. a. The 4th millennium Palace complex (Period VIA); b. The herder settlement of Period VIB1 with the communal building on the top of the mound; c and e. Early and late phases of Period VIB2 with the town-wall on the upper mound; d. The earliest and faint seasonal occupation of Period VIB1 on the ruins of the Palace.*

Figure 8: *Arslantepe. Pottery from Period VIA and VIB1.*



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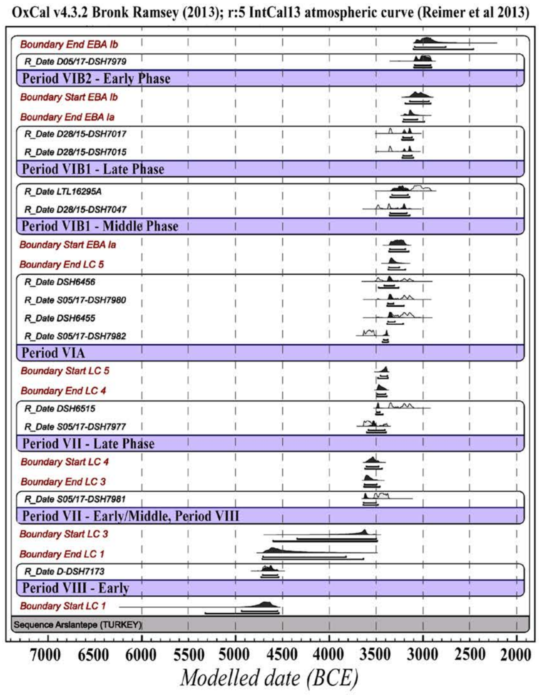

b

Recent C14 dates on Periods VIA (LC 5) and VIB (EBI)

ARS periods	phase	Room	Material	Radiocarbon age	Calibrated (2 sigma)
VI A 3450-3100 BC	LC5	A206	seed	4556 ± 35 BP	3485 - 3104 BC
				4541 ± 39 BP	3368 - 3099 BC
		A1358	seed	4584 ± 49 BP	3512 - 3101 BC
		A1397	small wood	4767 ± 28 BP	3639 - 3386 BC
VI B1 3360-3100 BC	EB I	A1369 3d*	fruit	4600 ± 33 BP	3507-3128 BC
		rM223	charcoal	4559 ± 21 BP	3369-3119 BC
		A1336 1d*	charcoal	4552 ± 21 BP	3366-3117 BC
VI B2a 3360-3100 BC	EB I	A1034	seed	4562 ± 26 BP	3366-3170 BC
		A1187	seed	4553 ± 58 BP	3368-3088 BC

c

Figure 9: *Arslantepe. Chronology of Periods VIA, VIB1 and VIB2 based on C-14 dates. a. Old and new modelled C-14 dates (BCE) from periods VIA and VIB1 (Dept. of Earth Sciences, Sapienza University of Rome, for old dates; Dept. of Mathematics and Physics, the University of Campania, and CIRCE Laboratory, Caserta, for the new ones), elaborated by C. Vignola and F. Terrasi; b. Recent AMS radiocarbon ages and the boundaries of archaeological periods according to the Bayesian statistics (OXCAL 4.3 program) (Univ. of Campania and CIRCE) (from Vignola* et al. *2019, Fig. 3); c. Synthesis of recent dates on Periods VIA, VIB1 and VIB2/early phase.*

'Audience Building' in the Palace, indicating on the one hand that chiefs or leaders also existed in this pastoralist world, and on the other hand suggesting that there was still a memory of the Palace and the powerful system they had probably contributed to destroy.[15] The archaeological stratification also suggests that the two moments occurred in quite a narrow timeframe.[16] The first huts were built on the ruins of the destroyed palace, still partly visible, without even grading the ground (**Figure 7d**). If we exclude the products of metallurgy, which had been probably already brought to the Palace by these mobile pastoralist groups in the previous period, this new occupation marked a radical change in every aspect of the material culture (**Figure 8**).[17]

Immediately after the last level of huts had been abandoned and the community building destroyed, an enormous fortification wall was built above it, which protected the upper part of the mound, suggesting a period of considerable conflicts (**Figure 7c**). The so-called Royal Tomb at Arslantepe has to be ascribed to this time of conflicts and instability. Once again, this new phase was marked by significant changes, albeit less radical than the previous ones, including the reintroduction of wheel-made pottery in the Uruk tradition which had spread by then throughout the Middle and Upper Euphrates valley. The political organisation of this new society seems to have consolidated and further developed the radical political changes that had occurred in the previous phase, following the collapse of the 4th millennium Palace system. No more central stores, temples, bowls, and *cretulae*, but weapons, metal-rich elite burials, and fortifications.

At a later moment, the entrances to the fortification walls were blocked, the walls fell into disuse, and the upper fortified part was probably abandoned, while a village of farmers spread outside the walls along the slope of the mound (**Figure 7e**). This time, the material culture did not change, except for the normal development of certain pottery shapes, indicating that the same groups that had built the fortification walls (probably farmers from the plain) had gradually regained possession of the site.[18]

The *tell* therefore passed through a sequence of three so-called 'periods' (identified on the basis of the changes in the material culture) and four occupation phases (identified from the changes in the settlement arrangement), all ascribable to the period between the end of the 4th and the beginning of the 3rd millennia BCE. New C-14 dating has surprisingly revealed that all these phases, except the final one, occurred in broadly overlapping chronological ranges varying from between 100 and 200 years (**Figure 9**).[19] The end of the Palace Period (VIA), the occupation by the pastoralists (VIB1) and the early fortification phase of the upper part of the mound (the earliest phase of Period VIB2) all occurred within a range between 3400 and 3100 BCE (**Figure 9c**). But this is hardly surprising when we consider the dramatic character of the events and changes occurred, which must have all taken place in rapid succession. Bearing in mind the archaeological interpretation of these events, the overlapping of the C-14 dates is therefore more than plausible.

So there was no slow transition but a series of rapid, violent, and dramatic events which involved groups of populations with different cultural traditions, who each time were the main players in these events, competing and contesting the site. This also explains the radical and sudden changes, in some cases all-out upheavals, in the evidence of the material culture.

A radically different situation emerged at Arslantepe following the crisis that we had assumed should have occurred in connection with the collapse of the Hittite Empire in Central Anatolia. The poor

15 Frangipane 2014; Palumbi *et al.* 2017.
16 Vignola *et al.* 2019.
17 Frangipane 2017.
18 Frangipane 2012b
19 Vignola *et al.* 2019.

Figure 10: *Arslantepe. Iron Age levels. a. The imposing town-wall and buildings belonging to the immediately post-Hittite phases (Early Iron Age I, 1200–1000 BCE); b. bas-relief found in connection with the town-wall; c. Monumental building preceding the well-known Neo-Hittite phase of the 'Lion's Gate' (Iron Age II).*

archaeological knowledge of these phases in the Euphrates area and some clues stemming from written sources had contributed to the belief that the peripheral political systems, which were considered to be dependent on the Empire, had also collapsed, and that there must have been a break in the Upper Euphrates valley between the crisis of the Hittite State and the subsequent political restoration giving rise to the Kingdom of Melid. A previous detailed study of the materials unearthed at Arslantepe in older excavations of the Late Bronze Age levels (the Empire period) conducted and published by Federico Manuelli had already shown that political relations between the centre and the periphery had probably been far more complex and nuanced than had originally been thought. He suggests that the local community had continued to some extent to follow their own traditions and needs, adapting any novelties to the local culture.[20] This evidence also indirectly suggests that the Arslantepe community may have had greater political autonomy than previously thought.

Excavations in recent years have revealed a very interesting sequence of Iron Age I levels immediately following the Empire period, which have shown an unexpected stratigraphic and cultural continuity with the earlier layers.[21] The construction of an impressive town-walls and imposing buildings during these phases also suggest a certain continuity in the paramount political importance of the site in its region (**Figure 10**).[22] The archaeological material shows both significant differences from that of the Late Bronze Age and clearly distinguishable features from the materials of the later phases of the Iron Age (Iron Age II), when the Neo-Hittite Kingdom of Melid was already mentioned in the Assyrian and Urartian sources.

This was one case that has been referred to as a typical 'transitional period', but it was indeed simply a little-known moment in between two better-known periods. Today, what the archaeological data offers us is a long period in which a series of evidence, obviously correlated and partly affected by the loss of the political influence of the Central Anatolian Hittite State, reveal a flourishing local political and cultural vitality, which was by no means a mere transition, or obscure moment between two well-defined periods. This is one case in which a new 'period', or more than one, could be identified along the trajectory of a continuous path of development thanks to new researches. A targeted and thorough analysis of the political, social, and cultural data, which are now already emerging from the archaeological investigation, will make it possible to outline the developments that paved the way for the establishment of a new powerful political structure arising from an uninterrupted sequence of gradual and non-overturning changes following the crisis of the Central Anatolian Hittite State. This was the path that led Arslantepe to become the capital of a new autonomous kingdom on the Euphrates, the Neo-Hittite Kingdom of Melid.

In more general terms, this period, far from being a simple transitional phase, was a crucial extended time marked by the formation of new entities that would have changed the face of the political geography of the Near East between the end of the 2nd and the beginning of 1st millennia BCE.

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There and Back Again — Towards a New Understanding of Abandonment Practices at the Neolithic Settlement of Göbekli Tepe

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Abstract

Göbekli Tepe is well-known for its monumental buildings with anthropomorphic T-shaped pillars, decorated with reliefs of wild animals which have been featured prominently in earlier works. The abandonment which occurred some 1500 years after the initial occupation of the site, however, remains virtually unexplored. This paper attempts to reconstruct abandonment practices and routines within and parallel to phases of occupation. A crucial source of data for the abandonment of Göbekli Tepe is provided by considerations relating to site formation, including the topography of the site with its mounds, steep slopes, and hollows where strong winter rainfalls potentially favoured erosional processes. I clearly oppose the widespread yet outdated interpretation of 'ritual backfilling' of the monumental buildings. Instead, I propose that the inhabitants of the Neolithic settlement were strongly intertwined with their landscape and built environment, which is reflected by the continuous re-building of structures as a response to slope slide events, the use of ruins for extracting recycled building material, and the creation of memory spaces by following a specific habitus. I argue that by applying microarchaeological approaches and the social sphere of 'detachment from place' the heterogeneity of settlement layout can be reconstructed by including the engagement of ancient people with ruins, abandonment, and memory.

Keywords

Pre-Pottery Neolithic, Microarchaeology, Intra-Site Abandonment, Detachment from Place, People-Ruin Interactions

Introduction

The long-term process known as neolithization is one of the most discussed transformations in Western Asian archaeology and beyond. In South-Eastern Anatolia, the Pre-Pottery Neolithic A and B hilltop settlement Göbekli Tepe (*c.* 9500–8000 calBCE), which spans nine hectares, is an outstanding example for these changes, since its inhabitants lived exclusively from foraging and hunting.[1] For the past twenty-five years, excavations have been carried out at Göbekli Tepe and research is still ongoing. It was assumed that the appearance of domesticated plants and animals was one of the main reasons for

[1] For the chronology at the site see Clare 2020; Kinzel and Clare 2020; Dietrich 2011; Dietrich *et al.* 2013.

the abandonment of Göbekli Tepe.[2] However, since the uppermost layer of the site is scarcely studied and severely eroded, this is a subject for future research. In order to trace abandonment processes and the associated daily practices of the inhabitants, the following presents an intra-site, small-scale study of selected settlement spaces embedded in the theoretical discourse of 'detachment from place'.[3]

From settlement abandonment to detachment from place — a theoretical approach

An indispensable part of mobility and change is to leave things behind — to abandon them. The discourse on how to interpret what is left in the archaeological record has challenged archaeologists since the beginning of the discipline and led to entrenched discussions in the fields of processual, behavioural, and post-processual archaeology as well as in anthropology.

Formal processual approaches interpret the archaeological record as a representation of the 'structure of the total cultural system', as Lewis Binford stated in the 1960s.[4] Hence, activities of ancient communities and their material remains leave a 'fossil record' behind that can be interpreted by analysing spatial artefact clusters.[5]

The view of Binford was heavily criticised in the 1970s and thereafter by Michael Schiffer, who defines site formation processes as crucial factors that inevitably affect the archaeological record.[6] His work is fundamentally influenced by the ethnoarchaeological research of Robert Ascher,[7] who suggested that the temporal scale ('time's arrow') heavily influences the state of preservation of the archaeological record and is therefore to be seen as part of taphonomic processes.[8] According to Schiffer, archaeological context is created during the process in which activity areas, structures, or entire settlements are abandoned.[9]

From the 1990s onwards, numerous ethnoarchaeological and archaeological studies were carried out that focused on different scales of abandonment and on the material patterns that abandonment practices leave in the archaeological record.[10] In Catherine Cameron and Steve Tomka's influential publication, Cameron states that all archaeological sites are in fact abandoned.[11] It is the different ways in which the abandonment took place that have to be examined. These ways are referred to as 'abandonment processes', which she defines as 'the activities that occur during abandonment' that 'condition the entry of cultural material into the archaeological record'.[12] Steve Tomka and Marc Stevenson add that the factors that condition abandonment processes, such as environment, technology, and social-cultural circumstances, set the frame for the interpretation of site abandonment.[13] Almost twenty years

[2] Schmidt 2016, 255.

[3] This paper contains preliminary results of my ongoing dissertation project 'All places are temporary places' – Praktiken des Verlassens und Auflassungsroutinen in der neolithischen Siedlung Göbekli Tepe (working title)' embedded in the PhD program 'Landscape Archaeology and Architecture' of the Berlin Graduate School of Ancient Studies (BerGSAS) at the Institute for Near Eastern Archaeology, Freie Universität Berlin.

[4] Binford 1962, 217.

[5] Binford 1964, 425.

[6] Schiffer 1972, 156.

[7] Ascher 1968.

[8] Schiffer 1996, 8.

[9] Schiffer 1996, 89.

[10] Cameron and Tomka 1993; Inomata and Webb 2003; Nelson and Hegmon 2001; Nelson and Schachner 2002.

[11] Cameron and Tomka 1993; but cf. Lamoureux-St-Hilaire and Macrae 2020b, 4.

[12] Cameron 1993, 3, see also Lamoureux-St-Hilaire *et al.* 2015, 550.

[13] Tomka and Stevenson 1993, 191.

later, the focus of abandonment studies has moved again towards the examination of broader social phenomena, such as the dynamics of mobility and migration, ritual practices, and resilience.[14]

In order to examine the reasons why people abandon places and how their decisions were made, recent research in the archaeology of settlement abandonment has dealt with people-place disentanglement, which involves 'migration and resettlement, and inquires into the dynamic relationship between people and their landscapes before, during, and after abandonment'.[15] These studies are concerned with a concept called 'detachment from place'.[16] The approach analyses the complex decisions people make for leaving places embedded in both social and landscape interactions.[17] Accordingly, the main research shifted from the study of formation processes as the main tool for examining abandonment processes to post-processual approaches by engaging 'with ancient people's decision-making regarding place-making and place-leaving'.[18]

Following Catherine Cameron's concept of scales of detachment, detachment from place comprises scalar and temporal aspects which reach from activity areas to structures within occupied areas (intra-site scale), to settlements, to entire regions or landscapes (regional scale).[19] These scales of detachment, in turn, can be distinguished between episodic, seasonal, or permanent abandonment, all of which can be planned or unplanned.[20] However, Cameron implies that these scales affect 'decision making regarding leaving, the ways in which migrants leave, and post-abandonment interactions with the place'.[21] Furthermore, the decisions people make when it comes to detaching from place are intertwined with the underlying reasons. Changing ecological conditions and climate catastrophes are often considered to be main motivations for leaving and are used as hypothetical scenarios to suggest collapse and disaster mindsets, which lead to final abandonment scenarios.[22] Recently, researchers have addressed social issues that are concerned with the transformation of communities and spaces, the reuse of formerly abandoned places, and the interactions of 'abandoners' with their home communities.[23] Hence, this research asks where people went to once they abandoned a place, and whether the individuals and communities perceived detaching from place in similar or different ways to one another.[24] When people remain both physically and spiritually connected to places, the concept of 'abandonment' becomes permeable and functions more as an archaeological term rather than describing social phenomena.[25]

The frame of my dissertation project embeds intra-site abandonment and gradual abandonment routines, which are still underrepresented in the discourse on detachment from place.[26] I say explicitly 'routines', by which I mean repetitive, often unquestioned, and unconscious practices with a fixed rhythm that makes them into events with some predictability. This runs against much of the literature which considers 'abandonment' as a singular or final event. My aim is to highlight the detachment practices and routines people developed within a settlement that was occupied for more than 1500 years. Additionally, I am interested in the ways in which the inhabitants of Göbekli Tepe dealt with periodic

[14] Lamoureux-St-Hilaire and Macrae 2020a; Edwards 2017; McAnany *et al.* 2016; Glowacki 2015; Sullivan *et al.* 2008.
[15] Lamoureux-St-Hilaire and Macrae 2020b, 5; for entanglement and disentanglement see Hodder 2016.
[16] Lamoureux-St-Hilaire and Macrae 2020a.
[17] Cameron 2020, 178.
[18] Cameron 2020, 180.
[19] Cameron 2020, 180; 1993, 3.
[20] Brooks 1993, 178.
[21] Cameron 2020, 180.
[22] Cameron 1993, 3.
[23] Lamoureux-St-Hilaire and Macrae 2020b, 6.
[24] Cameron 2020, 179.
[25] In the context of Mesa Verde, Donna Glowacki points out that Pueblo people do not perceive their landscape as 'abandoned'; see Glowacki 2020, 44.
[26] Lamoureux-St-Hilaire *et al.* 2015, 551.

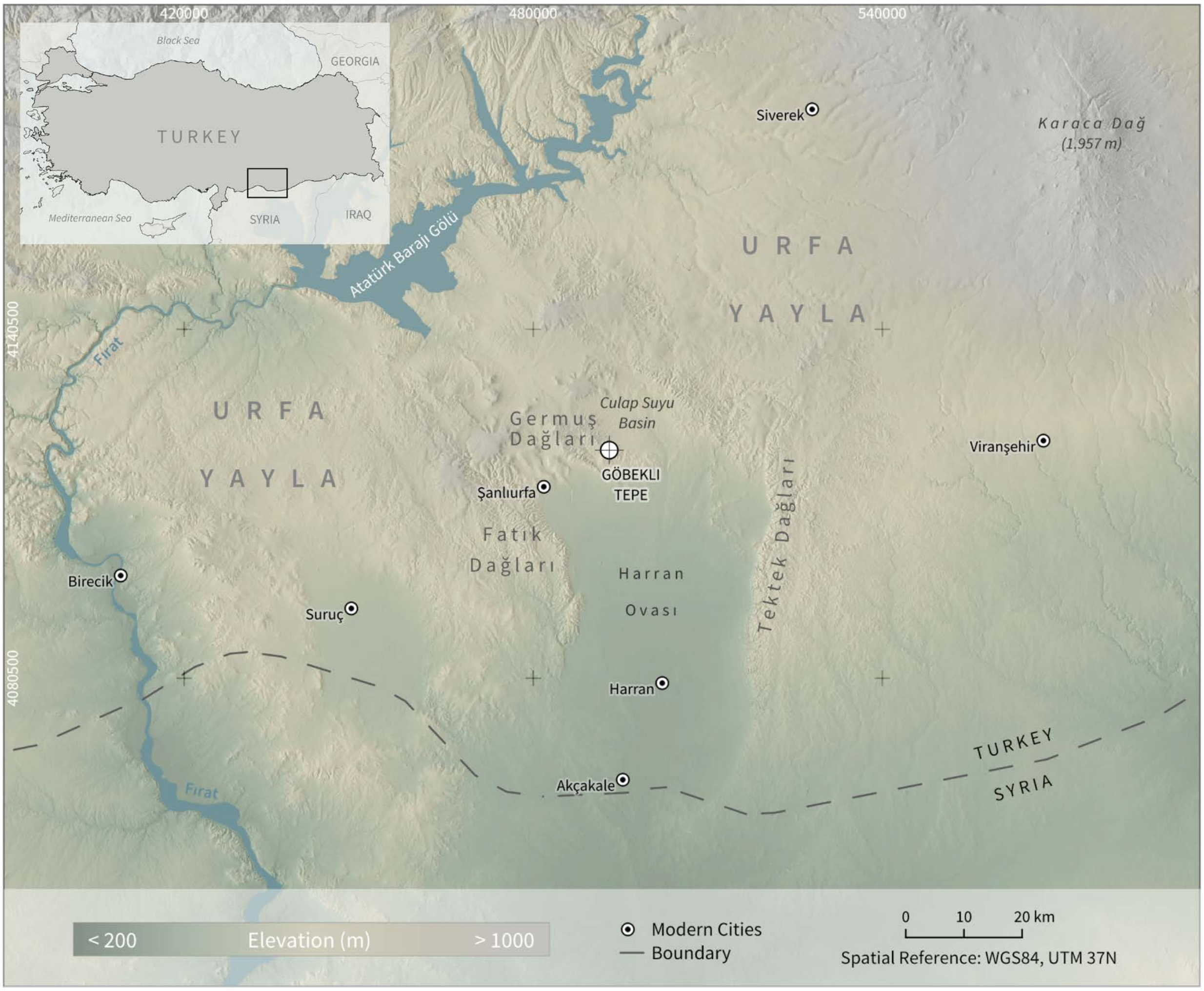

Figure 1: *Overview map with main topographic features showing the geographic setting of Göbekli Tepe (Knitter* et al. *2019, Fig. 1, with permission).*

destruction of their settlement; how abandoned areas within the settlement were connected to their daily practices; and how memory spaces in their built environment were created, since detachment from place and memory are deeply intertwined.[27] According to Pierra Nora, memory spaces or *lieux de memoire* are 'simple and ambiguous, natural and artificial, at once immediately available in concrete sensual experience and susceptible to the most abstract elaboration. Indeed, they are *lieux* in three senses of the word - material, symbolic, and functional.'[28] Therefore, referring to Heike Delitz, architecture can be seen as a 'medium of the social', and represents spheres of interaction between built environment and social practice.[29] Speaking of the archaeological record, the biography of a building, which includes phases of modification, repair, re-use, abandonment, re-occupation, and final abandonment, reflects social practices and abandonment routines.[30] Thus, the biography of a building is the material record of essential daily practices and is therefore one of the focal points of my research.

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[27] McAnany and Lamoureux-St-Hilaire 2020, 18.
[28] Nora 1989, 18–19.
[29] Delitz 2010.
[30] Trebsche 2010, 157.

New insights on stratigraphy and site formation in Göbekli Tepe

The Neolithic settlement of Göbekli Tepe is located about 15 kilometres east-northeast of the modern city of Şanlıurfa in South-Eastern Turkey. It is situated on the second highest point of the Germuş mountain range (786 m above sea level). The vast Harran plain opens towards the south. The plain itself is limited in the west by the Fatık and by the Tektek mountain range in the east.[31] From the mound, panoramic views open towards the distant areas of the Harran plain the nearby Culap Suyu basin in the northwest (**Figure 1**).[32] Due to its hillside location, the mound is exposed to extreme weather that causes severe erosion. Recent geomorphological studies demonstrate that the tell layers slide down the slopes and accumulate in the river basins.[33]

Göbekli Tepe was discovered in 1963 by Peter Benedict during a survey as part of a joint research project by the University of Istanbul and the University of Chicago, under the direction of Halet Çambel and Robert Braidwood.[34] More than thirty years passed before a small team around Klaus Schmidt revisited the site in 1994, followed by excavations starting in 1995 under the direction of the German Archaeological Institute (DAI) and Şanlıurfa Museum. From 2007 until his untimely death in 2014, the excavations were directed by Klaus Schmidt. Meanwhile, the Göbekli Tepe excavations have become part of a broader project 'Göbekli Tepe Culture and Karahantepe Excavations' directed by Prof. Dr. Necmi Karul from the Istanbul University in collaboration wthe the German Archaeological Institute (DAI) and the Şanlıurfa Museum. In 2018, Göbekli Tepe was inscribed in the UNESCO World Heritage list.[35]

Whereas excavation work in the early project phases focused on the special buildings with their iconography and sculptural art, small-scale analyses and microarchaeological approaches have been added in recent times. They aim at a better understanding of the intra-site stratigraphy and the reconstruction of social practices.

The anthropogenic layers accumulate on the underlying, undulating limestone plateau. The latter determines the topography of the site, forming mounds with steep slopes and hollows (**Figure 2**). The site was occupied between the second half of the 10th and the early 8th millennium BCE.[36] Göbekli Tepe is well-known for its large, round to oval-shaped monumental buildings, which boast up to 5.5 m high anthropomorphic, monolithic T-shaped pillars. These pillars, in turn, are decorated with reliefs of wild animals and abstract symbols which might reflect the symbolic world of the community.[37] To date, this is considered the earliest monumental architecture in a settlement and therefore a unique characteristic of Göbekli Tepe. Furthermore, the mound is densely covered with both round to oval-shaped and rectangular domestic structures, many of which contain smaller versions of the T-shaped pillars as well (**Figure 3**). Altogether, eight monumental structures have been completely or partially exposed so far.[38] It was repeatedly stated by the former excavators that Göbekli Tepe is a purely ritual site, or 'mountain sanctuary', with no or little domestic character.[39] Yet, some scholars strongly disagreed with this interpretation, including Edward Banning, who argued that the 'temples'

31 Knitter *et al.* 2019.

32 Although it is commonly stated that the view towards the Harran plain was important for the foraging community, recent studies on view axes from the site suggest that the view towards the nearby Culap Suyu basin was much more important for herd observations, see Braun 2020.

33 Nykamp *et al.* 2021; 2020a; 2020b; Knitter *et al.* 2019.

34 Benedict 1980.

35 Clare 2020, 86.

36 Clare 2020, 81; Kinzel and Clare 2020, 34.

37 Dietrich *et al*. 2012, 684; Schmidt 2010a.

38 Clare *et al.* 2015; Dietrich *et al.* 2014; 2016; Schmidt 2016; 2011; 2000b; 2000a; 1995.

39 Dietrich *et al*. 2015; Notroff *et al.* 2014; Dietrich *et al.* 2019. For the definition of 'mountain sanctuary' see Schmidt 1995; 2010b; 2016.

Figure 2: *Aerial view of Göbekli Tepe facing northeast. The main excavation area with buildings A-D is located in the southeast, building F can be seen at the southwestern mound, building H is located in the west (unexcavated then) (Photo: Erhan Kücük, DAI).*

were likely community buildings serving various purposes, and Reinhard Bernbeck, who stressed the importance of microarchaeological studies to determine what activities have actually taken place in these buildings.[40] These promising new approaches were rejected by the excavators at the time.[41] However, recent archaeological findings, such as domestic structures, domestic Neolithic artefactual assemblages,[42] domestic features,[43] and water supply installations, clearly point to the site being a settlement.[44] Hence, research has focused more on similarities to other Neolithic settlements than on simply stressing differences and the exceptional position of the site.

According to Moritz Kinzel and Lee Clare, both the monumental structures and some of the domestic buildings show a long use and maintenance history, including phases of destruction, rebuilding, and modification which have created vertical and horizontal stratigraphies. This can be seen in the way

40 Banning 2011; Bernbeck 2013. Moreover, Dietmar Kurapkat has already demonstrated in his dissertation (submitted 2010) that the special buildings were most likely roofed and that the pillars served static functions; see Kurapkat 2015, 230–236; 2012, 163.

41 Dietrich and Notroff 2015.

42 Breuers and Kinzel forthcoming. According to Jonas Breuers (personal communication), the lithic assemblage represents the common PPN tool kit. Breuers is analysing the lithic assemblage from Göbekli Tepe in the framework of his PhD project 'Diachrone Studien zur Lithik des Göbekli Tepe: Locus 166, Raum 16 und die Sedimentsäule aus Gebäude D', conducted at the University of Köln.

43 In the 2017 autumn season, a midden with fire installation located in a potential outdoor area (see below) and a burial under the floor of a PPNB building were found; see Clare 2020; Lelek-Tvetmarken and Kinzel 2017.

44 For the water supply installations, see Clare 2020, 84–85; Ernst 2016; Herrmann and Schmidt 2012.

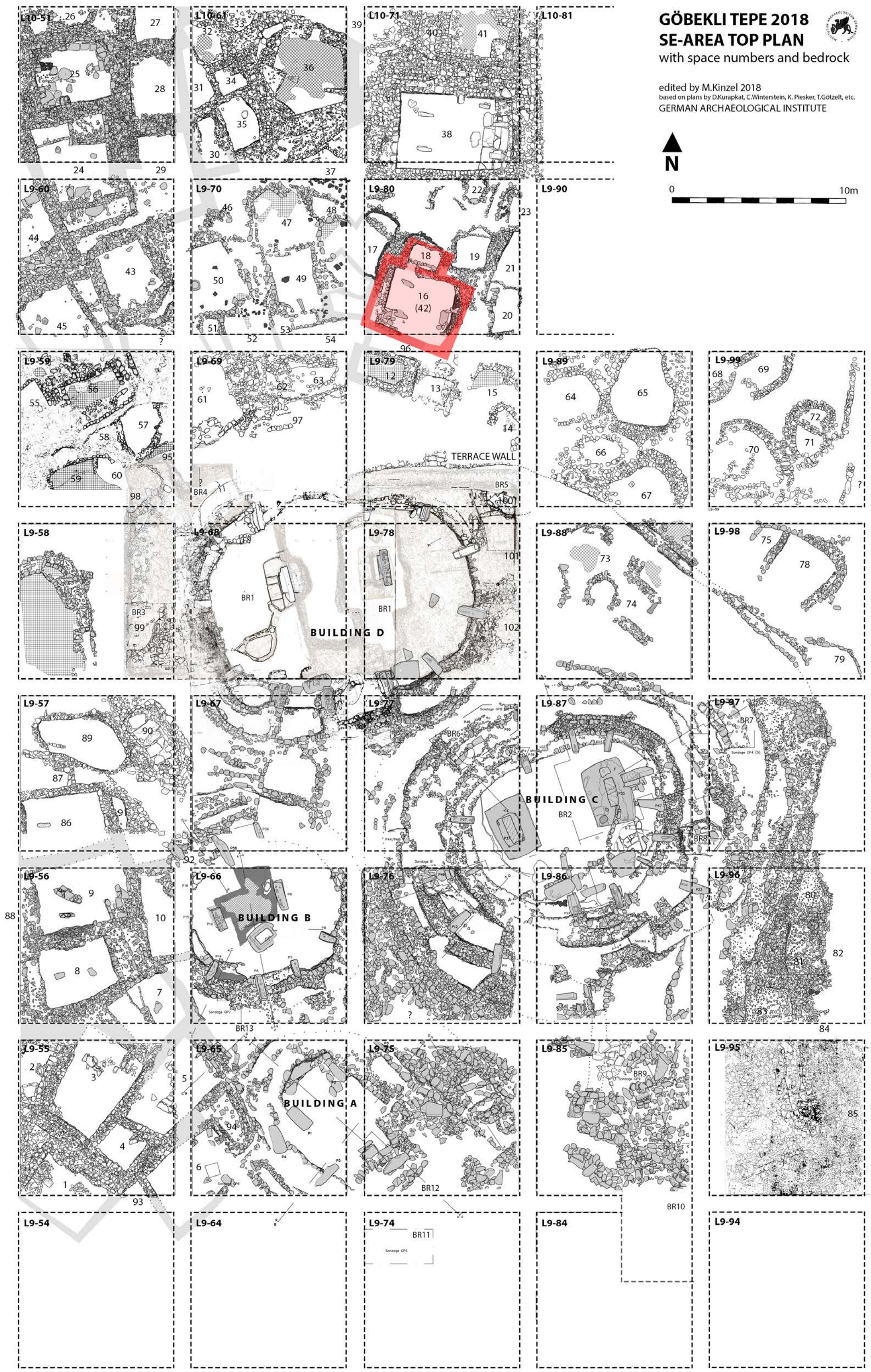

Figure 3: *Architectural top plan showing the main excavation area in the southeast hollow and the adjacent north-eastern slope. Superimposed rooms 16 and 42 mentioned in the text are marked red (after Kinzel and Clare 2020, Fig. 3.2.).*

the structures are not only built on top of but also into each other.[45] Also, structural elements, such as walls and pillars, were carefully relocated or used as *spolia* while the buildings themselves were modified to fit the needs of the inhabitants.[46] Based on recent and ongoing building archaeological studies, these models clearly contrast with and modify the preliminary yet oversimplified stratigraphic model of architectural Layers I, II, and III.[47] In the preliminary stratigraphic model, the special buildings were attributed to Layer III, e.g. to the 10th millennium BCE (PPNA), whereas Layer II (the rectangular structures) was attributed to the 9th millennium BCE (early and middle PPNB). Layer I comprised the modern surface, including post-Neolithic activities, and the plow zone.[48] New radiocarbon dates, however, suggest a more complex sequence of construction events and confirm observations that the special buildings, formerly of Layer III, were still in use in the late-9th millennium BCE.[49] To date, the new chronology comprises eight phases that span at least 1500 years.[50]

The settlement layout of Göbekli Tepe is formed by the natural landscape. The earliest structures were built directly on the natural limestone plateau.[51] Even though the limestone formation of the Urfa plateau is 'nearly horizontal',[52] the small-scale topography is much more complex than previous reconstructions have suggested (**Figure 4**).[53] Instead of reconstructing the anthropogenic layers of the mound as an accumulation on a generally flat limestone plateau with buildings being cut into older deposits (referred to as a 'nucleus tell', or 'layer IV'),[54] it is much more likely that the people of Göbekli Tepe used natural terraces to build their settlement. This means structures were built in first, the naturally hollowed-out spaces of the plateau (which also seem to be the preferred spaces for special buildings),[55] second, along the slopes of the limestone formation, and third, on top of the limestone terraces. Whereas some areas were built over, long-living structures, such as the special buildings, were not (but yet modified multiple times), as they were still being used parallel to younger structures. This led to an accumulation of architecture sloping up from the special buildings to the top of the plateau.

Exposed to wind, heavy rain- and snowfalls, and earthquakes, the structures located along the slopes and on top of the mounds suffered from severe landslide events.[56] With increasing instability of the mound, the structures slid into the depressions and damaged the buildings below severely.[57] So far, it was assumed that the special buildings were 'ritually buried' at the end of their use phase, which would require substantial impact of labour to supply the vast amounts of filling material.[58] The slope slide events, however, seem to provide much more likely explanations for the enormous amount of detritus material that was excavated inside the special buildings. As the fill of the special buildings in the hollows consists of a mixture of erosional layers, anthropogenic material, and the remains of slope stabilizing activities, it can be assumed that most remains of the eroded upper layers should at least partly be

[45] Kinzel and Clare 2020, 34.
[46] Kinzel *et al.* 2020, 15; for the use of *spolia* in Göbekli Tepe, see Kurapkat 2015.
[47] Dietrich *et al.* 2013, 36.
[48] Notroff *et al.* 2014, 84–85; Kurapkat 2015, 18.
[49] Kinzel and Clare 2020, 40.
[50] Kinzel and Clare 2020, 34.
[51] Kinzel and Clare 2020, 32; Kinzel *et al.* 2021, 10.
[52] Knitter *et al.* 2019, 2.
[53] Kurapkat 2015, 14.
[54] Piesker 2014, 36; Dietrich 2011, 15.
[55] I use the term 'special buildings' assuming that the large oval-round structures served several purposes such as community buildings, spaces for ritual practices, but also domestic activities. For a discussion concerning 'special buildings' and their monumentality, see Kinzel and Clare 2020.
[56] Climate changes with higher precipitation around 10.2 ka calBP might have increased seasonal destructions by slope slide events, see Weninger 2017.
[57] Kinzel and Clare 2020, 34.
[58] Notroff *et al.* 2014; Dietrich 2011; Schmidt 2016; for a re-evaluation of labour involved in building and burying the structures see Kinzel and Clare 2020.

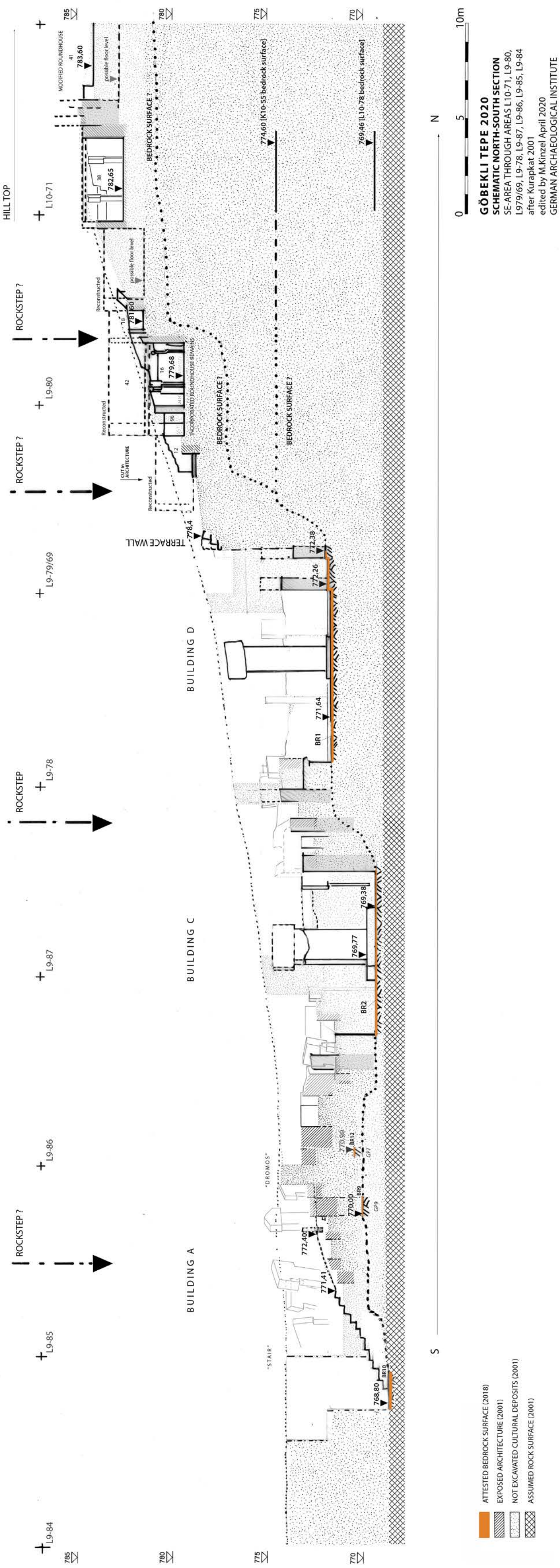

Figure 4: *Schematic North-South section through areas L10-71, L09-80, L09-79/69, L09-78, L09-87, L09-86, L09-85, L09-84 (Kinzel* et al. *2021, Fig. 5, with permission).*

found in the hollows. Kinzel and Clare state that 'we are now certain that the faunal remains from the buildings are not attributable to individual feasting events but instead represent accumulations of older displaced deposits.'[59] After destructive events, the inhabitants of Göbekli Tepe cleaned and repaired some buildings, while others were abandoned. Nevertheless, the backfilling of some of the special buildings is not only the result of natural catastrophes. Soil sediment analyses determined fossil humus (Ah) horizons within the partly filled building D that mark hiatuses in the sedimentation of the fill.[60] The depression that accommodates the special buildings A-D was not (fully) overbuilt in Neolithic times. At a certain point, building D was at least half filled with detritus material, but the pillar heads were still visible. It can be assumed that the intentional sparing of an otherwise densely built environment created a memory space and might also have served as a meeting or visiting place, maybe as early as when buildings A and C were still in use.[61]

Tracing detachment practices and abandonment routines

Taking the exceptional size of the Neolithic settlement and the long duration of occupation into account, it can be assumed that not all parts of the settlement were inhabited simultaneously. Furthermore, settlement centres shifted over the centuries with abandoned structures and areas existing next to occupied ones. These differently used abandoned spaces formed an integral part of a highly diverse settlement layout. Taking the topography of the site into consideration, the inhabitants of Göbekli Tepe likely had to deal frequently with the cleaning and repair of their built environment during and after harsh weather conditions or small and larger natural disasters. How and why did the Neolithic people maintain their settlement in specific ways? Did they develop certain repair and maintenance routines? And in what way was their symbolic world crucial to their decisions? In the frame of this study, similarities and differences regarding abandonment routines are discussed. Presumably, multiple intertwined phases of occupation and abandonment can be defined in both a single building and various settlement areas. Continuous processes and changes nevertheless produced some constancy up until the inhabitants of Göbekli Tepe detached themselves entirely from the place.

An attempt to visualise the successive repairing, re-building, recycling, and abandonment practices which the Neolithic people left in the archaeological record is carried out by establishing a systematic methodology for handling detachment practices from, but also interweavement with the place. As the abundance and lack of material remains in the archaeological record incorporate (to a certain point) the decisions and practices of the people, systematic mapping and sampling are used as archaeological tools to trace the materialisations of these activities.

Contextual comparability is provided by a consistent tripartite approach for several settlement areas which are analysed as examples. By embedding the following small-scale and microarchaeological analyses, I attempt to visualise these daily practices to carve out similarities and differences concerning living with ruins: first, architectural analyses in the form of systematic mapping of *spolia* use in buildings,[62] second, room internal stratigraphy, i.e. room fill analyses and artefact distributions

[59] Kinzel and Clare 2020, 37.

[60] Pustovoytov 2006, 716; recent studies are concerned with small-scale re-evaluation of the sediments in building D, see Pöllath *et al.* in prep.

[61] Schmidt 2010b; Kurapkat 2015, 214. However, the surface was not horizontal and therefore presumably not intentionally levelled; see Pöllath *et al.* in prep.

[62] *Spolia* are reused structural elements that originate from older buildings and are integrated into more recent architecture. They are usually deliberately and visibly placed and therefore describe an intentional building practice; see Meier 2021, 27–28.

Figure 5: *Room 16 in Area L09-80 after excavations in autumn 2017. Superimposed room 42 is indicated by the stepped walls. Note the disturbed floor (presumably of the deconstruction of former installations/benches) as well as the pits cut into the floor (Photo: C. Lelek-Tvetmarken, DAI).*

and densities, and third, geochemical sediment analyses.[63] The tripartite methodology leads to the construction of detailed biographies of several buildings that are to be understood as examples for the settlement as a whole. In these life cycles of architectural structures, their construction and subsequent building phases are described. Furthermore, re-use of ruins, taphonomic processes, and abandonment events are also included. In addition to building phases, 'activity phases' describe the diverse stages in the life of a building.

In this paper, my approach is highlighted by showing some preliminary results of two analysed contexts. I begin with a well-studied domestic building with a rectangular ground plan north of building D dated to the early to middle PPNB (part 1. *spolia* mapping and part 2. internal room-fill stratigraphy, **Figure 5**).[64] Afterwards, insights are presented from the ongoing analyses in a newly discovered potential PPNA outdoor area (part 3. geochemical sediment analyses).

[63] Within my dissertation project, I conducted geochemical sediment analyses at the Laboratory of Physical Geography, Freie Universität Berlin in collaboration with Philipp Hoelzmann, Moritz Nykamp, Manuela Abendroth, and Frank Kutz.

[64] The overall biography of this building begins in the PPNA and ends in the middle PPNB (new chronology phases 2–6/7), see Kinzel and Clare 2020, Fig. 3.2.

Part 1: Architecture - **spolia** *mapping in room 16*

Speaking of rooms 16, 18, 42, and 96 in Area L09-80, it is difficult to determine what is actually referred to as 'the' building. Recent building archaeological studies revealed that this structure, formally described as 'Layer II architecture', comprises at least four, likely five, building phases, whereupon an originally round-oval building was incorporated in a multi-room rectangular structure in a later phase (**Table 1**).[65] Due to the common building practice at Göbekli Tepe, younger walls are often built in front of the inner wall faces of older ones, reducing the size of internal space over time. Hence, it is only possible to map the use of *spolia* of the latest building phase of the room without dismantling the younger walls. I differentiate three different kinds of *spolia*: 1. architectural elements (pillar and portal stone fragments), 2. stone artefacts (ground stone tools and sculptures), and 3. re-used wall stones.

Room 16 is in its youngest phase enclosed by walls Loc. L09-80-63 in the north, Loc. L09-80-44 in the east, Loc. L09-80-43 in the south, and Loc. L09-80-65 in the west.[66] It is attributed to the four-pillar room type similar to the so-called 'lion pillar building'.[67] To illustrate my *spolia* mapping method, wall Loc. L09-80-44 is presented as an example.[68]

The remains of wall Loc. L09-80-44 count 239 visible wall stones (**Figure 6**). The most striking feature of this wall is the abundance of pillar fragments (n=25 resp. 10.5 %, highlighted in red). Several small pillar fragments are situated at the base of the wall all along the inner edge of the room. Two large pillar fragments are placed vertically into the wall. Here, it is unclear whether the southern pillar (PXI) was complete because the upper wall courses are missing. The northern pillar (PX) seems to be the head of an originally larger piece and is set on smaller pillar fragments. Accordingly, both pillars reach up to the same elevation.[69] The pillar fragments frame an eastwards-oriented setback in the masonry forming a niche. Another pillar fragment is placed horizontally in between the pillars, forming a bench (Loc. L09-80-70) that projects out from the wall itself. This general conception of space (benches being situated in between pillars) is well-known from the special buildings. Additionally, few grinding stones and stone bowl fragments were used as wall stones (n=8 resp. 3.4 %, highlighted in blue). They are made from basalt and are rarely but repeatedly found in masonry.[70] The large amount of re-used wall stones (n=46 resp. 19.3 %, highlighted in yellow) that clearly contrast the straight edges of the pillar fragments is remarkable. They are identifiable by their irregular shape, rolled and multiple chipped edges.[71] It can be assumed that they originate from other collapsed buildings. Altogether, the percentage of *spolia* in wall Loc. L09-80-44 sums up to n=79 resp. 33.1 %. In other words, it is made up at least of a third of *spolia*. Not only the masonry but also the mortar contains large amounts of secondary and tertiary used material including chipped stone and animal bone; there is no evidence that sterile soil has been used.[72]

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[65] For a detailed building archaeology study of this structure see Kinzel *et al.* 2020, 15; see also Kurapkat 2014; 2015; Winterstein and Kurapkat 2002.

[66] Locus numbers in Göbekli Tepe are composed of Area-Locus; here being Loc. L09-80-44 Locus 44 in Area L09-80.

[67] Often referred to as the 'lion pillar building' (Schmidt 2016, 228), yet archaeozoological analyses interpret the relief as a leopard since lions have a different physiognomic appearance, see Peters and Schmidt 2004, 184.

[68] *Spolia* mapping was conducted in the field while marking the spoils on a photo or drawing of the wall and later digitally redrawn. I would like to thank building archaeologist Moritz Kinzel for his help and instruction.

[69] Most likely, the pillars had a static function in buildings carrying the roof or suspended ceiling, see Kurapkat 2015; Piesker 2014; Kinzel and Clare 2020; Kinzel *et al.* 2020.

[70] Kurapkat 2015, 119.

[71] I am aware that it is difficult to discriminate between first and secondary (re-)fashioning of wall stones. In comparison with older buildings that contained less spoils and were constructed of large boulders such as the oval-round structures and the terracing wall in DR-2 (see below) these differences become more distinct. For the classification of masonry types and the localization of *spolia* in buildings see also the comprehensive dissertation on building archaeology in Göbekli Tepe by Dietmar Kurapkat (2015).

[72] Kurapkat 2015, 119.

Figure 6: Spolia *mapping of wall Loc. L09-80-44 in room 16. Re-used architectural elements are marked red, ground stone objects in blue, and re-used wall stones in yellow (Photo: M. Kinzel, DAI with illustration of J. Schönicke, DAI).*

In summary, it can be assumed that the majority (if not all) of PPNB architecture consists mainly of re-used building material. It is conceivable that the percentage of *spolia* rises in the younger levels. With increasing density of built environment, the quarries of the surrounding limestone plateau can only be reached by cumbersome routes. Therefore, abandoned structures were frequently used as raw material sources. Re-used architectural elements, such as pillar fragments, are deliberately placed in prominent positions. They thus resemble their former function (pillar) or imitate a spatial concept (bench). Although it seems obvious that the use of *spolia* follows practical and economical decisions, it becomes clear that they were not randomly used within the walls. This adds a symbolic value to their function.

Part 2: Room-internal stratigraphy: fill analyses

The room fill excavated in space 16 and the overlying space 42 is discussed in the following.[73] According to the recently established building phases, the room fill accumulated between phase 4 (last use phase of the multi-room two-storey rectangular structure) and phase 5 (small structures above completely filled rooms 16 and 42 erected by ruin dwellers) and therefore dates to the late 9th millennium BCE (**Table 1**). The structure itself comprises five building phases. I refine these building phases by adding

[73] The spaces were excavated in seasons 1998–2001. Additional documentation was carried out in 2002. In 2017, the remaining fill was excavated (*c.* 25 cm) down to the structure's floor and systematically sampled. Building archaeological studies were conducted in 2017 and 2018. Geochemical sediment and phytolith analyses were carried out and are currently being evaluated.

activity phases (indicated by '*a*' in front of the building subphase) that refer to abandonment practices, post-abandonment interactions, and taphonomic processes that evenly display essential parts of the biography of a building.[74] A potential scenario for the gradual abandonment of and ruin interactions with the building is described in the following.

Activity phase a4.1 – Abandonment

At a certain point, the space was no longer in use and the inhabitants detached from place. The abandonment of the building gives the impression of not being a rapid and unplanned event since almost no *in situ* artefacts were documented on the floor (Loc. L09-80-122) of the building.[75] A grinding stone was found within a shallow pit (Loc. L09-80-142/143) that was cut into the floor, whereas another grinding stone was documented between the bench and wall Loc. L09-80-44. Perhaps they were deliberately placed there. Various patches of silty-sandy material (Loc. L09-80-120 and -124) accumulated on the floor. They might be of aeolian origin mixed with crumbly material from the wall plaster, suggesting that the room was left open for a certain amount of time.

Activity phase a4.2 – Collapse

Subsequently, the eastern part of the ceiling that separated rooms 16 (below) and 42 (above) from each other collapsed. On the floor, an approximate 12 cm thick layer of ceiling collapse consisting of small (fist-sized) and medium-sized stones mixed with silty sand (Loc. L09-80-119) and wall collapse (perhaps from wall L09-80-44) was recorded.

Activity phase a4.3 – Re-use

On top of the wall and ceiling collapse, a trampled surface was identified (top of Loc. L09-80-119 resp. bottom level of Loc. L09-80-61.8).[76] The top level of the surface corresponds to the top level of the *spolia* bench Loc. L09-80-70.[77] Additionally, a re-used pillar fragment (Loc. L09-80-68) was found lying flat on the trampled horizon, whereas a stone bowl (Loc. L09-80-69) was documented south of the bench. These features can possibly be attributed to activities in the partly collapsed and levelled room. If the roof of the building was still intact, the ruin might have served as a shelter.

Activity phase a4.4 – Collapse

The decay of the structure proceeded. About 65 cm of collapse and sediments (Loc. L09-80-61.5-8) mixed with chipped stone, ground stone fragments, an incised bone bead, wall collapse (Loc. L09-80-114, -116 and -117), and erosional deposits on top (Loc. L09-80-112 and -115) have accumulated on the trampled surface. A few floor fragments that likely originate from the upper storey of the building, room 42, were located in the fill.

[74] Trebsche 2010, 157.

[75] Cf. Brooks 1993, however, it might also be the case that the room did not contain many artefacts anyway, or that Neolithic rooms were kept 'clean'.

[76] Before establishing a new excavation and documentation system in 2017, fill contexts were excavated in 10–30 cm thick artificial spits but yet as one Locus. Spits were numbered in order of excavating, e.g. Loc. L09-80-61.8 is the eighth spit of Locus 61 in Area L09-80.

[77] In the earlier documentation system, Locus numbers were also given to certain artefacts such as pillar fragments and ground stones.

Biography of a two-storey structure (rooms 16, 18, 42 and 96) in Area L9-80	
Building and activity (a) phases	Context
1	Oval building
2	Incorporation of rectangular building (16+18)
3	Single-storey rectangular building (16,18, 96) or already two-storey building
4	Two-storey rectangular building (16, 18, 42, 96)
a4.1	Abandonment of the building
a4.2	Aeolian sediments on floor; wall and roof collapse
a4.3	Trampled surface on collapse
a4.4	Wall collapse and erosional deposits
a4.5	Possible activity area in half-filled up room
a4.6	Wall collapse and erosional deposits
5	Small structures and terracing wall, ruin dwellers
A5.1	Site abandonment and detachment from place; slope slide events and erosion processes

Table 1: *Activity phases with attributed building phases and associated contexts and practices for rooms 16, 18, 42, and 96 in area L09-80 forming the biography of the building. The activity phases a5.1–6 described above are marked in blue (Building phases of the structure after Kinzel* et al. *2020; Kurapkat 2015; Winterstein* et al. *2002).*

Activity phase a4.5 – Possible activity area

Within the fill, a patch with high density of animal bones was identified in Loc. L09-80-61.4, which is embedded in sandy-silty sediments. This could point to food consumption in the ruin. Alternatively, it could suggest the collapse proceeded slowly and bone-tempered wall or roof mortar decayed.

Activity phase a4.6 – Collapse

The upper part of the western wall of upper room 42 Loc. L09-80-15 collapsed onto the ceiling that separated rooms 16 and 42 (collapse Loc. L09-80-55) and, thus, the western part of the ceiling collapsed. The existence of a two-storey building is indicated by the position of a portal stone (Find no. GT17-WS-0080) in the south-western corner of the room fill that presumably connected rooms 16 and 42.[78] After these damaging and destabilizing events, the decay of the building proceeded at faster pace. The uppermost 1.30 m of room fill were attributed to room 42 but are sparsely documented (excavated in artificial spits as Loc. L09-80-10 in the northern and Loc. L09-80-19 in the southern part). Yet, collapsed stones (maybe from the roof) and several floor fragments (possibly from room 18, situated north of room 42, and other spaces) were documented in spit Loc. L09-80-19.4. A concentration of burnt limestones in Loc. L09-80-19.8 indicate a fire installation that was perhaps originally located on the roof of the building or might point to activities related to combustion in the ruin.

The interior of the structure was entirely filled with sediments due to erosion processes caused by slope slide events, but settlement activity in Göbekli Tepe continued. Findings indicate a younger building phase (phase 6) on top of the filled rectangular structures, which likely continued even into

[78] For a reconstruction of this building with two stories, see Kinzel *et al.* 2020.

the early 8th millennium BCE.[79] Small structures cut into the deposits of the infilled rooms and a recently discovered terracing wall Loc. L09-70-101/ L09-80-9 south of them are clear indicators for later settlement activities. The bottom levels of these structures appear directly underneath the modern surface. Therefore, it seems likely that their superstructures eroded into the subjacent rooms and into the buildings located along the slopes and in the hollows. Further research, which will include a detailed study of the associated fill layers, will form a part of my ongoing dissertation project.

Part 3: Geochemical sediment analyses in drainage channel (DR-2)

In addition to the geomorphological studies mentioned above, microarchaeological analyses of fill layers are indispensable for understanding sedimentation sequences within the settlement.[80] Human activities performed repetitively and over a longer period of time leave behind distinct chemical signatures.[81] The very loose and crumbly sediments at Göbekli Tepe often impede tracing anthropogenic layers while excavating. Hence, many contexts were excavated in artificial pits. In order to identify activity areas and the intensity of anthropogenic activity anyway and to better reconstruct site formation processes, geochemical sediment analyses were carried out.[82] Especially in light of contrasting the interpretation as ritual backfilling of the special buildings, detailed understanding of the sediments is required.

During the construction of two protective roofs that now cover the excavation area in the southeast (covering the special buildings A-D) and the southwest, drainage channels were dug for the pipes of the rainwater coming down from the roofs. Drainage channel 2 (area DR-2) runs in NE-SW direction at the western edge of the northwestern excavation area.[83] DR-2 is 35 m long and 1 m wide channel and with a 5 x 3 m large tank area (for the installation of a sedimentation container) at its southeastern end. In between, three 1.7 x 1.7 m so-called 'chimneys' (vertical shafts for overflow basins) were dug.

Excavations in DR-2 revealed several possible PPNA round-oval structures (**Figure 7**) as well as a midden with a fire installation in a potential outdoor area (**Figure 8**). An oval structure was built directly on the natural bedrock. Furthermore, a terracing wall indicating early slope stabilizing activities was found. No remains of potential younger layers were recorded. Therefore, it can be tentatively assumed that this part of the settlement was abandoned at the beginning of the PPNB or later traces have fully eroded.

Altogether, four sections in three chimneys were systematically sampled. Samples were taken directly from the section in 5 to 10 cm depth intervals. The sample size adds up to 0.1 l sediment per sample. Here, sediment analyses of the eastern section of chimney 1 are discussed. The uppermost layer of the southern section of chimney 1 (**Figure 9**) is characterized by colluvial deposits resulting from slope wash processes on the mound. The erosion layers running down the slope are clearly visible. Underneath, the remains of a terracing wall (Loc. DR2-18, -21, -81) built of large limestone boulders are located. Below, a collapsed lime plaster floor fragment is visible. The midden layers underneath consist of reddish and brown soft deposits and grey to white ashy layers with frequent pieces of charcoal. Within the midden,

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79 Kinzel and Clare 2020, 35.

80 Rowley *et al.* 2018; Nicosia and Stoops 2017; Weiner 2010; Parnell *et al.* 2002.

81 Parnell *et al.* 2002, 332.

82 Thereof: multi-element analysis using Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES) with 2100 DV Perkin Elmer; total carbon (TC) and total nitrogen (TN) using LECO TruspecCHN+S-Add-On Elemental Analyzer; total inorganic carbon (TIC) using Woesthoff Carmhograph C-16 Carbon Analyzer; mineralogic composition using X-Ray Diffractometer Rigaku Miniflex 600; particle size analysis by laser diffraction using LS 13320 PIDS Beckmann Coulter Laser particle size analyser; pH values and electric conductivity.

83 DR-2 was excavated in spring and autumn 2017. Excavations revealed another special building, building H (see Dietrich *et al.* 2016; Waszk 2017), as well as several oval-round domestic structures (Clare 2020; Kinzel *et al.* 2021).

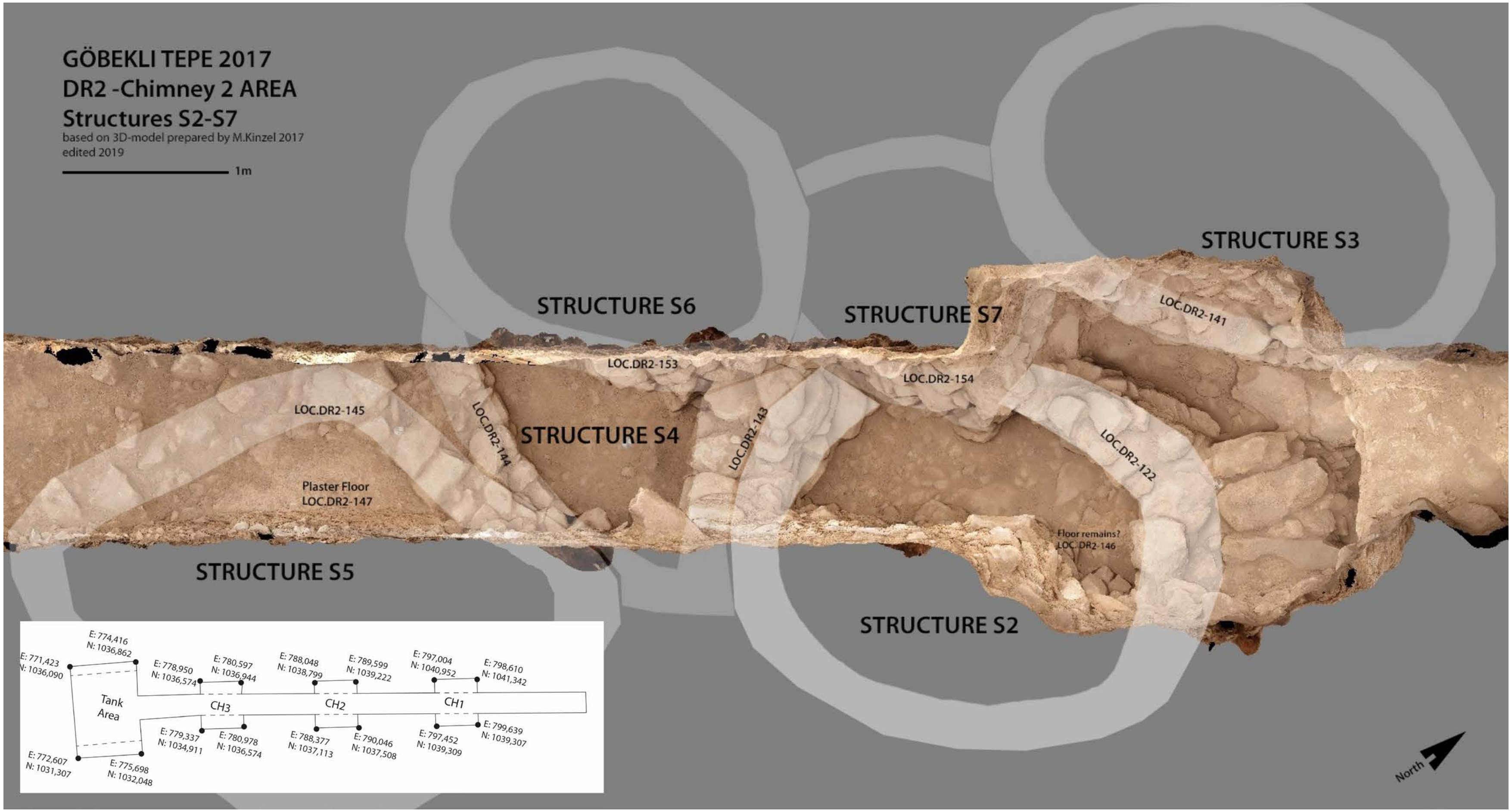

Figure 7: *PPNA Structures excavated in DR-2, chimney 2 and the adjacent channel (based on 3D-model prepared by M. Kinzel/ DAI). The plan in the bottom left corner shows the entire trench layout of DR-2 with chimney (=CH) 1 being the north-easternmost one, chimney 2 and 3 in the centre, and the tank area in the southwest (plan facing north) (Plan: after D. Sönmez in Lelek-Tvetmarken and Kinzel 2017).*

Figure 8: *Midden and fire installation in area DR-2, chimney 1. The fire installation is lined by a thin silty ridge, visible at its western edge. Note the over 50 cm thick ashy layers attributed to the midden visible in section (Photo: C. Lelek-Tvetmarken, DAI).*

a collapsed structure (Loc. DR2-119 and -120) is located. Excavations stopped after 2.5 m, revealing a fire installation inside the midden. The fire installation is lined by a two-layered silty ridge (Loc. DR2-136 and -138) that shows traces of burning. Next to frequent lithic artefacts, the horn of an aurochs and the tail of a wild sheep (with bones still articulated) were found.

The most striking result of the geochemical sediment analyses comes from phosphate measurements.[84] Analyses of both total and available phosphates were conducted.[85] The ratio between geogenic or total ($PO_{4\ tot.}$) and available phosphates ($PO_{4\ av.}$) gives the percentage of phosphates that accumulated through external, likely anthropogenic processes, such as the deposition of organic waste and bone material. Areas of intensive use and refuse are expected to show higher portions of available phosphates when compared to less intensively used ones.

When reaching the fire installation level, the portion of available phosphates rises substantially from 36.4 % (sample GT17_10) to 63.8 % (sample GT17_11), i.e. the amount of imported phosphates almost doubles (**Figure 10**). When comparing the data with the control samples from the surrounding plateau

[84] In archaeology, phosphate measurements are used to determine activity areas, settlement centres, and boundaries; see Kalkan and Özbal 2018; Canti and Huisman 2015; Middleton *et al.* 2010; Middleton and Price 1996.

[85] 'Total' phosphates represent the measured amount of nearly all geogenic phosphates using aqua regia (3:1 mixture of 3 ml 32% HCl and 1 ml 65% HNO_3). Available phosphates were determined using citric acid 2% $C_6H_8O_7$. Both the aqua regia and citric acid dilutions were analysed using ICP-OES.

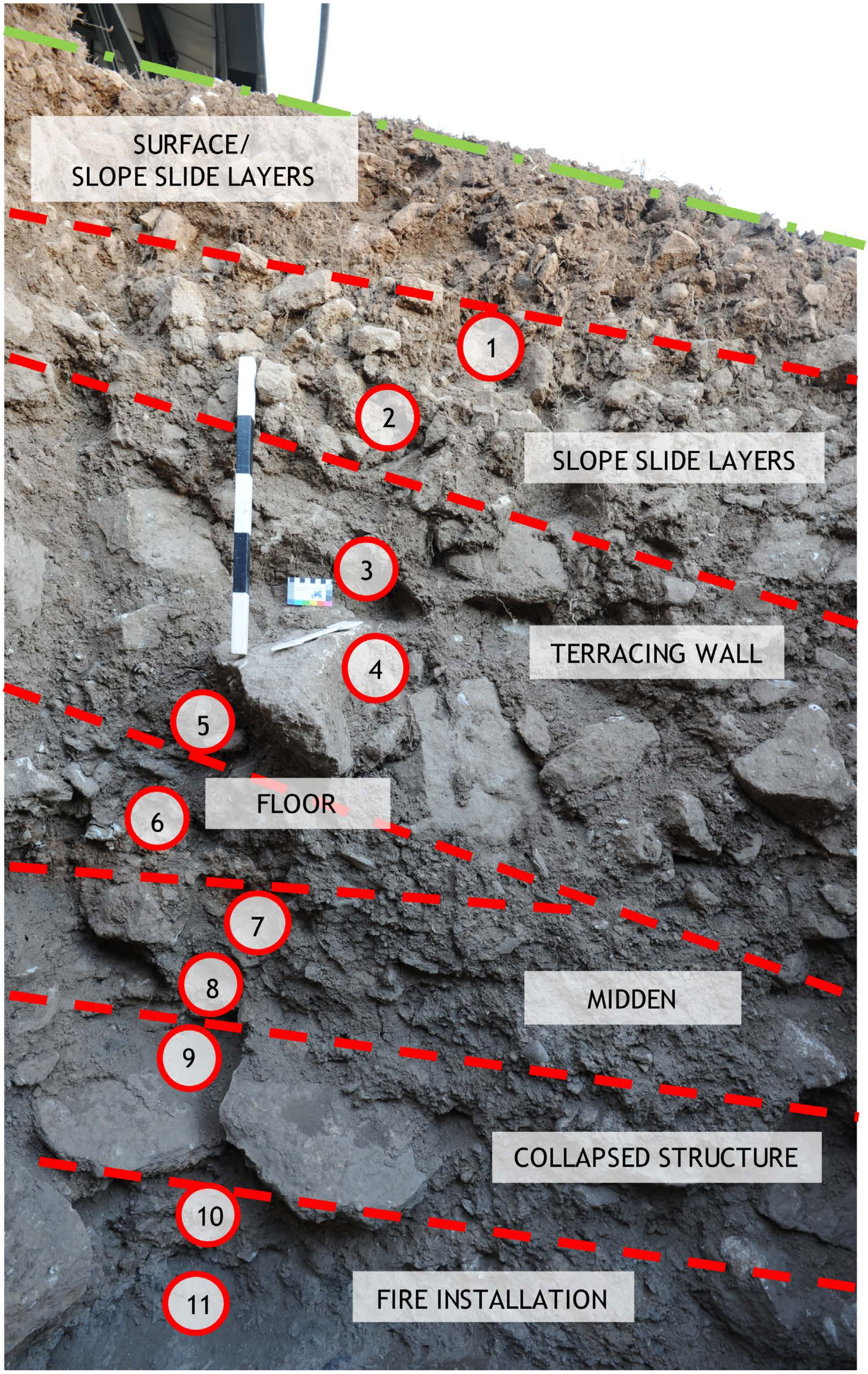

Figure 9: *South section of chimney 1 in DR-2. Locations of extracted samples are marked by red circles; dashed lines show the approximated limits of layers (Photo: J. Schönicke, DAI).*

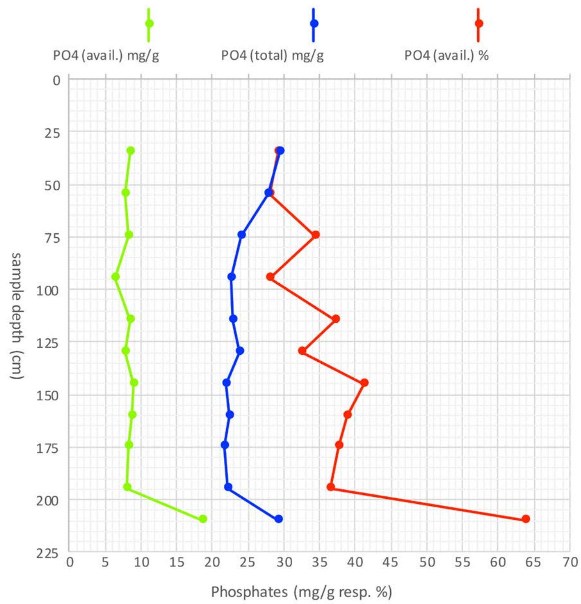

Figure 10: *Diagram showing the portions of $PO_{4\,av.}$ (green), $PO_{4\,tot.}$ (blue), and the percentage of $PO_{4\,av.}$ in relation to $PO_{4\,tot.}$ (red) measured with ICP-OES in the soil samples of DR2-chimney 1, S section. Each dot refers to the certain sample ID marked in the section visible in Figure 9.*

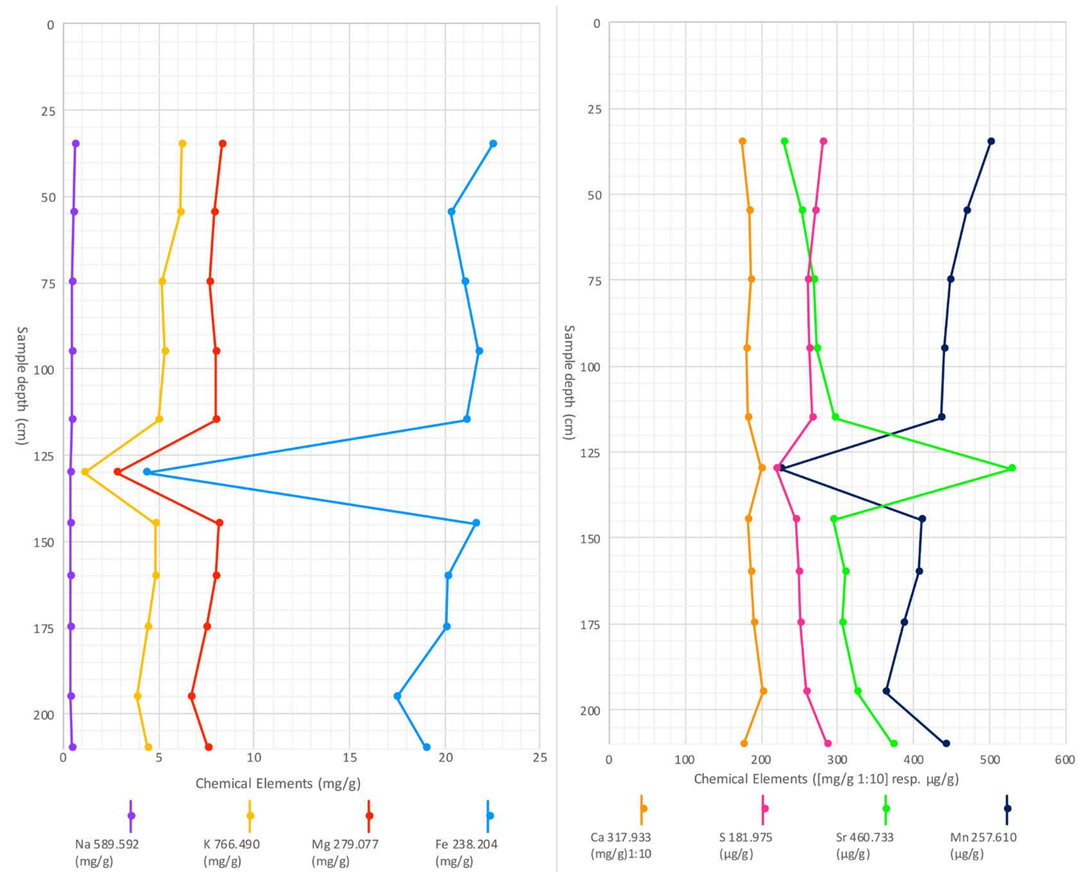

Figure 11: *Diagrams with portions of chemical elements measured with ICP-OES in the soil samples of DR2-chimney 1, S section. Each dot refers to the certain sample ID marked in the section visible in Figure 9. Figure 11 left shows the portions of Na, K, Mg, and Fe (mg/g). Figure 11 right shows the portions of Ca (mg/g) 1:10, S, Sr, and Mn (µg/g).*

($PO_{4\ av.}$ = 1.0–2.6 %), the portion of available phosphates in the fire installation is more than 20 times higher. The fire installation layer shows also slightly increased K, Mg, Fe, S, Sr, and Mn values compared to the layer above. The higher amounts of both Mg and K may indicate wood ash (**Figure 11**).[86]

The layer containing the collapsed floor fragment shows a distinct increase in Sr and Ca. This can presumably be attributed to the chemical composition of the floor, whereas the distinct decrease in K, Mg, Fe, S, and Mn, and the slight decrease of $PO_{4\ av.}$ might indicate a 'clean' surface.[87] Since the floor fragment was not found *in situ* conclusions regarding geochemical residues and associated activities, however, need further examination.

The final interpretation of the results of the geochemical sediment analyses is still ongoing and is even more promising in comparison with the results from other contexts and phytolith studies whose analyses is still pending (thereof room 16 in L09-80 and sediment column in building D).[88] An intra-site comparison with a large number of sampled contexts provides insights in the different intensities of anthropogenic activities and site formation processes in a diachronic and spatial way. This becomes particularly important when questions are asked about how 'abandoned' apparently 'empty' fill contexts really are.

Discussion and conclusions

Recent research allows new insights for understanding Neolithic lifeways in Göbekli Tepe. Small-scale stratigraphic analyses resulted in a radical revision of the chronology. It turned out that the settlement layout is much more diverse and heterogenous than previously thought. Structures have long biographies with multiple re-building activities. Domestic activities such as water management and burial practices leave no doubt that Göbekli Tepe is a Neolithic settlement and not purely a ritual site.

In the light of these findings the question may arise to what extent Göbekli Tepe is still a particularly unique place since it has now lost some of its singularity. There is no denying that the advances in the Neolithic in Central Anatolia in recent years have shown that this area might even be considered a primary region of the Neolithization, as the relationship between the settlements Pınarbası, Boncuklu, and Çatalhöyük demonstrates.[89] Nevertheless, the region of Southeast Anatolia in general and the site of Göbekli Tepe (even with its new interpretation) in particular are still crucial to our understanding of the Neolithization process. The agglomerative building technique we see on the slope architecture in Göbekli Tepe is still much earlier than similar ones in Central Anatolia.[90] This alone opens up questions about the transfer of knowledge. The application of a more neutral terminology (e.g. 'special buildings' instead of 'temples') does not diminish the uniqueness of the monumental structures and the achievements of their creators. In fact, it is quite the opposite: the new approaches demonstrate much more precisely how the inhabitants of Göbekli Tepe were intertwined with their environment and how they reacted to new challenges.

86 Maschner *et al.* 2010, 72; Middleton and Price 1996, 678.

87 Maschner *et al.* 2010, 72.

88 Sediment analyses in L09-80 and DR-2 have been conducted in the framework of my current PhD dissertation. For sediment analyses in building D see Pöllath *et al.* in prep. Ongoing phytolith analyses are carried out by Birgül Öğüt (Göbekli Tepe Project/DAI, Orient Department) at the Laboratory of Physical Geography, Freie Universität Berlin. Phytoliths from grinding stones were analysed by Laura Dietrich and Julia Meister (Dietrich *et al.* 2019).

89 See i.a. Feldman *et al*. 2019; Brami 2019; Baird *et al.* 2018; Kılınç *et al*. 2017.

90 Kurapkat 2015, 125–126.

This becomes particularly clear when taking a closer look at the abandonment processes and the responses of the inhabitants to slope slide events. By analysing structures, room fill, and taphonomic processes in detail, this study shows that the abandonment of the Neolithic settlement Göbekli Tepe was not a single event, and that the inhabitants did not detach from place rapidly and in an unplanned fashion. Shifting settlement centres, the transformation of spaces from oval to rectangular, and the integration of *spolia* in re-built structures are clear indicators for the application of new technologies while preserving a specific habitus.

Abandoned buildings within settlements are not only used as middens but can actually be important building material sources and thus one of the reasons why people interact with them. This seems to be especially true for Neolithic Göbekli Tepe. Re-used architectural elements such as fragments of pillars or ground stones were deliberately taken out of old and incorporated into new structures. Some of them, apart from the economic aspects of re-used material, can be addressed as intentionally chosen and deliberately placed *spolia* and, thus, might have served mnemonic functions creating memory spaces.

The results of microarchaeological analyses show that apparently homogenous contexts such as room fills turned out to be heterogenous, multi-phased zones of successive activities. When studying detachment from place, intra-site abandonment, and site formation processes, it is therefore indispensable to give special attention to these often overlooked contexts.

Small-scale room-internal stratigraphic analyses support the establishment of intra-site occupation levels and provide contextual comparability of building biographies. The latter, in turn, reflect social practices, whereas the incorporation of activity phases provides insights into making decisions regarding place-making and place-leaving. Post-abandonment interactions can be traced in the fill of ruins, either through the use of ruins as middens or the re-use of old walls for ruin dwellers, as shown above by means of the biography of spaces 16/42 in Area L09-80.

When systematically applied, small-scale approaches including architectural, room fill, and microarchaeological analyses could also permit comprehensive comparisons between different settlements. The discourse about intra-site abandonment and detachment from place demonstrates the need to engage more with the decision-making of ancient people and how this is reflected in the archaeological record. We need to ask where people went once they detached from place, and whether we can trace post-abandonment interactions with the settlement. For this, it is relevant to carefully excavate the uppermost settlement layer that is often referred to as 'surface material'.[91] Prior to recent and ongoing small-scale stratigraphic analyses, the importance of the uppermost layer of Göbekli Tepe was not recognised. Even if findings are located directly below the modern surface, their potential to contain information regarding settlement abandonment is crucial, and their careful excavation indispensable. Geochemical sediment analyses of the anthropogenic layers and geomorphological studies of the environment of Göbekli Tepe highlight dynamic formation processes. Here, detailed knowledge is essential if the old interpretation of ritual backfilling is to be contrasted with new approaches which clearly show that the fill of the structures is mainly the result of slope slide events. But not only the final abandonment of the site should be in focus. Rather, I have used my analyses to draw attention to detachment routines that occur within the settlement during the occupation. This provides valuable insights on place-making and the creation of memory spaces, human-environment interactions, and people-place (dis)entanglement by engaging with decision-making in Neolithic communities.

[91] McAnany and Lamoureux-St-Hilaire 2020, 22.

Acknowledgements

The Göbekli Tepe Research Project thanks the Turkish Ministry of Culture for the permission to work at the World Heritage Site of Göbekli Tepe. Furthermore, I would like to thank the organisers of the Broadening Horizons 6 conference for the opportunity to present my research and most gratefully acknowledge the possibility of publishing in this volume. In this regard, I particularly thank Federico Manuelli and Christian W. Hess for editing. For fruitful comments and constructive discussion, I would like to thank Lee Clare, Moritz Kinzel, Reinhard Bernbeck, Moritz Nykamp, and the reviewer. I sincerely thank the German Archaeological Institute and the Göbekli Tepe Team for the ability to use unpublished data in my research. For the most generous instruction in geochemical sediment analyses I thank Philipp Hoelzmann, Moritz Nykamp, Manuela Abendroth, and Frank Kutz. The analyses were carried out with funding for the advancement of women*'s equality of the Department of History and Cultural Studies at Freie Universität Berlin. I would also like to acknowledge Timothy Rey and the reviewer for their valuable linguistic perusal.

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Tarḫuntašša: Rise and Fall of the New Capital for the Hittite Empire

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Abstract

During Muwatalli II's reign, the Hittite capital was transferred from Ḫattuša to Tarḫuntašša, in the Lower Land. The expansion of the Empire was in need of a center of power closer to the new territories and far away from the traditional elite's feuds and the raids from the Kaškans. However, Muwatalli's personal deity was the Storm-god *piḫaššašši*, which caused the main gods of the Hittite pantheon to be relegated and their statues transferred to the new capital. These changes led to great discontent among the former elite and the king's successors re-established the capital again in Ḫattuša, while Tarḫuntašša continued to compete with Ḫattuša for political supremacy. Despite the fact that king Muwatalli's prayer does not offer much information, Ḫattušili III's 'Apology' provides an account of his brother's motives for the capital's transfer and the problems arising during his nephew Urḫi-Teššub's reign and his own. The aim of this paper is to suggest political and religious motives for Muwatalli's decision and the changes that they entailed, and to provide a summary of the political situation in Ḫattuša and the final conflict between Urḫi-Teššub and Ḫattušili III.

Keywords

Tarḫuntašša, Muwatalli II, Urḫi-Teššub, Ḫattušili III, Ḫattuša

Muwatalli II

The early years of Muwatalli's reign are poorly documented; among the few references which have reached us from his reign, there are no direct documents which cover the transfer of the Hittite capital to Tarḫuntašša. At the beginning of his reign, Muwatalli II must have resided in Šamuḫa, which was an important religious center and capital of the Upper Land as well as the temporary royal residence during the reign of Tudḫliya III, when the Kaškans burned Ḫattuša.[1] The prominent position of the Storm-god as the king's patron deity, and of his consort Ḫebat, in the pantheon of Šamuḫa suggest that the king was settled in this city and started the promotion of his cult that time.[2] However, a few years before the Battle of Qadesh, Muwatalli went to the Lower Land to establish the city of Tarḫuntašša as his new capital.[3] Although there are no texts of the king which explain his motives, some indication can

[1] Cammarosano 2018, 381.

[2] Staatliche Museen zu Berlin 1923, No. 45++ (KUB 6.45++) i 40.

[3] The location of Tarḫuntašša is still not certain. Some scholars (Dinçol *et al.* 2000) have hypothesised that Tarḫuntašša was located in the Hulaya River Land, which extended from its core in the Taurus mountains. However, the discovery of a rock

be in the so-called 'Apology', or Autobiography, of his brother Ḫattušili III. In this royal decree, which established an endowment for the goddess Ištar of Samuḫa, he stated that king Muwattalli settled there at the command of his god.[4]

Upon the establishment of the new capital, Muwatalli transferred the gods of Ḫatti, their cultic representations, and the remains of his ancestors from Ḫattuša to Tarḫuntašša.[5] This transfer resulted in a long-term relocation of the capital, and Ḫattuša lost its position as the center of the Hittite cult. The first attestation of the Storm-god as his personal deity appears in the 'Alakšandu Treaty', in which the king is called beloved of the god *piḫaššašši*.[6] Muwatalli's Prayer, CTH 381, was certainly composed early in his reign, before the transfer of the capital, since Tarḫuntašša itself is not included in the long list of cultic centers.[7] Nevertheless, the Storm-god of Lightning is clearly the dominant protagonist among the gods addressed, ahead of the main traditional deities of the Hittite pantheon, the god Teššub and the Sun-goddess of Arinna.[8] At the time, his main cult center appears to have been the city of Šamuḫa, which occupies the prominent second position, after Arinna, the traditional seat of the Sun-goddess, and before the cities of Katapa and Ḫattuša.[9] The order in this list, which also corresponds to the arrangement of divine witnesses in the treaty of the king Muwatalli and Alakšandu of Wiluša, likely indicates the situation in the early phase of Muwatalli's reign, in which Šamuḫa had the role of a secondary capital and Ḫattuša was still the capital of the Empire.[10]

It has been assumed that there were strategic and military reasons behind the decision to transfer the capital. The Kaška tribes had previously attacked Ḫattuša and there were raids against different sites in the north.[11] Political and military developments in Syria may thus also have been an important factor, as Tarḫuntašša would be a geographically more convenient base than the ancient Hittite capital for launching his campaign into Syria. It would also have been a more central base for Muwatalli's kingdom, as his father Muršili II conquered the western regions of Anatolia. Furthermore, the massive movements of the kingdom's troops and other military resources to Syria for the confrontation with Egypt would leave the ancient capital dangerously exposed to the enemies in the northern regions, particulary the Kaškans. South-Central Anatolia was part of a network, connected by land and sea routes, which placed this region at the center of southern and western peripheries and could help to provide the large amount of economic resources required to establish a new capital.[12]

Other scholars, however, have mentioned the unprecedented wave of new foundations of ancient capitals throughout the Near East, comparing it to the Amarna reform led by the pharaoh Akhenaten in Egypt.[13] In doing so, they cast considerable doubt on these earlier assumptions. The Kaška people were not a threat to the Empire at this moment, in particular when Muwatalli had gathered a significant army. These scholars have also pointed to the immense impact of the plague on the Land of Ḫatti during the rule of Muwatalli's grandfather and father, the struggle with the armies of Egypt and Muwatalli's

monument with Luwian inscriptions at Hatip confirms that this polity included at least parts of the Konya plain (Harmanşah 2017, 41). The most recent study by Massa *et al.* (2020) places the kingdom of Tarḫuntašša in the Konya-Karaman plains.

4 Otten 1981, 11.

5 Singer 2006, 42.

6 Košak *et al*. 2020, CTH 76 B.I, 1–2.

7 Košak *et al*. 2020, CTH 381; Taracha 2007, 758.

8 García Trabazo (2019, 183–184) points that the weather god *piḫaššašši* could be addressed by the king as an intermediary figure between the people and the gods.

9 Kp 14/95+, also known as 'Šamuḫa tablet', which dated most probably from the reign of Ḫattušili III, offers a detailed account of the offerings for these three gods of the town: the Storm-god of Lightning, the Sun Goddess of Arinna and an unattested 'glorious Sun Deity of the Field' (Cammarosano 2018, 382, 384–400).

10 Staatliche Museen zu Berlin 1923, No. 45++ (KUB 6.45++) i 50-56.

11 Bryce 2003, 91; 2005, 231.

12 Matessi 2018, 146.

13 Singer 2006; Tatišvili 2010; Singer 2011c.

conflict with the queen Danuḫepa.[14] This theory is based on the possibility that all these enduring conflicts and pressures resulted in a deeper sense of penitence and piety in Muwatalli. This emerging piety had culminated in prayers and seals in which the Storm-god *piḫaššašši* gained a more prominent position in the Hittite pantheon.[15] Although his prayers assigned a more important position to his personal deity than to the traditional gods of the Hittite pantheon, there is nothing in the texts to prove that Muwatalli introduced any religious reforms comparable with those of Akhenaten.

Muwatalli's decision to transfer his capital to Tarḫuntašša certainly had the effect of partitioning the Hittite Kingdom. The northern part of the kingdom, including much of the homeland, was now directly ruled by his brother Ḫattušili.[16] There is no doubt that, from very early in Muwatalli II's reign, his brother Ḫattušili had exercised considerable power within the Hittite Kingdom and that, shortly after his accession to the throne, Muwatalli had conferred upon his brother the position of GAL *MEŠEDI*, Chief of the Royal Bodyguards.[17]

Along with the appointment as GAL *MEŠEDI*, the king made his brother governor of the Upper Land.[18] This decision was needed not only to ensure the security of the region from the plundering of the Kaškans, but also to maintain Hittite authority in the north while Muwatalli prepared his battle against Egypt. Many of the former Hittite settlements located in this region consisted of underpopulated or abandoned towns, partly inhabited as well by Kaška settlers. Muwatalli assigned the whole region to Ḫattušili, with the purpose of repopulating the settlements and establishing a Hittite population in areas where there was a considerable Kaškan presence.[19] Muwatalli also conferred upon his brother the status of king in the Land of Hakpis. The location was strategically important, as it was located on the route from Ḫattuša to the holy city of Nerik, which was in Kaškan territory, and had served as an important administrative center.

Although the sources before Ḫattušili III are very scarce, the discovery of two seals of Urḫi-Teššub with the title of *tuḫkanti*, the crown prince, suggests that he was appointed as his father's heir before his death.[20] His ascension to the throne would therefore not depend solely on the support of Ḫattušili III, as is indicated in his 'Apology'.[21] The *Umarmung* seal, which belonged to Urḫi-Teššub as *tuḫkanti,* depicts the crown prince being embraced by the god Šarruma, the son of the god *piḫaššašši*.[22] This seal shows that Urḫi-Teššub was recognized as his father's heir presumptive while the latter was still alive. Consequently, as a crown prince, he could be associated by official propaganda with the god Šarruma, who in the Hurrian pantheon, in Anatolia, became the 'Calf of Teššub'.[23]

At this time, Urḫi-Teššub had acquired a prominent position in the government of his father. Although it has been suggested that he was a co-regent, the textual data are silent on this matter and it suggests

14 Singer 2006, 39.

15 The god Tarḫunta was the main god of the Luwians. Unlike other weather gods, his chariot was pulled by horses. One of his most represented forms was with the epithet *piḫaššašši* ('of the thunderbolt') (Hutter 2003, 222–223).

16 Singer 2011b, 623–624.

17 The GAL *MEŠEDI* was the commander responsible for the personal safety of the Hittite Great King and had at his disposal troops who were not under the direct command of the king. As a result, this title was the highest rank within the military hierarchy and it was usually reserved for those belonging to the royal family; see: Bilgin 2018, 97–116.

18 Singer 2011b, 597.

19 Bryce 2005, 232.

20 Found in the archive of Nişantepe, his name appears on almost 600 *bullae* (Neve 1992, 54; Houwink ten Cate 1994, 235).

21 Forrer 1920, No. 12 (KBo 4.12), 20–21.

22 Singer 1996, 188; Hawkins 2001, 170. The iconography of the *Umarmung* seal shows a deity (at first, a tutelary deity) embracing a king, who is depicted as a small figure; see Hawkins 2001, 172–175, 186; Herbordt *et al.* 2011, 96–97. On Šamuḫa as tutelary deity of Tudḫaliya IV see Tatišvili 2019.

23 Taracha 2008, 747–748.

only that he had more power to intervene in matters that were normally under the jurisdiction of the Great King.[24] CTH 79 makes clear that some of his decisions brought him into conflict with his father and with members of the Hittite elite.[25]

These major conflicts also included the exile of the queen Danuḫepa.[26] The reasons for her banishment from the court are still unclear, though it has been alleged that she tried to put her son on the throne.[27] Instead, it is more reasonable to think that the main reason was her opposition to the changes in the Hittite cult led by Muwatalli**.** Her role as the leader of the northern elites, specifically the elites from the cultic centers of Ḫattuša and Arinna, as priestess of the Sun-goddess of Arinna, and as the second most powerful person of the Hittite Empire regarding cultic matters, after the Great King, would have conferred upon her the position of leader of the elite faction that opposed the changes instituted by Muwatalli.

Urḫi-Teššub was forced to judge the legal case between the queen and his father.[28] His reluctance to position himself against the queen seems to indicate his exposure to her circle, which reinforces the possibility that this conflict would have been rooted in the change in the organization of the cult, and not solely in the question of succession to the Hittite throne. This affair, as well as other decisions made against his father's wishes, seem to suggest that Urḫi-Teššub moved into an enviroment hostile to Muwatalli.[29] They also suggest that he would go on to make a decision against his father's vision and policies, which led to a strained relationship between them. In this context, it is also noteworthy that Muwatalli changed the decorative style of his royal seals after the expulsion of the queen Danuḫepa from the palace. Afterwards, the king adopted the *Umarmung* style seal, in which Muwatalli is shown being embraced by his god, the Storm-god *piḫaššašši*.[30]

The texts provide no information about Urḫi-Teššub's place of residence during the reign of his father in Tarḫuntašša, but since hostilities had arisen with his father and since his political views were more in accordance with those his uncle of Ḫattušili III, he might have sought his residence in Ḫattuša.[31]

During this time, only three texts belonging to Ḫattušili III provide information on Ḫattuša. The first, CTH 87, informs that the capital was placed under the authority of the chief scribe Mittannamuwa.[32] It seems that the scribe and afterwards, one of his sons, continued to govern the city until the restoration of the capital by Muršili III. However, Ḫattušili maintained a close relationship with him and his family, as attested in CTH 87. The prayers of Ḫattušili, CTH 383, and of queen Puduḫepa, CTH 384, to the Sun-goddess of Arinna emphasize that Ḫattušili could have accepted more attractive offers from his brother but instead chose Nerik.[33] This proves that Ḫattušili did not rule over Ḫattuša during the transfer of the capital to Tarḫuntašša.[34] However, it is uncertain whether Muwatalli would offer the opportunity to rule over Ḫattuša to his brother, as this could easily create a faction against him.

[24] Cammarosano 2009.
[25] D'Alfonso 2014, 218.
[26] Cammarosano 2010. Güterbock (1940, 11–16) identifies her as the the wife of Muwatalli's father Muršili II.
[27] Houwink ten Cate 1994, 240–243; Van den Hout 1998, 50; Cammarosano 2009.
[28] Sturm and Otten 1929, KUB 31.66(+) III 3′–23′.
[29] Other measures that nullified his father's decisions once he became the Great King were the restoration of Bentešina in the throne of Amurru and the rehabilitation of the son of Manapa-Tarḫunta, who were exiled by Muwatali II as it is attested in in Goetze 1928, No. 33 (KUB 21.33).
[30] Singer 2006, 39–40.
[31] D'Alfonso 2014, 219.
[32] Singer 2011b, 624.
[33] Goetze 1928, No. 19+ (KUB 21.19+) iii 9′–11′.
[34] Singer 2011b, 626.

Muršili III

After the death of Muwatalli, the crown prince Urḫi-Teššub was crowned as Muršili III. Shortly afterwards, he transferred the capital and the cultic images of the gods back to Ḫattuša. The sources do not reveal where the new king was crowned. The coronation could have taken place in Tarḫuntašša before the capital was transferred. Alternatively, he could have been enthroned by his uncle Ḫattušili in Ḫattuša and restored the capital only later.[35] In both scenarios Ḫattuša again became the Hittite capital and queen Danuḫepa returned to the court, as is shown by several seals in which the queen appears next to Muršili III.[36]

Indeed, Muršili III may have been under pressure to reinstate Ḫattuša as the capital, and probably did so partly to strengthen his position on the throne, as his own influence on the elites was very fragile. Ḫattušili's 'Apology' shows that his uncle would have encouraged the transfer, and most members of the royal family seem to have approved as well. Instead, the transfer of the capital back to Ḫattuša caused a great opposition among the new elites of Tarḫuntašša and all those participating in their network, as they were loosing a great part of the privileges that Southern Anatolia had gained when Muwatalli settled the capital there. The new king, Muršili III, reinstated the state and dynastic deities either in their old temples in Ḫattuša, which had been abandoned for over a decade, or in new temples built by him. Architectural changes at Ḫattuša, especially in the royal citadel, visible from this time, could have been started already during his reign.[37]

Shortly after the restoration of the capital, confrontations began between Muršili III and his uncle Ḫattušili, who recorded this in his 'Apology'. When Muršili intended to take away the title of Chief Scribe from the son of Mittannamuwa, Ḫattušili's intervention on behalf of the scribe's family made evident the power which he exercised over the king.[38] Soon after, Muršili III started to curtail Ḫattušili's jurisdiction and influence, taking Nerik and Harpis from him, until the latter revolted and usurped his nephew's throne. The civil war took place in the domains of Ḫattušili and therefore resulted in a great advantage for him.[39] The war ended with the enthronement of Ḫattušili and the exile of Muršili III in Nuḫašši, in Northern Syria,[40] where Ḫattušili assigned some fortified towns to him.[41]

Ḫattušili III

Ḫattušili's attitude towards his brother and nephew is expressed in the prayer to the Sun-goddess of Arinna.[42] In this prayer, Ḫattušili presented the offences that his father Muršili II, his brother Muwatalli and his nephew had committed against the Sun-goddess of Arinna and the deities of her circle. He also distances himself from the deeds of his predecessors, especially those of his brother. This attempt to distance himself from Muwatalli's deeds, as well as from his personal god, is made clear in his avoidance of naming the latter. Instead, he refers to him, merely as a 'deity' or by the epithets of 'great' for the

[35] D'Alfonso 2014, 220–221.
[36] Hawkins 2001; Herbordt *et al.* 2011, 97–98.
[37] Taracha 2008, 749.
[38] Forrer 1920, No. 12 (KBo 4.12), 24–26.
[39] Muršili III had the aid of Manapa-Tarḫunta and Kupanta, king of Mira; Ḫattušili had the aid of the northern elites, the king Masturi of the Seḫa River Land and also of some Kaška people of the Upper Lands (Bryce 2005, 287).
[40] Houwink ten Cate 1974, 137.
[41] Muršili III later fled to Egypt, where he briefly stayed in the court of the pharaoh Ramesses II before his escape to some Hittite vassal states in Syria, where he took refuge from his uncle.
[42] Košak *et al.* 2020, CTH 383.

international correspondence and ‘evil’ in the local propaganda. All of these efforts were aimed at consigning the deity to oblivion.[43]

A progressive decrease of the political and historiographical cuneiform texts can be observed starting from the end of the reign of Muršili II and very few political documents from the reigns of Muwatalli II and Muršili III remain. At the beginning of Ḫattušili III’s reign, the historical and political documents show a change compared to the earlier texts, both in the external form and in the political program they display. There, the king presents himself as being favored by the gods: the one chosen by the gods for the well-being of his people and of the dynasty.[44] Therefore, lacking the legal rights of succession to the Hittite throne, Ḫattušili appealed to the authority conferred by a supreme deity. In addition to these changes, the textual genre of the Annals was progressively abandoned, as the hieroglyphic inscriptions became the privileged medium for communicating the royal ideology during the final period of the Hittite Empire.[45] Instead, in the cultic sphere, Ḫattušili returned to the traditional multiplicity of territorial deities. Hittite theology during his reign had a marked feminine inclination, possibly a reflection of the great influence of the queen Puduḫepa. Consequently, the great goddesses and their sons reappeared in the front line of the Hittite pantheon, with a strong tendency towards syncretism.[46]

Along with his own enthronement, Ḫattušili appointed Kurunta as king of Tarḫuntašša, now a third viceregal state along Karkamiš and Aleppo.[47] According to most scholars, Kurunta was Ulmi-Teššub, probably a first rank son of Muwatalli, who, due to his young age, did not ascend to the throne after his father’s death and was raised by his uncle Ḫattušili.[48] Muwatalli’s motives for giving his son to his brother are still not clear, some scholars suggest that Danuḫepa was his mother and the son was taken by Ḫattušili after her banishment.[49] The document KUB 21.37 is a loyalty oath decreed by Ḫattušili to the people of Ḫattuša in which the new king claims that Ulmi-Teššub was in no way involved in the offences of Muršili III and requests the loyalty of the congregation to Ulmi-Teššub along with his own descendants.[50] This text would show the ambitions of Ḫattušili, who gave Tarḫuntašša to Kurunta, the most likely legitimate heir to the Hittite throne, and secured the kingship of Ḫatti for him and his son.

Tarḫuntašša during the last decades of the Hittite Empire

Later, during Tudḫaliya IV’s reign, a treaty was established between Kurunta and his cousin, the Hittite king. The treaty preserved on the so-called ‘Bronze Tablet’, CTH 106, extends the borders of Tarḫuntašša, and contains many reciprocal clauses typical of parity treaties.[51] It also mentions the possibility that Kurunta could enter Muwattalli’s mausoleum and perform the offering rites to the late king, which

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43 Tatišvili 2010, 359.

44 Balza and Mora 2011, 216.

45 Balza and Mora 2011, 216–217.

46 Singer 2006, 45.

47 Bryce 2007, 120.

48 Goetze 1928, No. 37 (KUB 21.37; Košak *et al.* 2020, CTH 85.2). On the development of Tarḫuntašša, see Singer 2011a; Cammarosano 2010. There is no a consensus about Kurunta’s genealogy. According to van den Hout (1989), Ulmi-Teššub was a successor of Kurunta in Tarḫuntašša. However, according to Bryce (2006, 5), Kurunta was a second-rank son of Muwatalli II. Houwink ten Cate (1992; 2006) identifies Kurunta with the ‘elder brother’ of Tudḫaliya IV, who at first had been designated *tuḫkanti* but was removed from his position, as stated by the Bronze Tablet. According to this interpretation, Houwink ten Cate (2006, 110, 112–114) re-examined the oracle inquiry published in Staatliche Museen zu Berlin 1922, No. 24+ (KUB 5.24+; Košak *et al.* 2020, CTH 577) and proposed that Ḫattušili III would have revoked the *tuḫkanti* title from Kurunta and presented it to his other son, Tudḫaliya.

49 Singer 2011a, 642–643.

50 Singer 2011b, 628–633.

51 Košak *et al.* 2020, CTH 106; Beal 1993, 29; Hoffner 2000, 100.

could restore Kurunta to the status of Muwattalli' son. One of these clauses establishes the equality between the kings of Tarḫuntašša and Karkamiš, stating that only the Hittite king and the heir to the Hittite throne stood above the kings of both appanage kingdoms.[52]

Although the treaty of the Bronze Tablet ensured Kurunta's fidelity to the Hittite king, the Hatip rock inscription reveals that Kurunta, later in his reign, openly claimed the title of Great King for himself.[53] The inscription 'son of the Great Muwatalli, Great King, Hero' proves his parentage. Its use of the title of Great King suggests the possibility that he revolted against the authority of the Hittite king.[54] Moreover, two seals found in the Nişantepe archive document Kurunta's use of this title.[55]

During the reign of the last Hittite king, Šuppiluliuma II, Chamber 2 of the SÜDBURG, at Ḫattuša, records a successful campaign against Tarḫuntašša. This implies that this kingdom was no longer under the rule of the Hittites.[56] One of the reasons that the SÜDBURG inscription was dated to the reign of Šuppiluliuma II was the apparent mention of the city of Tarhuntašša. However, this assumption is not accepted by all the scholars, Klinger states that the SÜDBURG incription belongs to the king Šuppiluliuma I, according to the archaizing writing of some of the signs that compose the king's name.[57] Weeden examined the equation TONITRUS(URBS) with Tarhuntašša, concluding that TONITRUS(URBS) could be a reference to any local cult of the Storm-god, excluding only those places which are known to have a regular hieroglyphic writing. Furthermore, Weeden examined the main arguments of both positions. Based on newer readings of the NİŞANTAŞ hieroglyphic inscription, he securely dated it to the reign of Šuppiluliuma II. This supports the notion that the SÜDBURG inscription is from the same period.[58]

In the Tarḫuntašša land itself, the complex of KIZILDAĞ 4 describes the conquest by a king named Ḫartapu, a son of Muršili, of the west and north-west borders from Tarḫuntašša. Ḫartapu was considered to be the successor of Kurunta, or even of Muršili III,[59] until the recent discovery of the inscription TÜRKMEN-KARAHÖYÜK 1 (TKH 1), a Luwian hieroglyphic inscription that relates the conquest of Phrygia by a king named Ḫartapu.[60] With this new discovery, a recent comparison of the inscriptions in which the king Ḫartapu is attested (KIZILDAĞ 1, 2, 3, 4; KARADAĞ 1; and BURUNKAYA) with TKH 1 concluded that both KIZILDAĞ 4 and TKH 1 inscriptions belong to the same period. The same study suggests that the king Ḫartapu named in these inscriptions ruled over an unattested Iron Age Kingdom, the capital of which was located at Türkmen-Karaköyük, during the first half of the 8th century BC.[61] Once the cult of the Storm-god of Lightning was established in Tarḫuntašša, it spread to other areas of Anatolia. On the 18th day of the AN.TAḪ.ŠUM festival, the Storm-god of Lightning, here Hurrianized, was celebrated alongside the Sun-goddess of Arinna. The cult also seems to have enjoyed a certain revival during Tudḫaliya IV's reign.[62]

[52] Mora 2003, 290–291; De Martino 2016, 96.

[53] Bryce 2007, 123.

[54] Giorgieri and Mora 2010, 144.

[55] De Martino 2016, 96.

[56] Melchert 2002.

[57] Klinger (2015, 103–104) has referred to the style of the sign *lu* (L 186) on the SÜDBURG as resembling that used on the seal of Lupakki (BoHa 19.207), an official from the time of Šuppiluliuma I. However, as Weeden (2020, 478) notes, the sign in this form could still be used in the time of Šuppiluliuma II.

[58] Weeden 2020, 483–485, 487–489.

[59] Jasink 2001a, 238; 2001b, 54.

[60] The TÜRKMEN-KARAHÖYÜK 1 (TKH 1) inscription was discovered in 2019 by the Turkmen-Karahoyuk Intensive Survey Project (TISP), a sub-project of the Konya Regional Archaeological Survey Project (KRASP).

[61] Goedegebuure *et al*. 2020.

[62] Archi 2015, 21.

Conclusions

In summary, there is no consensus on Muwatalli's motives for transfering the capital of the Hittite Empire from Ḫattuša, but there are two main hypotheses: the threats to the capital and the military expansion to Syria; and the internal problems and disagreements among the Hittite elites, including the plagues that lead to Muwatalli's increased piety towards the gods, especially his personal deity. There is no possible comparision with the reforms of the pharaoh Akhenaten. It is clear that Muwatalli's reign produced some artistic innovations, as in the seals in which he appeared embraced by the deity, but this is hardly commensurable to Akhenaten's reforms. Aside from the creation of a new capital, there are no other parallels. Muwatalli continued to promote different cults, especially in the Lower Lands.

There is no doubt that choosing the Lower Lands, a Luwian region, along with a deity with a Luwian epithet, clearly show a Luwian orientation of this king. They also show a greater involvement in the Hittite cultural and cultic spheres, which could be another possibility for the settlement of a new capital there. Along with the efforts by king Muwatalli to favor Southern Anatolian traditions, it is known that queen Puduḫepa who is described as a 'daughter of the Land of Kizzuwatna, beloved of the goddess Ḫebat' in the Fraktın relief, also promoted and spread the Kizzuwatnean cults.

Although the texts from the reign of Ḫattušili III explain that the transfer to Tarḫuntašša was due to the king Muwatalli's piety towards the Storm-god *piḫaššašši*, it may be partly explained by the fact that Muwatalli sought the help of his personal god against his confrontation with Egypt, drawing away from the traditional deities of the Hittite pantheon, especially Teššub, who punished the country for the sins of his ancestors, Šuppilulima I had broken the treaty with Egypt and attacked the borders after his son's death. Although Muwatalli had more affinity with the South-Eastern cults, this region also offered him a more central position to control the expanding Hittite Empire and maintain a closer distance and communication with the problematic southwestern regions, which the situation of Ḫattuša in the north did not provide.

The propaganda to delegitimize the reign of Muršili III led by Ḫattušili is evident in the 'Apology'. The later king never called his nephew by his throne name, although it seemed that Ḫattušili always respected his nephew's legitimate rights to the Hittite throne. He also drew upon his injustice toward him and especially his defiance towards the deities as justification for his *coup d'état*. His revolt against his nephew initiated an unstable period in the country, which led to noble families taking sides with Muršili III or with him. Moreover, after his own enthronement he refused to include Kurunta in the royal lineage for the succession, taking the Hittite throne again from the rightful heir. In the document, Ḫattušili emphasizes to the gathered Hittites that he took good care of Kurunta, and generously gave him the land of Tarḫuntašša. Thus, Kurunta had to leave the Hittite throne to him and his son. This led to a situation in which his son Tudḫaliya IV had to face further dynastic problems, as his cousin Kurunta claimed his throne and most probably had to suffocate a revolt promoted by him.

The fact that the city of Tarḫuntašša has not yet been found makes it difficult to judge the impact of this reform on the Hittite cultural and political spheres. Without the archaeological record of the city of the 'Storm-god of Lightning' (*piḫaššašši*), and especially without its archives, the textual data concerning this period come mostly from Ḫattušili III, whose clear intentions to justify his actions and to legitimize them by appealing to the command of the goddess Ištar cause several difficulties in evaluating the validity and truthfulness of his reports. In any case, Tarḫuntašša's ephemeral position as capital was not an impediment to a great relevance on its own. The city, later achieved an autonomy that allowed its kings to revolt against the Hittite Empire, and even survive it.

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Dual Narratives: Collapse and Transition at the End of the Late Bronze Age

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Abstract

The ‘collapse’ at the end of the Late Bronze Age (LBA), *c.* 1200 BC, in the Eastern Mediterranean, is traditionally considered an end point. Before it, the LBA cultures flourished, traded, and constructed great monuments. After it, once major cities were destroyed and abandoned, trade dwindled and writing disappeared, bringing on a ‘Dark Age’. However, is this all there was to the end of the LBA? This paper will explore two themes relating to the LBA ‘collapse’. The first is the evidence which does not fit into a narrative of dramatic collapse. This ranges from a lack of destruction in the Levant and Cyprus to sites which flourished during the ‘Dark Age’, all of which conveys a more protracted and less violent transition to the Iron Age. The second theme of this paper is to explore the devastating events which did occur such as the destruction and abandonment of Ugarit and Emar. The aim is to examine how both sets of data can be integrated into a holistic interpretation of this transition, focusing on both the ‘good’ and the ‘bad’ to avoid the pitfall that in speaking of transition the negative aspects of collapse are overlooked or minimized and vice versa.

Keywords

Collapse, Transition, Late Bronze Age, Destruction, Trade

Introduction

The end of the Late Bronze Age (henceforth LBA) in the Eastern Mediterranean *c.* 1200 BC is often seen as a time of violence, disasters, and collapse. Once mighty empires such as the Egyptian New Kingdom and Hittite Empire came crumbling down. Warfare brought on by the Sea Peoples or disenfranchised population groups ravaged cities while earthquakes helped to bring down once monumental palaces and temples. Trade which had flourished during the LBA was brought to a halt with the collapse of these mighty empires and by the destruction of once great trading centers such as Ugarit. The picture painted is typically a bleak one as the time surrounding the year 1200 BC is often referred to as the ‘Crisis Years’ and the following 200 years after it as a ‘Dark Age’.[1] Indeed, as one prominent archaeologist has recently summarized the situation for the end of the LBA, ‘Archaeologists and historians speak somewhat cavalierly of destructions... But it was not just sites that were destroyed... it was people, their

[1] See for example: Bachhuber and Roberts 2009; Cline 2014; Drews 1993; Fischer and Bürge 2017; Gitin *et al*. 1998; Killebrew and Lehmann 2013; Knapp and Manning 2016; Nur and Cline 2000; Oren 2000; Ward and Joukowsky 1992.

lives lost or shattered. Thousands might have been slaughtered, thousands of others made refugees or homeless.'[2]

This stark picture of doom, destruction, and collapse, however, is only one side of a two-sided coin. Not all was terrible at the end of the LBA and much of the evidence for destruction and collapse has been exaggerated, as there were regions which flourished after 1200 BC. The purpose of this paper is to explore both themes, that is, transition and collapse, to better understand how both sets of data can be integrated into a holistic narrative of what did and did not transpire at the end of the LBA in the Levant and on Cyprus. For the narrative of transition, I will demonstrate that there was less destruction than typically assumed, that in some regions there was a flourish rather than a decline, and that not all trade disappeared at the end of the LBA. On the other hand, for the narrative of collapse, I will present several destruction events which speak to a rapid loss of complexity, as might be expected in a collapse scenario, as well as evidence for crisis in the Levant and Cyprus. Finally, after examining the evidence for both narratives, I will lay out several suggestions for how we might join these two data sets into a better understanding of what ensued at the end of the LBA in the Levant and Cyprus.

Narrative of transition

Destruction plays a critical role in the various interpretations for the end of the LBA in the Eastern Mediterranean.[3] However, even though destruction functions in such a crucial interpretive role, there has a been a systematic exaggeration of just how much destruction took place *c.* 1200 BC. Indeed, an astonishing 52% of destruction events from the Levant and Cyprus cited as having occurred *c.* 1200 BC did not take place.[4] This is for three reasons: destruction events have been misdated; sites were assumed destroyed based on theoretical assumptions or insufficient evidence; many sites were simply falsely cited as destroyed even though there is no empirical evidence that the sites were destroyed nor is there a claim of destruction by the excavators.

Misdated destructions

Several destruction events have been associated with the end of the LBA even though the destruction events occurred either well before or well after 1225–1175 BC. In Syria, both Hama and Qatna were destroyed in the 14th century BC, with no evidence of destruction *c.* 1200 BC.[5] However, both can be found cited as destroyed *c.* 1200 BC.[6] The same can be said for Hazor, which suffered a destruction event *c.* 1250 BC.[7] Other sites often found listed as destroyed *c.* 1200 BC had destruction events well after 1200 BC, such as Lachish Level VI, Tel Azekah, and Beth-Shean, all of which experienced a destruction event after 1150 BC.[8] These destruction events have been chronologically compressed to fit into a 1200 BC mold despite the fact that they occurred well outside of what is typically considered the end of the LBA.

[2] Dever 2017, 105.
[3] See for example: Cline 2014, 102–138. Drews 1993, 8–32; Knapp and Manning 2016, 123–134.
[4] See for complete details: Millek 2017; 2018a; 2018b 2019a; 2019b; 2019c; 2020; forthcoming.
[5] Fugmann 1958, 126, 134, 141–143, 146–147, 149, 275; Pfälzner 2007, 42–43; 2012: 774, 778–779; Morandi Bonacossi 2013, 119–121. See the discussion in Millek 2019a, 165.
[6] Drews 1993, 14, 221; Cline 2014, 110–111, Fig. 10.
[7] Ben-Tor and Zuckerman 2008.
[8] Millek 2018a, 8–11; 2018b, 284–288; 2019b, 125–127.

Assumed destructions

Another issue with destruction at the end of the LBA is that many destruction events were assumed to have taken place even when no evidence had been uncovered in the archaeological record or what evidence of 'destruction' was found was so minimal it does not constitute a destruction event. For example, Stern stated that Tel Dor was destroyed by invading Sea Peoples based on his theoretical leanings; however, as he himself noted, 'The Bronze Age stratum of destruction at Tel Dor **has not yet been reached.**'[9] Here the theory dictated that a destruction event should be uncovered at Dor even though no physical evidence of an end of the LBA destruction has ever been discovered.[10] At other sites, the presence of limited amounts of ash or debris were assumed to represent vast destruction events. For example, at Tell es-Safi/Gath, some restorable pottery on a floor was assumed to be evidence of a possible violent destruction. However, this was not enough evidence to assume the site was destroyed, and further excavations at the site have demonstrated that there was no destruction *c.* 1200 BC.[11] The same can be said for Tell Tweini which had a destruction attributed to the Sea Peoples. However, in the few loci where ash was uncovered, it only ranged in thickness from 2–15 cm while other debris initially assumed to be evidence of a destruction event was in actuality Iron II fill resembling destruction debris.[12] At Tell Tweini, there is no substantial evidence that the site was destroyed *c.* 1200 BC. This is true for several other sites where minimal evidence has been maximally interpreted, creating destruction events where none exist in the empirical archaeological record.[13]

False destructions

The final type of false destructions are false citations, which are the most pernicious of the group. Sites have been added to lists or maps as destroyed to act as evidence of the supposed vast destruction horizon *c.* 1200 BC. Yet, there is no evidence of destruction nor is there any claim by the excavators that the site was destroyed. One such example is Tel Batash, which has been repeatedly cited as destroyed.[14] Yet the excavators clearly state that, 'Stratum VIA, and thus the Late Bronze phase [at Tel Batash], appears to end peacefully.'[15] The same can be said for ᶜAfula, which is cited as destroyed *c.* 1200 BC even though the LBA settlement has yet to be uncovered.[16] Tel Michal has also been claimed to have been destroyed *c.* 1200 BC;[17] however, the site was abandoned at the end of the 14th century BC without destruction and was not resettled for another 300 years.[18] On Cyprus, Kition has been ascribed a destruction;[19] however, neither is there evidence of destruction nor have the excavators ever claimed that the site was destroyed.[20] Tell Nebi Mend (Kadesh) in Syria has also been cited as destroyed,[21] and yet there is no evidence that the site was destroyed *c.* 1200 BC.[22] How exactly these false destruction events came to exist in the scholarly literature is not entirely clear, but it is unlikely that any of these were added with

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9 Stern 2013, 5 emphasis my own.
10 Millek 2017, 125; Gilboa *et al.* 2018, 28–35.
11 Millek 2017, 125–126.
12 Al-Maqdissi *et al.* 2008, 344; Bretschneider *et al.* 2019, 6; Millek 2019a, 161–162.
13 See Millek 2017; 2018a; 2018b; 2019a; 2019b; 2019c; 2020; forthcoming.
14 Dagan 2004, 2679; Greenberg 2019, 322; Yasur-Landau 2010, 216.
15 Kelm and Mazar 1995, 69.
16 Millek 2017, 120; For a destruction of the site at *c.* 1200 BC see Dever 1992, 100.
17 Stern 2013, 5.
18 Herzog 1993, 1037; Millek 2018b, 275.
19 Cline 2014, 111; Drews 1993, 11; Knapp and Manning 2016, 132.
20 Karageorghis and Demas 1985, 92, 273–275; Millek forthcoming.
21 Cline 2014, 111; Drews 1993, 11.
22 Bourke 2012, 51; 2020; Millek 2019a, 165–166.

ill intent or to purposely falsify how much destruction took place at the end of the LBA. Most likely the reason behind these false destruction events comes down to human fallibility, employing outdated data, or citing other lists and maps of destruction rather than checking the archaeological data to see if these secondary sources were indeed correct.

All three types of false destructions, when put together, demonstrate that there was in fact far less destruction in the Levant and Cyprus than is habitually claimed for the end of the LBA. Therefore, simply from an empirical standpoint, the end of the LBA was less violent and filled with less destruction than is typically assumed. Destruction in general has been exaggerated. This is even true for sites which did suffer a destruction event *c.* 1200 BC. For example, Ras Ibn Hani is cited as destroyed. Nevertheless, out of all the excavated structures only a single building was found burned.[23] This is the case for many other sites which are typically described as destroyed wholesale when in actuality only one or some of the sites' structures were destroyed *c.* 1200 BC.[24]

The flourish of society after 1200 BC

The traditional narrative for the end of the LBA paints a picture where there was widespread societal collapse as well as the sudden collapse of the great empires. However, for several regions this was not the case, and instead these areas went through a period of flourish or at least do not appear to have suffered. It has been well known and documented that the island of Cyprus did not collapse *c.* 1200 BC.[25] Sites such as Kition and Paphos entered into a period of flourish and prosperity, while other sites such as Enkomi and Hala Sultan Tekke maintained positions of prominence until later in the 12th century BC. At Kition and Paphos, monumental structures constructed with ashlar masonry were built after 1200 BC, the period when monumental architecture was supposedly abandoned.[26] Indeed, the LBA on Cyprus did not even come to an end until 1100 BC, some 100 years after the traditional end of the LBA.[27]

Similarly in Syria, it has been known for some time that Carchemish, rather than falling with the Hittite Empire, became the seat of local power as Kuzi-Tešub took up the title of Great King, which had traditionally been reserved only for the Great King in Hattusa.[28] Moreover, despite claims that Carchemish was destroyed, possibly by the Sea Peoples, the site has no evidence that it suffered a destruction event *c.* 1200 BC.[29]

For Lebanon, no sites were destroyed *c.* 1200 BC while sites such as Tyre and Sarepta continued on into the Iron Age without a break in habitation.[30] In the Southern Levant, despite the conventional notion that the Egyptian empire and Canaanite culture collapsed under the weight of the assaults of the Sea Peoples, this was not the case. LBA Canaanite culture continued at several major sites such as Megiddo, Lachish, Tel Azekah, and Beth-Shean well into the late 12th century BC.[31] Likewise, rather than crumbling, Egypt's hold over the region persisted at least until the end of Ramesses III's reign in the mid-12th century BC, if not slightly later, until the reign of Ramesses VI. The collapse of the Egyptian empire was neither sudden nor dramatic. It was a protracted decline over the course of 100 years,

23 Lagarce and Lagarce 2006; Millek 2019a, 160–161.
24 See Millek 2017; 2018b; 2019a.
25 See Karageorghis 1992; Iacovou 2008; 2013; 2014; Georgiou 2011; 2015; 2017.
26 Georgiou 2015.
27 Iacovou 2008, 635–637; 2014, 662–663, 667.
28 Hawkins 1988.
29 Millek 2019a, 167.
30 Bell 2006.
31 Millek 2018b, 284–287.

largely influenced by the troubles and political struggles the Egyptians faced in their own country.[32] Thus, despite the narrative of a dramatic collapse, several regions throughout Cyprus and the Levant either experienced a flourish or no major changes during the so-called 'Crisis Years'.

The continuation of trade after 1200 BC

The last aspect to the narrative of transition that will be presented here is the continuation of trade after 1200 BC, with a focus on tin. Within the narrative of collapse, there is the notion that trade ceased at the end of the LBA. However, archeometallurgical studies from the past 30 years have demonstrated that there was never a drop in the amount of available tin, a non-local metal, in the Levant and Cyprus during the Iron I period.[33] As Yahalom-Mack and Eliyahu-Behar have recently summarized the situation: 'With respect to the question of tin availability for the production of bronze, analysis of 95 copper based artifacts from LB II–Iron II contexts showed that tin-bronze was continuously used and that the average tin (Sn) content (5–6 wt%) was maintained throughout the periods. This supports earlier studies that showed there was no shortage of tin during the transition period... '[34]

What must be recalled here is that tin as a resource has no local sources in the Levant or Cyprus. The exact origin of the Bronze and Iron Age tin is unknown, as it could have been derived from Afghanistan or as far away as Cornwall in England.[35] Nevertheless, the continued presence and use of tin after 1200 BC indicates that trading ventures continued. Tin, no matter its point of origin, had to have been moved by land and sea to arrive in the Levant and Cyprus. The networks which had existed during the LBA did not die at 1200 BC; rather, they remained at least to some degree.[36]

Narrative of collapse

With all that said, the evidence for the narrative of transition is only one side of the coin of what transpired at the end of the LBA. To focus solely on this would diminish the negative events which did occur *c.* 1200 BC. The emphasis of this section will be on some of the more cataclysmic destruction events which did affect the Levant and Cyprus as well as on evidence for crisis throughout the regions.

Destruction

In the narrative of transition, I asserted that there was a 52% error rate in the amount of destruction *c.* 1200 BC in the Levant and Cyprus. However, despite this error, there were still dramatic destruction events which struck the region at this time. One such event is the destruction of Ras Shamra, the capital of Ugarit, *c.* 1185 BC. Nearly the entire site was found burned, except for the *Ville Sud*, a domestic quarter, while weapons of war were found scattered throughout the site. Twenty-five arrowheads were recovered in the *Centre de la ville*, while another thirty-two arrowheads were discovered strewn about the *Ville Sud*. Twelve of these arrowheads were found on the streets and in the open spaces of the area. Along with the arrowheads, two bronze lance heads, four bronze javelin heads, five bronze daggers, one bronze sword,

32 Millek 2018a.
33 See Waldbaum 1989; 1999; Pickles and Peltenburg 1998; Yahalom-Mack *et al.* 2014; Yahalom-Mack and Eliyahu-Behar 2015.
34 Yahalom-Mack and Eliyahu-Behar 2015, 298.
35 Galili *et al.* 2013.
36 For other forms of exchange which persisted after 1200 BC in the southern Levant, see: Millek 2019c.

and three bronze pieces of armor were scattered throughout the houses and streets, showcasing the fight which took place in the city.[37] After its destruction, Ras Shamra was largely abandoned other than by some pastoralists who reused part of the site to keep their animals.[38]

Another site in Syria, Meskéné-Emar, too suffered a destruction sometime between 1187–1175 BC. Only the monumental structures were targeted for destruction and much of the domestic architecture appears to have been emptied and abandoned without destruction. Given that nature and accidents would not specifically target monumental structures while leaving domestic architecture alone, the likely culprit for this destruction was humans. Thus, much like Ras Shamra, the once thriving city of Emar perished by human hands and was afterwards abandoned.[39]

On the island of Cyprus, the small, short-lived, fortified site of Maa-*Paleokastro* was completely destroyed sometime shortly after 1200 BC. Ash and evidence of destruction were found in every area and it appears as if the site was destroyed in an act of violence. Weapons, including bronze sling bullets, arrowheads, and daggers were found scattered throughout the site in open spaces and on a street. While the site was reoccupied shortly after this destruction event, it was subsequently abandoned.[40]

In other instances, such as Ras Ibn Hani mentioned above, while the site might not have been destroyed wholesale as is often reported, part of the site was still destroyed. In this case, the *Palais Nord* appears to have been specifically targeted for destruction by arson, and after this destruction the structure was not rebuilt.[41] This is the situation for other sites which experienced a destruction event *c.* 1200 BC. While it may not be that the site as a whole or even the majority of the site was burned, part of it was still destroyed which would have had a negative impact on the populace.[42]

Crisis, crisis architecture, and abandonment

Destruction was not the only negative situation to affect settlements in the Levant and Cyprus. Several experienced a phase of crisis seen in architectural and functional changes. Monumental buildings at Tell el-'Umayri, Tell el-Fukhar, the Amman Airport Structure, Tel Yin'am, and Kalavasos-*Ayios Dhimitrios* were all used by squatters in their final phase of use.[43] Flimsy walls were built in once magnificent structures, hearths were placed in once sacred spaces, and domestic activates were carried out in buildings which had not been utilized for living prior to undergoing a period of crisis. While the exact nature of the crisis which brought about these changes is unknown, it is clear that all was not well for them *c.* 1200 BC.

For other sites, such as Maroni-*Vournes* or Tel Gerisa, there is no apparent evidence of crisis architecture, nor were these sites destroyed.[44] Rather, they and their monumental buildings were simply abandoned *c.* 1200 BC.[45] There is no clear reason why these once thriving sites were abandoned; however, it is evidence of a collapse on an individual level, even if the reason for this collapse is not well-defined or overly dramatic.

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37 Millek 2020.
38 Callot 2008.
39 Margueron 1975, 68–69; Millek 2019a, 167–169.
40 Karageorghis and Demas 1984, 266; Millek forthcoming.
41 Lagarce and Lagarce 2006.
42 See Millek 2018b; 2019a; 2020.
43 Zuckerman 2007; Millek 2018b; 2019b; forthcoming.
44 Cadogen 2011; Millek 2018b; forthcoming.
45 The same could be said for Kalavasos-*Ayios Dhimitrios* as the site was abandoned prior to its Building X being reused by squatters (South 1996).

Bridging the gap between dual narratives

What is evident from the above discussion is that the narrative for the end of the LBA can be taken in one of two directions, depending on what evidence one chooses to emphasize. One can focus on the evidence which speaks to a period of non-violent transition where some regions experienced growth while trade in a vital commodity continued unhindered. Alternatively, one could concentrate on the massive destruction events, evidence for crisis in once impressive buildings, or the total abandonment of once prospers towns. Both sets of data present distinct narratives; however, these narratives are not mutually exclusive. Transition and collapse can exist at the same time in the same region and the goal that we must strive for is to integrate these two narratives into one cohesive whole. To do this, I offer three suggestions which may help bridge the gap between these two narratives so that we can form a better understanding of what transpired at the end of the LBA *c.* 1200 BC. These three suggestions are: sub-regional perspectives; understanding that in all things there are winners and losers; and maintaining a tighter chronological perspective.

Sub-regional perspectives

One of the issues underpinning the interpretive challenges for what caused the end of the LBA is that often the focus is far too broad. We cannot take a superregional approach such as examining the Eastern Mediterranean or even the Levant as a whole and expect to come up with accurate answers. This approach encompasses vastly different cultures, geography, climates, and regional variations. However, we can also not expect to find answers at the regional level even if we focus on just Cyprus, or the Northern Levant, or the Southern Levant. Here to, the variation between sub regions and even between sites may provide widely different evidence. Take Carchemish and Emar as an example. Both were important sites during the LBA, both are located in the Northern Levant, and both are situated on the Euphrates river. However, despite this, their trajectories were vastly different at the end of the LBA. Carchemish was not destroyed or abandoned, and it became the seat of a Neo-Hittite kingdom. Emar was partially abandoned, had its public and monumental structures burned, and then was completely abandoned. Or as has been recently demonstrated the divergent path which Tell Tayinat took becoming a regional power as well.[46] Therefore, to understand the at times diametrically opposed outcomes we must take sub-regional or even a site by site approach. Only by doing this can we understand what transpired and how this varied between the diverse sites and sub regions of Cyprus and the Levant and why those variations exist.

In all things there are winners and losers

The first point leads to the second, which is that we can expect that in any situation some groups and individuals may experience negative effects from any given set of circumstances, while other groups and individuals will be able to capitalize on these circumstances for their own benefit. Even if there is war, famine, climate change, population movements, or a pandemic while these may adversely affect some, they will prove to be a boon for others. This was true for Paphos on Cyprus. While Maroni-*Vournes*, Kalavasos-*Ayios Dhimitrios*, Alassa *Paliotaverna*, were all abandoned between the end of the 13th and the mid-12th century BC, Paphos took advantage of this situation to grow and flourish during the same time. The same can be said of Carchemish which capitalized on the collapse of the Hittite heartland.

[46] See the discussion in Manning *et al.* 2020; Welton 2020.

If Suppiluliuma II had maintained his position of power in Hatti, there would have been no way that Kuzi-Tešub could have taken up the title of Great King. However, Suppiluliuma II's disappearance and the fall of the Hittite Empire proved to be advantageous for Kuzi-Tešub. In the Southern Levant, while the advent of the Sea Peoples and the Philistines has often been couched in the language of a crisis, for a site such as Tel Miqne-Ekron, it grew substantially larger during the Iron I than its LBA predecessor.[47] If Ras Shamra had been a lead player in the tin trade during the LBA as some have suggested,[48] than some other group must have taken over this trade after the city was destroyed and abandoned benefiting from Ras Shamra's loss. Thus, what must be recalled is that even though there were negative circumstances, politically, socially, and at least in some areas climatically, these need not have been a hindrance to all. There will always be winners and losers, and for the majority of research on the end of the LBA, the focus has been on the losers. However, to have a better understanding of what transpired we must search for who won and how they might have benefited from these adverse situations.

Maintaining a tighter chronological control

The final issue surrounding the end of the LBA to be discussed here is exactly what constitutes the chronological period of the 'end of the LBA'. As mentioned above, the LBA on Cyprus does not end until the 11th century BC. The Egyptian hegemony over the Southern Levant did not end until sometime after the mid-12th century BC, and certain Canaanite centers did not lose their LBA Canaanite characteristics until the late 12th century BC. In the Southern Levant, this situation has in part fed into the debate of what to call the first decades of the 12th century BC, if it is dubbed Iron IA or LB III. Thus, depending on what chronological focus one takes, the 'end of the LBA' can cover as much time as 130 years spanning the years between 1250 through 1130 BC or later.[49] This broad chronological window encompasses a wide variety of events which are not connected temporally.[50] By the time Lachish Level VI was destroyed and abandoned *c.* 1130 BC, everyone involved in the destruction of Hazor was dead, their children were dead, their children's children were dead, and likely their children's children's children were dead. While these incidents are often described as being part of the 'end of the LBA', they are not connected, nor are they part of the same set of circumstances, as entire generations lived and died between these two events. The destruction of Hazor was already history by the time Lachish was destroyed. Moreover, neither event falls within the period traditionally associated with the end of the LBA that is *c.* 1200 BC. Much of this confusion falls under what Puglisi has dubbed the 'Atlantis premise', where temporally displaced events are artificially constricted into one cataclysmic event, similar to what happened to mythical Atlantis.[51] This broad chronological outlook blurs the events surrounding the end of the LBA, as chronologically disparate and unconnected events have been temporally conglomerated into a series of connected events. Rather than maintaining this broad and misleading chronological framework for the end of the LBA we should rather focus on a more rigidly defined and temporally narrow view for the end of the LBA.

I would maintain that the end of the LBA should be defined as the 50 years between 1225 through 1175 BC, that is, as the end of the 13th and beginning of the 12th centuries BC. This reflects the traditional, albeit arbitrary, date for the end of the LBA of *c.* 1200 BC. This encapsulates many of the major historical events which define the end of the LBA, such as the movement of the Sea Peoples, the destruction of

[47] Stager 1995, 346.
[48] Bell 2006; 2009.
[49] Marked by the destruction and abandonment of LBA Hazor *c.* 1250 BC.
[50] This does not even mention the fact that there are wide time frames when many of these texts could have been written and thus when key events could have taken place. See the discussion in Knapp and Manning 2016.
[51] Puglisi 2013, 178.

Ugarit, the destruction of most of the major palaces in Mycenean Greece, and the fall of the Hittite Empire. While the LBA cultural characteristics may have ended later at certain sites such as Megiddo, Lachish, and Beth-Shean, to include the circumstances that brought the LBA cultural at these sites to a close with the 'end of the LBA' masks the fact that for most other regions and sites what would be typically considered the LBA had already ended. This again brings up the point that we must focus on regional and site by site variations, as LBA cultural or political characteristics need not have ended at the same time in all places. However, for scholarly purposes, we must put a limit on what we define as the period of end of the LBA to avoid confusion, and here I would propose that it should be roughly the 25 years on either side of 1200 BC, the already common benchmark for the end of the LBA.

Conclusion

These three suggestions as a method of analysis will certainly not answer all of the questions about exactly what took place at the end of the LBA. No answer(s) can ever be found that neatly ties up all the loose ends for all sites and all regions which suffered or benefited in the years surrounding 1200 BC. Even for a modern event such as the collapse of the Soviet Union, not all questions concerning the break up and collapse of the USSR can be answered.[52] Nevertheless, this focus on sub-regions and individual sites, the search for the winners along with the losers, and the maintenance of a tighter chronological outlook will help to bring us a better if still incomplete knowledge of the events and circumstances which changed the world of the Eastern Mediterranean *c.* 1200 BC.

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[52] Tallberg 1996.

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Do Not Fear the Dark: Change and Continuity in the Amuq Valley (14th–6th Centuries BC)

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Abstract

The transition from the Late Bronze to the Iron Age in the Eastern Mediterranean and the Near East is recognised as a period of major social and historical significance. Despite being at the centre of these changes, the Late Bronze Age II-Iron Age III at Alalakh and in the Amuq valley generally remains poorly understood in terms of chronology and local development. This paper presents the pottery assemblage coming from selected Late Bronze Age II–Iron Age III contexts from the sites of Alalakh and Sabuniye.

Keywords

Pottery, Late Bronze Age, Iron Age, Northern Levant, Amuq

Introduction

In recent years, new excavations and research conducted in the Amuq valley have allowed a better understanding of the events that characterised the Late Bronze Age II and Iron Age in the area.[1] In particular, this paper will provide a summary of the changes that occurred in pottery typology from the Late Bronze Age II to the Iron Age III in the Amuq valley by comparing the material retrieved from the sites of Alalakh and Sabuniye.[2]

The site of Alalakh is located in the Amuq valley, in South-eastern Turkey (**Figure 1**). During the Bronze and Iron Ages a series of urban centres arose in this region, including Tell Atchana,[3] Tell Tayinat,[4] Chatal Höyük,[5] and Tell el-Judeideh.[6] The finding of well-stratified Iron Age deposits is one of the most recent discoveries made at the site of Alalakh. Until very recently, it was thought that the occupation of the site ended towards the end of the Late Bronze Age; Woolley suggested a failed attempt in reoccupying the city during the mid-12th century BC (Level 0).[7] New evidence from Tell Atchana suggests a prolonged period of occupation until the end of the Iron Age I. Here, the Late Bronze Age I settlement was slowly reduced in size during the 13th century BC and was sparsely occupied until the 9th century BC.[8]

1 Yener 2017; Montesanto and Pucci 2019; Pucci 2019a; 2019b; Welton *et al.* 2019; Osborne *et al*. 2019.
2 For Alalakh, see Yener 2017; Montesanto and Pucci 2019. For Sabuniye, see Pamir 2005; 2013.
3 Yener *et al*. 2000; Osborne 2013.
4 Harrison 2009.
5 Pucci 2019b.
6 Braidwood and Braidwood 1960.
7 Woolley 1955, 399, footnote 4.
8 Fink 2010; Montesanto and Pucci 2019; Montesanto 2020a; 2020b; Yener *et al*. 2020.

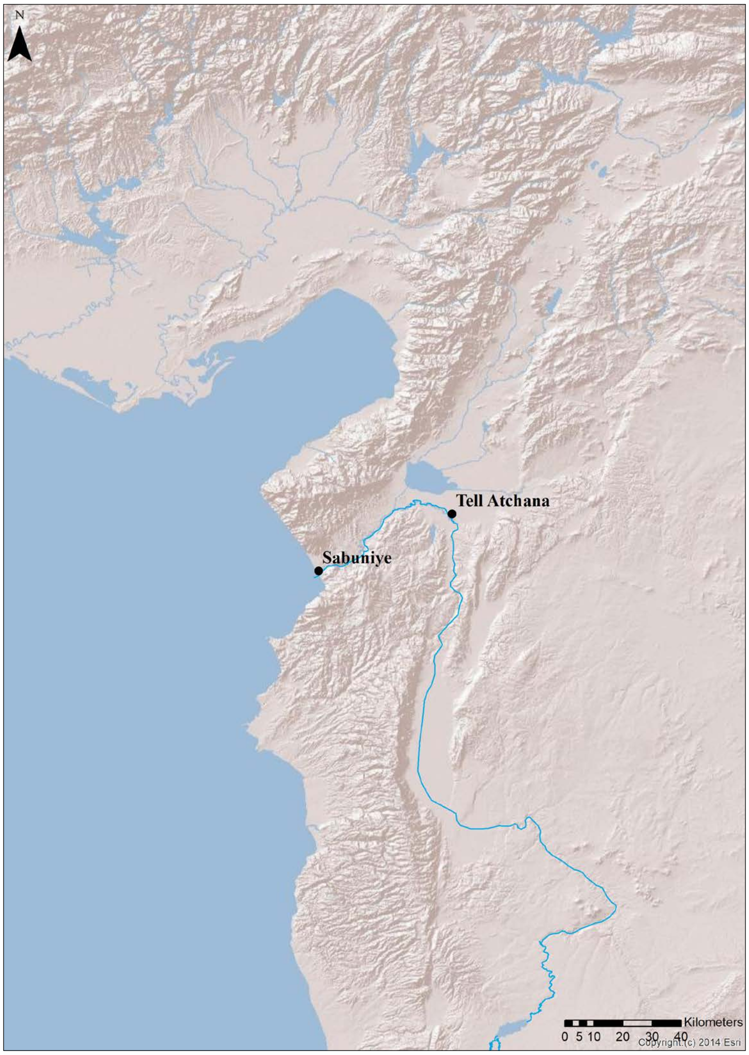

Figure 1: *Location of Alalakh/Tell Atchana and Sabuniye. Created by author using ArcGIS software by Esri; base map: ESRI Topographic Data (Creative Commons), World Shaded Relief, World Linear Water.*

The site of Sabuniye is located in the Orontes delta, close to the Mediterranean sea (**Figure 1**). The site was originally surveyed and briefly excavated by Woolley in 1936, when he conducted a total of three soundings,[9] and it is briefly mentioned in the Al-Mina excavation report.[10] Subsequently, the site was surveyed as part of the Orontes Delta Survey by Prof. Hatice Pamir in 2000 and excavated during 2008, 2009, and 2010.[11] The site is located *c.* 5 km upstream along the Orontes river from the site of Al-Mina.[12] Sabuniye was occupied from the Late Bronze Age II to the Hellenistic period, although the Late Bronze Age levels were not reached during the excavation and evidence dated to the Late Bronze Age II comes from the Orontes Delta Survey and from surface collection.[13] Survey and excavations confirmed that the main occupation of the mound is limited to the southern part of the natural hill, although it is possible that the original occupation included the entire hilltop area. The site is now heavily damaged by cultivation activities and a series of large cuts is visible on the mound. Excavations conducted at the

[9] Woolley 1937.
[10] Woolley 1937, 11–18; 1938, 8–9; Pamir 2005; 2013.
[11] Pamir 2005.
[12] Pamir 2005, 71.
[13] Pamir 2005; 2013.

site of Sabuniye and a recent re-analysis of the pottery material confirmed that the site was occupied at least from the Late Bronze Age II until the Hellenistic period.[14] Generally, evidence of the Iron Age in the Orontes delta is scarce, but there are a number of sites dated to this period,[15] and scholars consider this area to have been politically integrated into the kingdom of Wa/Palastin, later Patina.[16]

The aim of this article is to provide an overview of the changes and/or continuity noticed in the pottery typology from the Late Bronze Age II to the Iron Age II by considering the material retrieved from the sites of Alalakh and Sabuniye.

Historical background

During the Late Bronze Age II, Alalakh was the capital city of the kingdom of Mukish,[17] which was incorporated into the Hittite empire together with other cities such as Aleppo, Carchemish, and Ugarit. It is not clear whether a Hittite ruler was installed in Alalakh after its conquest. However, the discovery of a Hittite orthostat and of a bulla point to the presence of a prince Tuthaliya, probably the nephew of the Hittite king Mursili II.[18] During this period, the site of Sabuniye is thought to have been controlled by Alalakh, which functioned as the main hub for Aegean trade within the region.[19] Survey and excavations carried out at the site have identified material evidence dated to the Late Bronze Age II, but the excavation did not reach any structure.[20]

In general, archaeological evidence dated to the 12th–11th centuries BC, i.e. the Iron Age I, in the Amuq valley is limited to very few sites.[21] At the site of Tell Atchana, only the temple and the surrounding area remained in use until the 10th century BC. However, archaeological findings on the site suggest that it was no longer the most important administrative site of the region. The site was most likely used sporadically during the 12th–10th century BC, while occupation and related activities diminished towards the 9th century BC.[22]

During the 10th–9th centuries BC, i.e. the Iron Age II, the Amuq valley was the seat of the kingdom of Unqi, the capital of which was located in Tell Tayinat.[23] As Osborne has suggested, it may be assumed that the Amuq valley and the Orontes delta were territorially organised on a three-tiered settlement pattern, in which a few secondary sites managed other parts of the valleys.[24]

While the site of Tell Atchana was abandoned during the Iron Age I and only its temple remained in use, it is likely that the site of Sabuniye was politically integrated into the kingdom of Patina during the Iron Age I and into the kingdom of Unqi during the Iron Age II–III. Although it is believed that Al-Mina replaced Sabuniye as the main port for the region during the Iron Age,[25] the archaeological evidence confirms that the two sites co-existed and perhaps formed an integrated functional unit.[26]

[14] Pamir 2013; Lehmann 2005.
[15] Pamir 2005.
[16] Donbaz 1990, 5; Osborne 2013.
[17] Akar 2013.
[18] Yener *et al.* 2014; Niedorf 2002; Yener 2017; Singer 2017.
[19] Pamir 2013; Radner and Valcek 2020.
[20] Pamir 2005; 2013.
[21] Besides the site of Alalakh, Iron Age occupation is attested only at Tell Tayinat (Harrison 2013; Welton *et al.* 2019) and Chatal Höyük (Pucci 2013; 2017; 2019b).
[22] Montesanto and Pucci 2019.
[23] Harrison 2009.
[24] Osborne 2013.
[25] Pamir 2005, 542.
[26] Radner and Valcek 2020, 117.

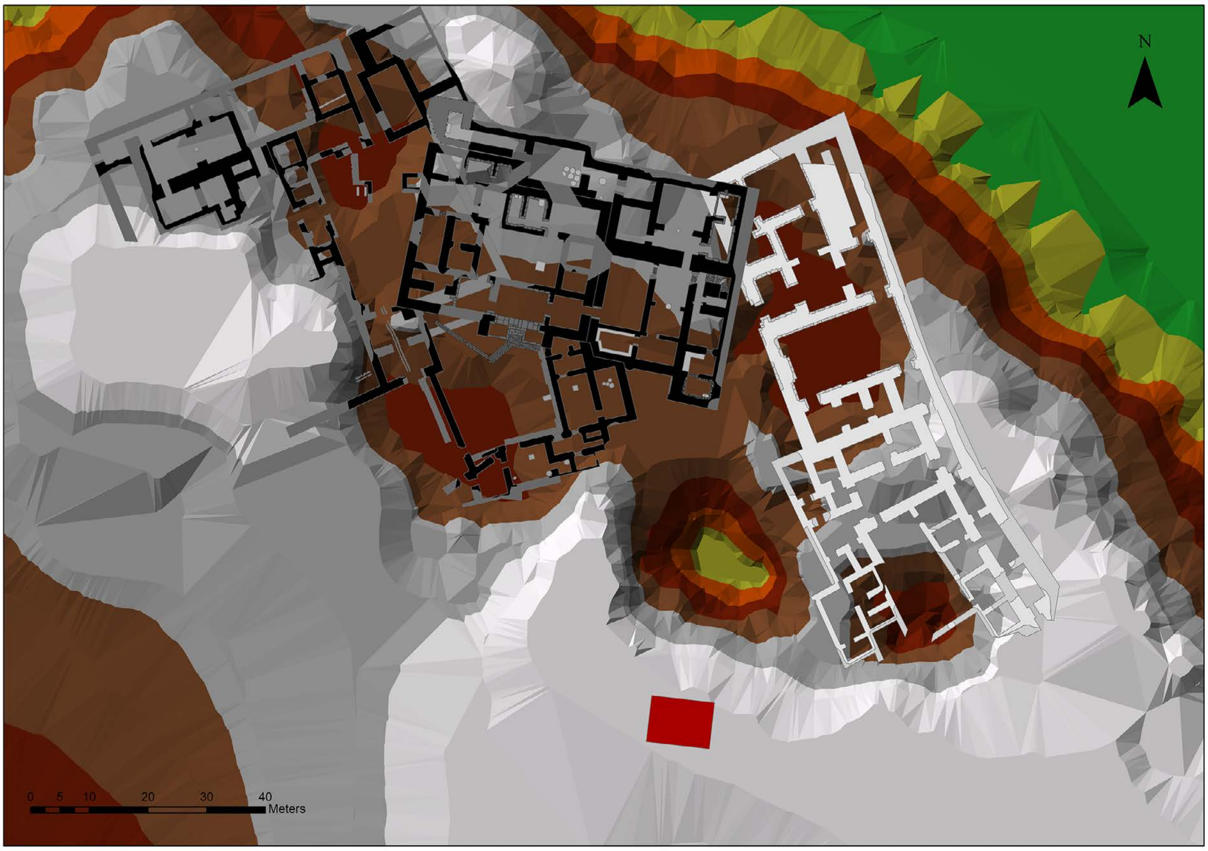

Figure 2: *Alalakh. Location of square 42.10 (red square in the map) (courtesy of Alalakh Excavation Project).*

The transition from the Late Bronze Age II to the Iron Age I at Alalakh

Levels dated to the Late Bronze Age II-Iron Age I transition have been identified in square 42.10 (local phases 4-3) (**Figure 2**). The square is located in Area 1, to the southeast of the so-called 'temple area' first excavated by Woolley.[27]

The occupational phase dated to the end of the Late Bronze Age II begins with phase 4 (**Figure 3**). Phase 4 is placed directly below phase 3, dated to the mid-12th century BC, and can be dated between the 14th century BC and the 13th century BC because of the finding of a burnt bulla and of two sherds dated to the Late Helladic IIIb period.[28]

Architecture belonging to phase 4 can be identified in a mudbrick building consisting of at least 6 rooms with clay floors and silos. Objects retrieved from this building include pottery for food preparation, cooking, eating, and drinking activities as well as ceramic basins, hand-stones, stone bowls, metal strainers, beads, pins, and rings.

The occupational phase dated to the Iron Age begins with phase 3 (**Figure 4**). This is the first occupational phase to be recorded after the 14th or 13th century BC. Phase 3 can be dated to the mid-12th century

[27] Woolley 1955, 89–90, Fig. 2; Yener 2017.

[28] Yener *et al.* 2014; Yener 2017.

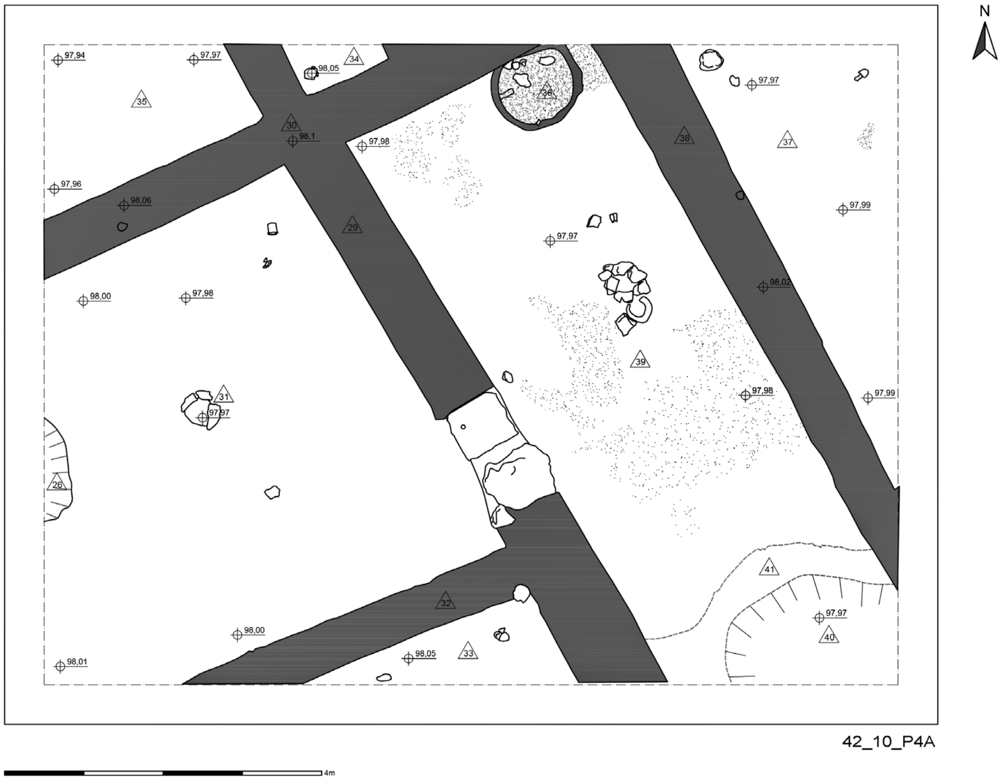

Figure 3: *Alalakh. 42.10, local phase 4 (courtesy of Alalakh Excavation Project).*

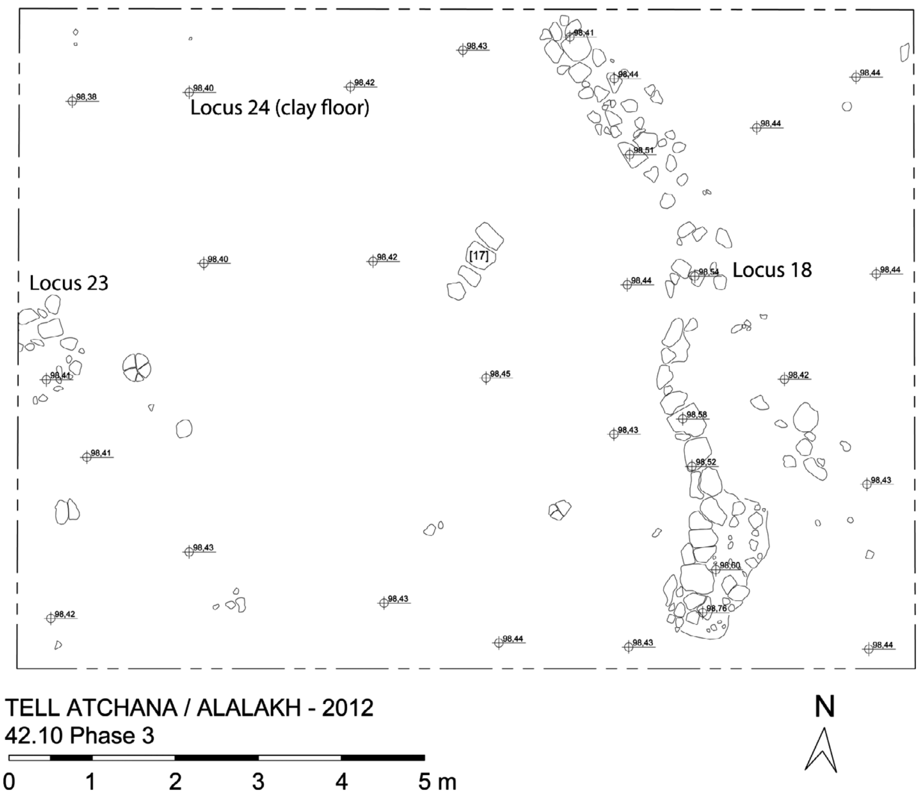

Figure 4: *Alalakh. 42.10, local phase 3 (courtesy of Alalakh Excavation Project).*

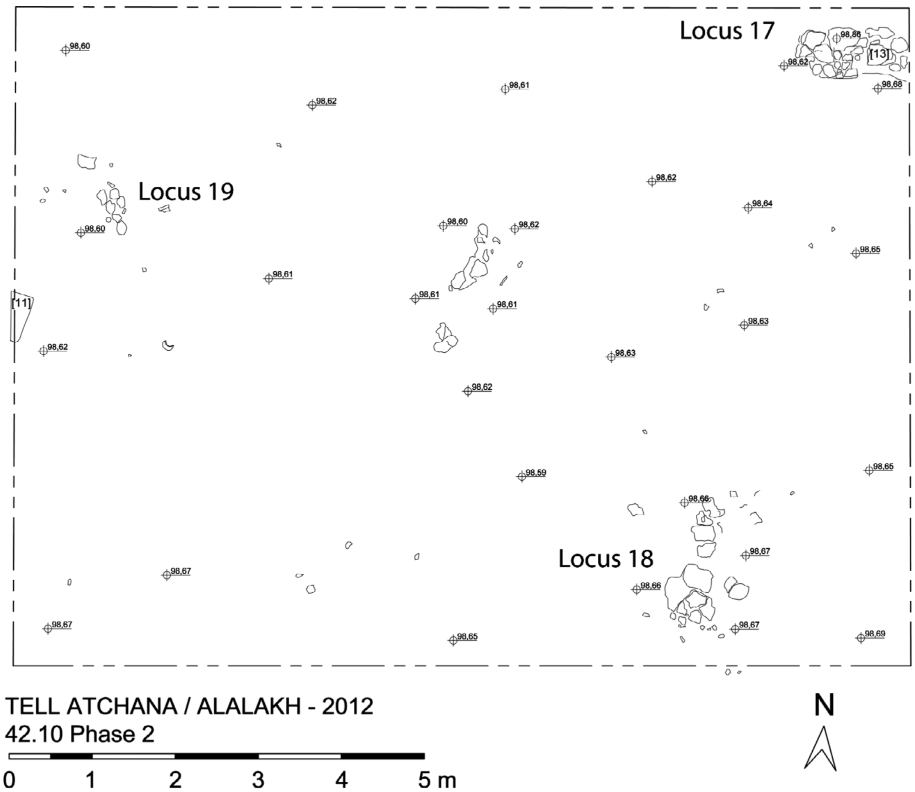

Figure 5: *Alalakh. 42.10, local phase 2 (courtesy of Alalakh Excavation Project).*

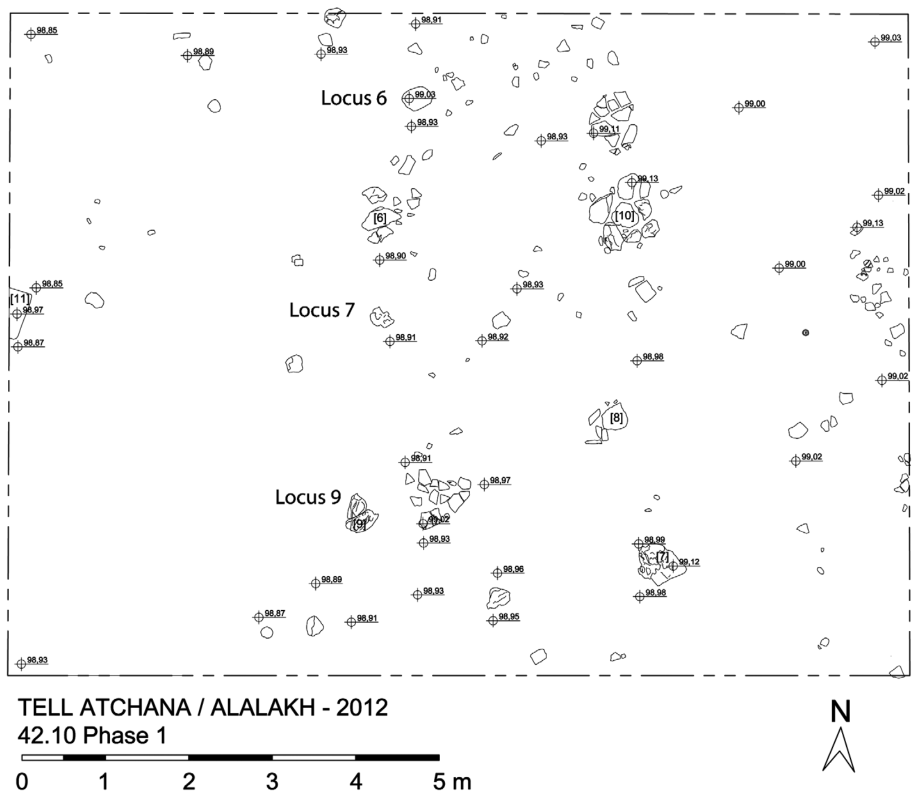

Figure 6: *Alalakh. 42.10, local phase 1 (courtesy of Alalakh Excavation Project).*

BC (Amuq phase N early),[29] due to the recovery of a painted sherd inspired by the Aegean Late Helladic IIIc Middle Developed style.[30] Phase 3 consists of an open area with the upper face of the threshold stone of phase 4 reused on a clay floor. Here a pyrotechnical installation, interpreted as an oven, has been identified, which consisted of an elliptical pit with a stone at the bottom and located in the southwestern part of the square. The main architectural feature identified in phase 3 is a curvilinear structure that runs in a north-south direction and divides the area into two. The floor yielded some *in situ* objects such as pottery, a grinding stone, hand-stones, beads, earrings, pendant, pins, and a metal beer strainer. These objects suggest that the area was dedicated to daily life or domestic activities. The following occupational phase, dated to the Iron Age I, is phase 2 (**Figure 5**). This phase yielded two occupational floors with few installations. The ceramic material retrieved from this phase points to activities associated with the preparation and consumption of food.[31] The subsequent phase (phase 1) is dated to the Iron Age II (**Figure 6**). This phase consists of an occupational floor with a series of clusters of stones visible all over the square. The recovery of *in situ* storage jars, grinding stones, and slabs indicates that this area was likely used to process food.[32]

The Late Bronze Age II pottery from Alalakh

With very few exceptions, the pottery assemblage dated to the Late Bronze Age II is aligned with Alalakh's 14th century BC local assemblage.[33] The majority of shapes coming from phase 4 includes bowls with simple or flaring rims (**Figure 7.6–8**),[34] with thickened internal or hook rim (**Figure 7.3–4**),[35] and flat plates (**Figure 7.1**), some also in banded ware (**Figure 7.2**).[36] The rest of the pottery assemblage includes shallow bowls (**Figure 7.9–11**), some with thickened external rim (**Figure 7.5**), high-necked jars (**Figure 7.14, 16**), globular jars, cups, hole-mouthed cooking pots (**Figure 7.13, 18**), and very few pitchers (**Figure 7.17**) and storage jars. The assemblage also includes cylindrical kraters (**Figure 7.11**), amphoroid kraters (**Figure 7.12, 15**) and pointed juglets.

Painted ware is not very common during this phase and the motifs mainly include horizontal bands, generally on cups and plates. Other motifs include hatched triangles in dark brown paint (**Figure 8.1, 3**) or with a combination of hatched triangles and a horizontal band in red paint (**Figure 8.2**) on closed shapes. In general, painted decorative designs from the Late Bronze Age contexts are restricted to geometric motifs, with the occasional occurrence of figurative motifs. Imports recovered in this phase include Aegean LHIIIb, LHIIIa2,[37] and Cypriot White Slip II sherds.[38]

The Iron Age I–II pottery from Alalakh

The pottery assemblage dated to the Iron Age I–II (phases 3–1) is very mixed, showing residual fragments typical of the Late Bronze Age II tradition as well as sherds with new attributes that clearly define this

[29] Pucci 2019c, 148–149.
[30] Koehl 2017, Fig. 18.1.7
[31] Montesanto and Pucci 2019, 106–107.
[32] Montesanto and Pucci 2019, 108–109.
[33] Horowitz 2020; forthcoming; Montesanto 2020b.
[34] Goldman 1956, Fig. 391.1266.
[35] Venturi 2007, Fig. 48.12; Lehmann 2017, Fig. 2.2.
[36] Horowitz 2015, Fig. 7.5.1–3; Mazzoni 2002 Pl. LXI; Venturi 2014, Pl. 2.d–f.
[37] These sherds have been analysed and dated by Robert Koehl.
[38] These sherds have been analysed dated by Ekin Kozal.

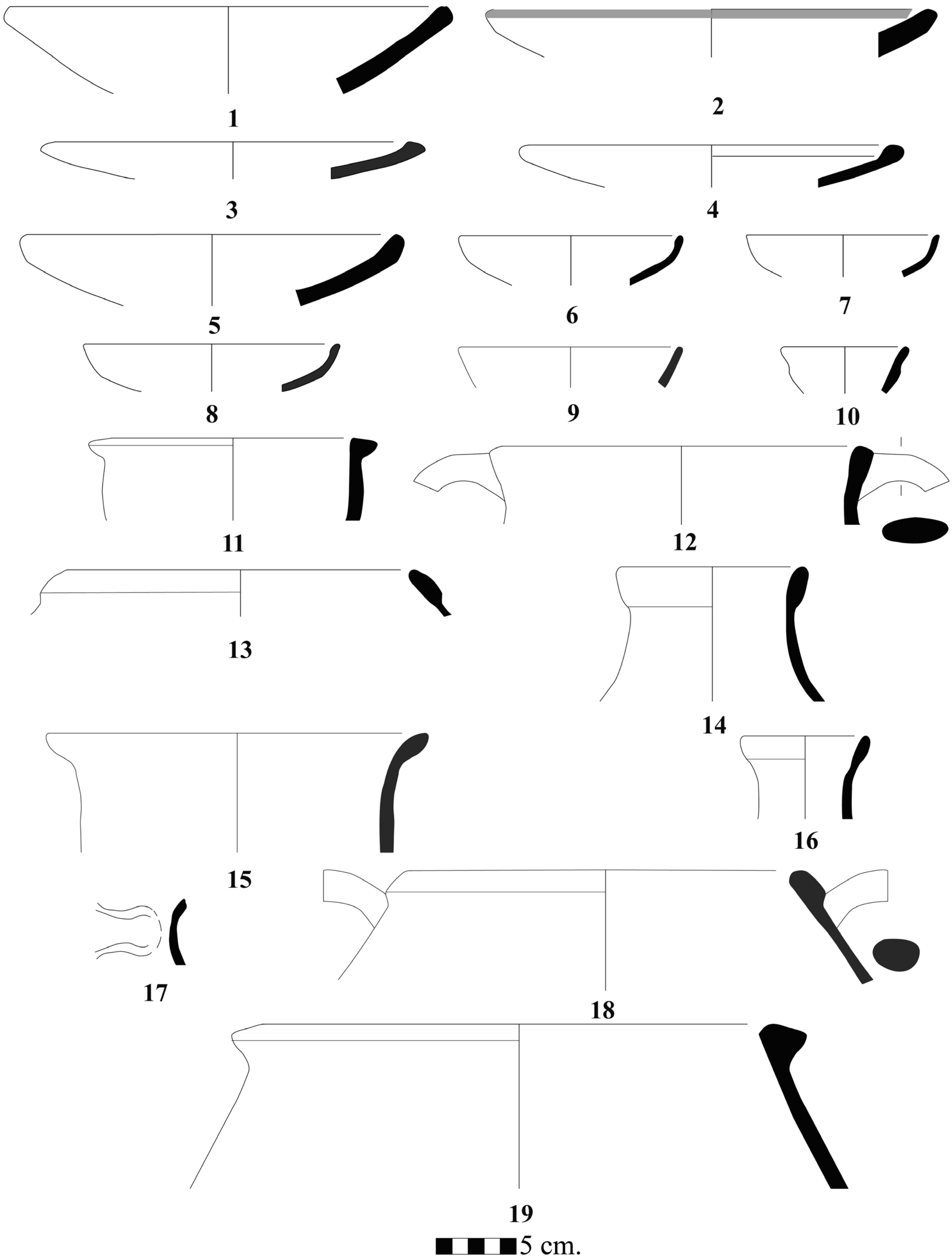

Figure 7: *Alalakh Late Bronze Age II pottery assemblage (courtesy of Alalakh Excavation Project).*

1 2 3

Figure 8: *Alalakh Late Bronze Age II painted ware (courtesy of Alalakh Excavation Project).*

phase as belonging to the Iron Age period. Some shapes attested in this phase are typical of the Late Bronze Age II period and are not attested in later levels. These are the hemispherical truncated cup (**Figure 9.12**),[39] the fusiform jar (**Figure 10.1**), and the pilgrim flask (**Figure 10.3**). The majority of shapes recovered in phase 3 are flat plates (**Figure 9.1, 3**) and bowls (**Figure 9.5–9**). Other shapes recovered include amphoroid kraters, a krater with cylindrical body, maybe a local imitation of an Aegean shape (FS 282) (**Figure 9.14**), high-necked jars (**Figure 9.11**), and globular jars (**Figure 9.10, 13; Figure 10.5**). Two types of cooking pots have been recovered: the broad cooking pot (**Figure 10.2**) and the hole-mouthed cooking pot (**Figure 10.4**).

Painted decoration was present in the Late Bronze Age II contexts (phase 4), but it became very popular at the beginning of the Iron Age not only in the Amuq valley but also in Syria and Cilicia.[40] The painted motifs recorded in the Iron Age at Alalakh include the hatched motif and the wavy line motif.[41] These motifs continued to be used also during the Iron Age.[42] The hatched motif (**Figure 10.2**) was present at Alalakh already in Late Bronze Age II contexts;[43] the wavy line motif (**Figure 9.8**) is found on sherds dated to the Late Bronze Age in combination with other motifs, but it is also part of the Mycenaean tradition during the Late Helladic IIIc period.[44] During the Early Iron Age, painted pottery occurs with motifs reflecting local, regional traditions alongside a locally made LH IIIc tradition and hybrids made of both.

Imports recovered in this phase includes few sherds of Cypriot White Slip II, Cypriot Base Ring II, and Mycenaean LH IIIa2.

The pottery dated to the Iron Age II includes flat plates (**Figure 10.7**), bowls (**Figure10.8–11**), amphoroid krater (**Figure 10.16–17**), hole-mouth cooking pots (**Figure 10.14–15**), bichrome painted sherds (**Figure 10.19**), and hole-mouth pithoid jars (**Figure 10.6**) as well as jars (**Figure 10.18**), plates, and bowls in Red

[39] This shape is generally found in North-Central Anatolia (Glatz 2009, 130; Schoop 2009, Fig. 13.2–3). However, it is also attested in the Levant at Tyre (Bikai 1978, Pl. XLVIIa, 15–17), Ugarit (Monchambert 2004, Fig. 801180), Byblos (Salles 1980, Pl. 20), Hazor (Zuckerman 2015, Fig. 6.3.11), Tell Kazel (Level 6: Badre *et al.* 1994, Fig. 42c; 52b–c), and Tell Arqa (Level 11: Thalmann 2006, Pl. 118.3–4).

[40] Montesanto 2020a.

[41] Montesanto 2020a.

[42] Horowitz 2020; Montesanto 2020a.

[43] Hatched decoration is commonly attested in the Amuq valley (Pucci 2019b, Fig. 45; Janeway 2013, Pl. 4–7), in Cilicia (Ünlü 2005, Fig. 4, 12–15; Gates 2013, Fig. 10, 5–7), and in Northern Syria (Monchambert 2004, Fig. 95, 1283; Riis and Buhl 1990, Fig. 81, 637; Venturi 2007, Fig. 58, 1; Badre and Capet 2014, Fig. 24, 3).

[44] Mountjoy 1986, Fig. 116.21, 200.22, 235.14; Janeway 2017, 56–57.

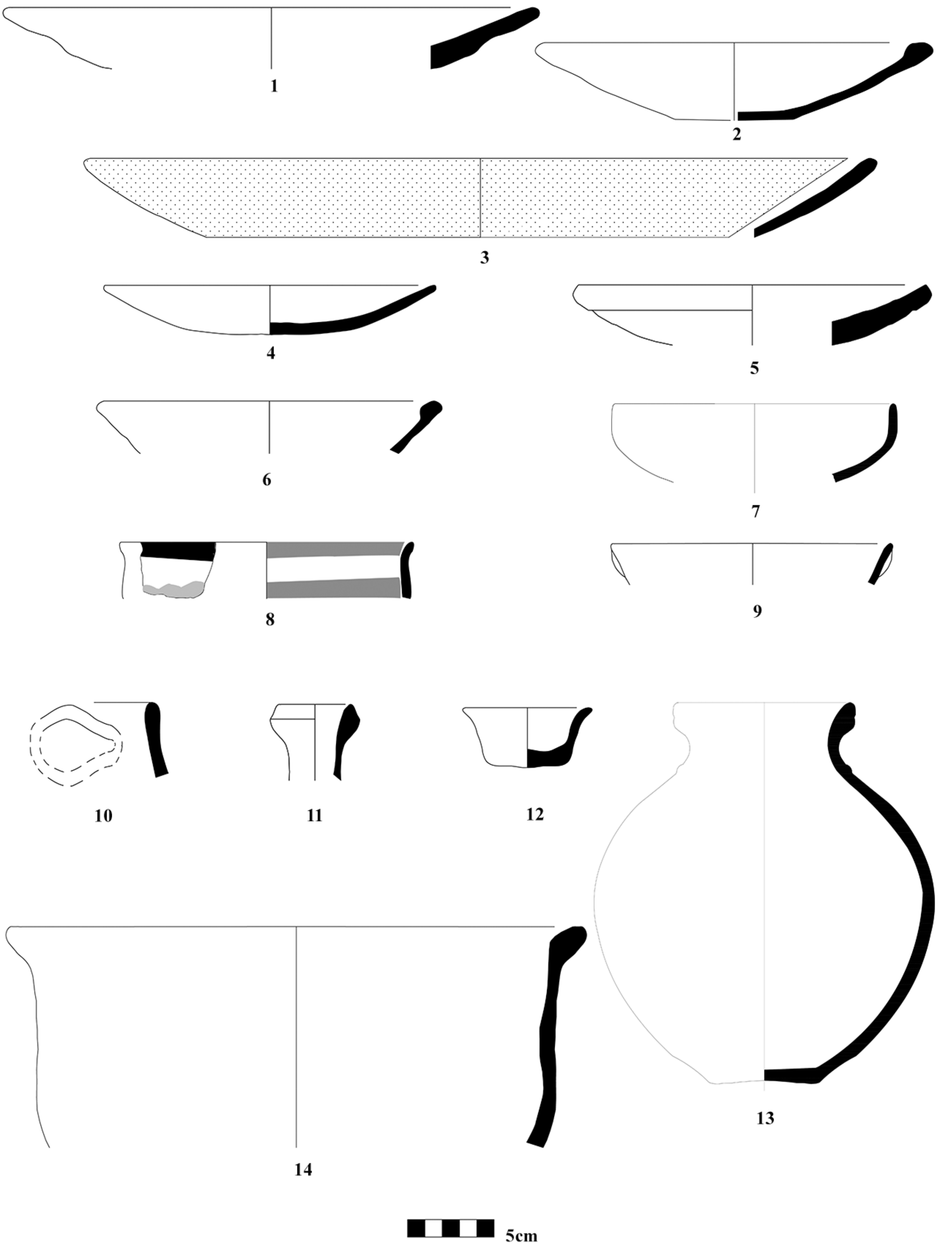

Figure 9: *Alalakh Iron Age I pottery assemblage (courtesy of Alalakh Excavation Project).*

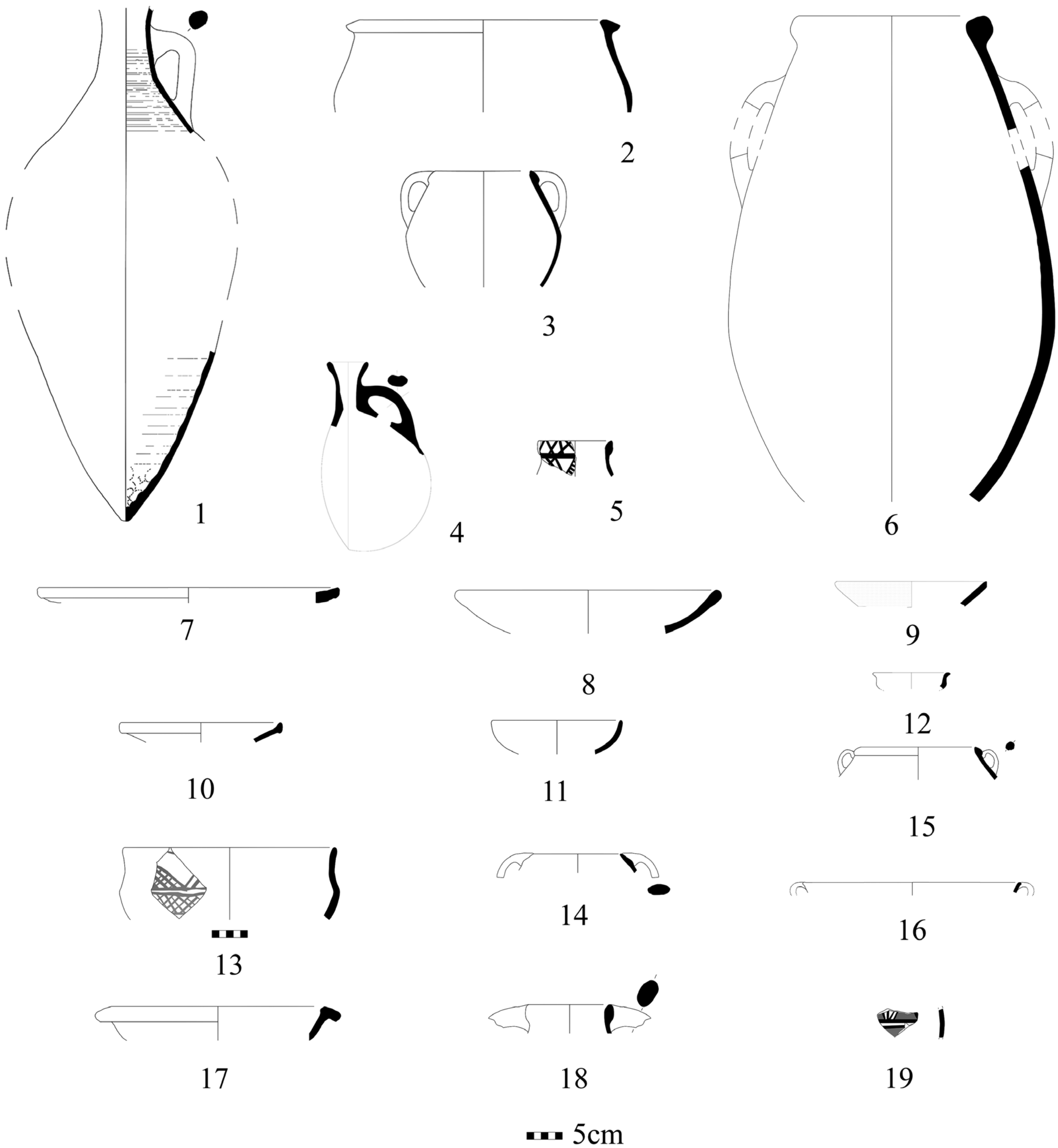

Figure 10: *Alalakh Iron Age II pottery assemblage (courtesy of Alalakh Excavation Project).*

Slip Burnished Ware (**Figure 10.9, 12**).[45] Painted decoration continued to be used, although in reduced number. The most popular motif was the hatched triangles motif (**Figure 10.13**).

Overall, the pottery assemblage dated to the Iron Age I shows a strong continuity with the Late Bronze Age II, while the pottery dated to the Iron Age II sees the appearance of bichrome pottery, probably influenced by Cypriot-style production,[46] and an increase in the amount of pottery with surface decoration and treatment (red slip and burnished).

[45] The rim and the overall shape of this pithos can be compared with similar pithoi from Iron Age II Tell Afis (Mazzoni 2014, Fig. 45.5).

[46] Montesanto and Pucci 2019, 108–109.

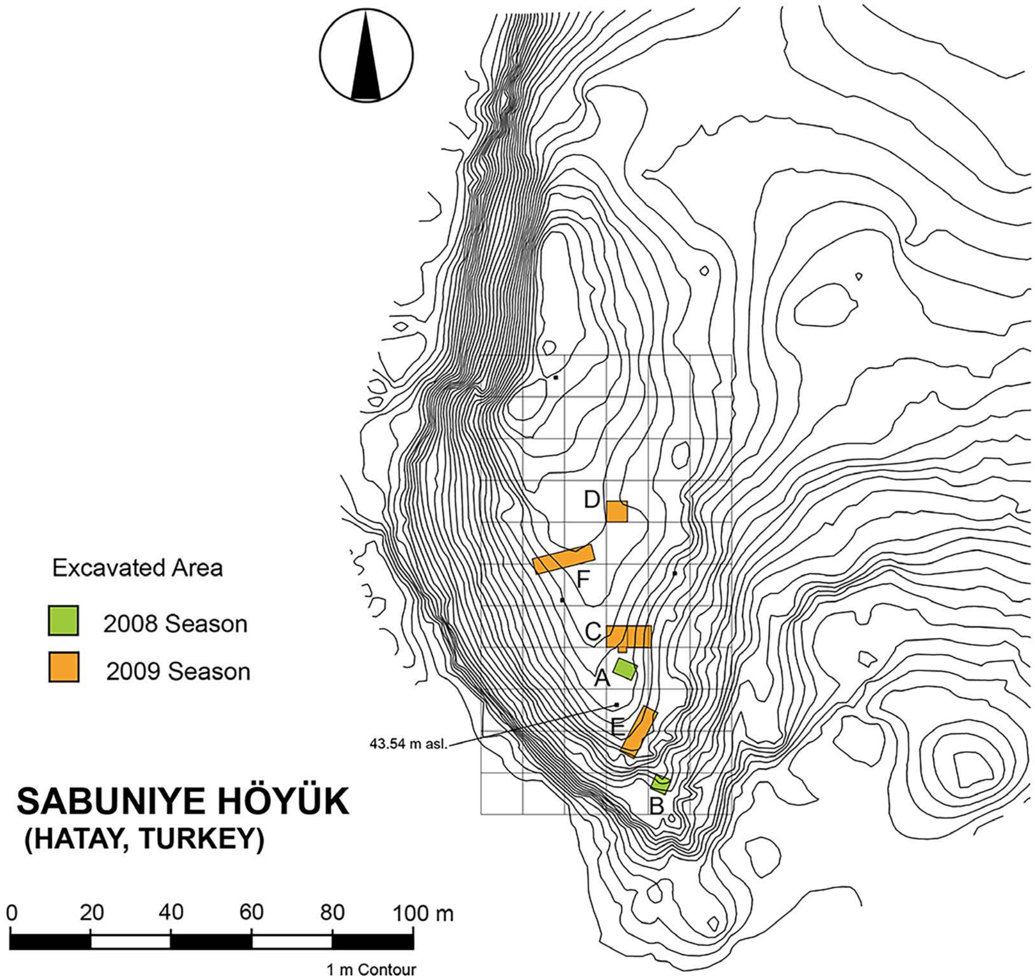

Figure 11: *Location of Sabuniye squares (after Pamir 2013).*

The Iron Age at Sabuniye

Pottery dated to the beginning of the Iron Age I (12th century BC) was mostly collected during the surveys conducted in 1999–2007 or during the 2008–2009 excavation. Almost all sherds dated to the Iron Age I are surface finds and therefore not stratified; they come mainly from the survey carried out during the 1999–2002 seasons and from the surface collection during the 2008–2009 excavation on the site.[47]

The pottery assemblage dated to the Iron Age II–III from Sabuniye is mainly derived from trenches B, E, and F (**Figure 11**).[48] These trenches have been excavated during the 2008–2009 excavation seasons. Trench B is a 3x5 m^2 square located on the second terrace of the mound. Excavations in trench B yielded three building phases. The first building phase, Level 1, consists of a mudbrick wall located in the northern part of the trench. Level 2 consists of the remains of a mudbrick wall plastered in white. The wall was located in the southern part of the trench. Finds related to this phase have been dated to the Iron Age I–II transition. The third building phase, Level 3, consist of the remains of a mudbrick wall

[47] Pamir 2005; 2013.

[48] The description of trenches B, E, and F is based on the unpublished excavation notebooks provided by the Sabuniye team, courtesy of Prof. Dr. Hatice Pamir and Dr. Shinichi Nishiyama.

located in the southern part of the trench. Pottery recovered from this level has been dated to the Late Bronze Age II-Iron Age I.

Trench E is a 3x10 m^2 square located on the southern slope of the mound. This area was probably linked to the cultivation or production of olive oil as many charred olives have been found. The earliest phase, Level 3, can be dated to the Iron Age II because of the finding of Red Slip Ware and of a basalt bowl. It consists of many large rubbish pits and some canals with a rectilinear stone wall located in the southern part of the trench. Level 2 is likely an agricultural level with no architecture except for the presence of a stone wall, while in Level 1 the only attested architectural feature is a stone wall of three rows located in the same position as those found in Level 2 and 3.

Trench F is a 4x10 m^2 square located almost on top of the mound. No architectural feature has been found in this trench, and the finds include a small number of worn pottery sherds. This trench was highly affected by agricultural levelling in the recent past. It sits directly on the bedrock and yielded a total of four archaeological features: three pits (Loci 8, 9 and 12) and a canal (Locus 10). Locus 8 is a rectangular pit located in the centre of the square, has a diameter of 2.5 m, and was probably related to the production of metals because of the finding of copper and iron slags inside. Locus 9 is a triangular pit located in the eastern part of the trench. The pit contained animal skulls and bones as well as Iron Age II local and imported Cypriot pottery. Many of the pottery vessels were placed on top of the skull, suggesting a ritual function for the pit. Locus 12 is a small and almost empty pit located in the south-east corner of the trench.

The Iron Age pottery from Sabuniye

The majority of Iron Age I pottery belongs to the so-called Aegeanizing style.[49] The shapes retrieved are hemispherical flaring bowls (**Figure 12.10**) and carinated bowls (**Figure 12.6**).[50] These shapes are local imitations of Aegean types. These shapes can be dated to the 12th or 11th century BC based on comparisons with similar items found in the sites located in the Amuq valley,[51] sites in Northern Syria,[52] or in Cilicia.[53]

Other shapes dated to the Iron Age I include flat plates (**Figure 12.1–2, 5**), some of them also in Red Slip Ware, hole-mouth cooking pots (**Figure 12.13–15**), rim bowls (**Figure 12.3**), shallow bowls (**Figure 12.4**), conical bowls (**Figure 12.7–8**), globular jars (**Figure 12.9–11**), high-necked jars (**Figure 12.12**) and kraters (**Figure12.13**), which find comparisons with Tell Atchana period 0, Tell Tayinat FP 6-3,[54] and Tell Afis phase IVb.[55] Pottery dated to the Iron Age I from Sabuniye can therefore be compared with similar assemblages coming from phase 2 of square 42.10 in Tell Atchana, dated to the end of the Iron Age I (ca. 11th century BC).[56] Similar shapes have also been found in Chatal Höyük phase N-Mid/N-Late, dated to the 10th–9th century BC, and in Tell Tayinat FP6-3, dated between the mid-12th and the mid-10th century BC.[57]

[49] Pamir 2005, Fig. 3.11.2; 2013, Fig. 9; Montesanto and Pucci 2019, 4l, 6l.

[50] For the hemispherical flaring bowls see, Pamir 2013, Fig. 9, 11b, 12k.

[51] Tell Atchana (Montesanto and Pucci 2019, Fig. 4l–m), Chatal Höyük (Pucci 2019c, Fig. 4), Tell Tayinat (Welton *et al.* 2019, Fig. 15).

[52] Tell Afis (Venturi 2007, Fig. 56.1), Tell Kazel (Badre and Capet 2014, Fig. 25c, 27e).

[53] Tarsus (Goldman 1956).

[54] Welton *et al.* 2019.

[55] Venturi 2007.

[56] See above and Montesanto and Pucci 2019.

[57] For Chatal Höyük, see Pucci 2019b, 186; for Tell Tayinat, see Welton *et al.* 2019, 322.

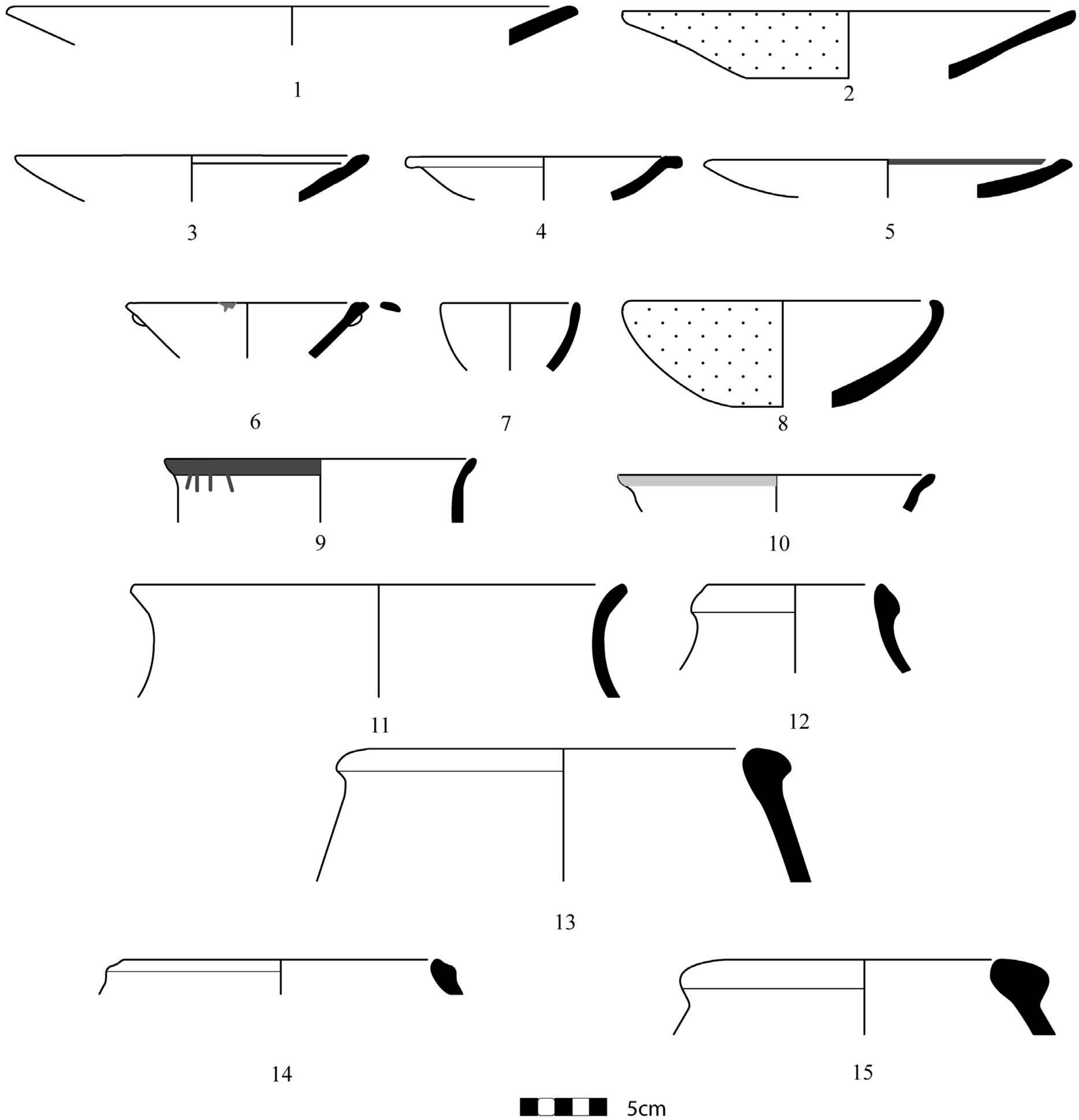

Figure 12: *Sabuniye Iron Age I pottery assemblage (courtesy of Sabuniye Excavation Project).*

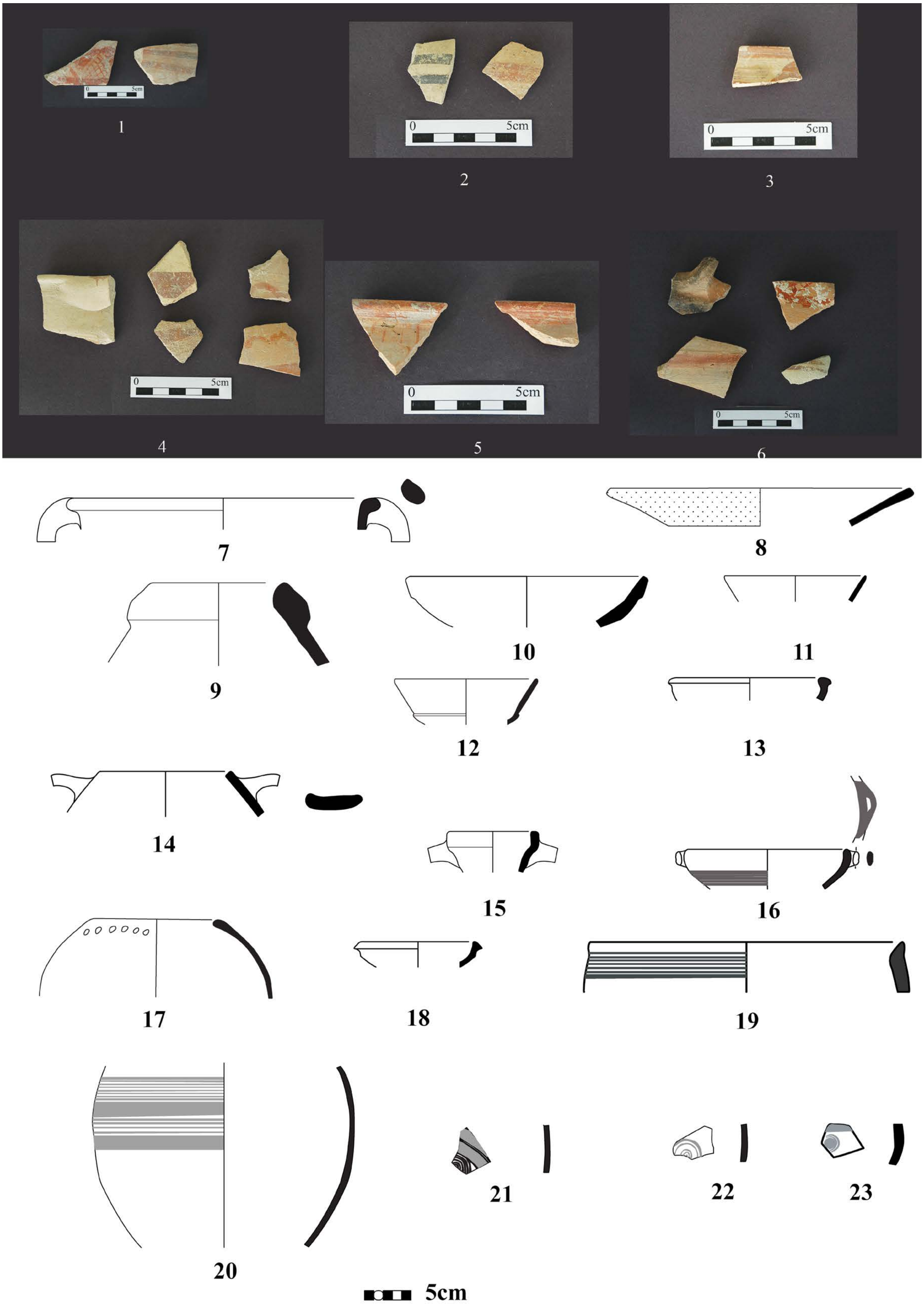

Figure 13: *Sabuniye Iron Age II–III pottery assemblage (courtesy of Sabuniye Excavation Project).*

Painted decoration includes bands (**Figure 13.2, 6**), hatched triangles (**Figure 13.1, 3**), wavy lines (**Figure 13.3–4**), and diagonal lines (**Figure 13.5, 9**) made in red or black paint.

The majority of pottery dated to the Iron Age II–III mainly consists of flat plates (**Figure 13.8, 10**),[58] bowls (**Figure 13.11, 13**),[59] high-necked jars (**Figure 13.15**), kraters (**Figure 13.7**),[60] pithoi (**Figure 13.9**), and hole-mouth cooking pots (**Figure 13.14, 17**).[61] Some of the flat plates, rim bowls, shallow bowls, and jars are made in Red Slip Burnished Ware (**Figure 13.8**). Furthermore, a large number of Cypriot imports of Bichrome III/IV and White Painted IV belong to the Cypro-Archaic period (**Figure 13.17, 19–23**).[62] The assemblage also includes Cypriot bowls (**Figure 13.16**), Assyrian types (**Figure 13.12–18**),[63] and Geometric pottery dating between the 8th and 7th century BC. The majority of shapes recorded in Common Ware are plates, bowls, jars, and kraters. These shapes find comparisons with Tell Tayinat FP2,[64] Chatal Höyük,[65] Tell Afis Area D level 6,[66] and Tell Acharneh.[67]

Other wares include barrel jugs, plates, and bowls in Bichrome Ware and White Painted, and *skyphoi* in Greek Geometric Ware. Parallels can be found in Northern Levantine sites such as Al-Mina and Hama.[68] The pottery material dated to the Iron Age shows the adoption, at the beginning of the Iron Age, of Aegean shapes and a progressive diffusion of the Red Slip Burnished Ware.[69] During the Iron Age II–III, the disappearance of specific Iron Age I shapes, such as the hemispherical flaring bowls and the appearance of Cypriot and Greek imports, is also attested, confirming the importance of the site within the Mediterranean trade network.

Conclusions

The preliminary analysis of the material culture of the Amuq valley from the Late Bronze Age II to the Iron Age III allows the drafting of some cautious conclusions. For instance, a strong continuity between the Late Bronze Age II and the Iron Age I material culture can be noted. Subsequently, the Iron Age I saw an adaptation of foreign shapes and perhaps also of exogeneous habits, which could be seen in the local material culture. The Iron Age II shows an increase in the standardisation of shapes and wares mostly visible in the Red Slipped Burnished Ware and, most importantly, the growing importance of the site of Sabuniye as a trade centre within the scenario of the Eastern Mediterranean world.

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[58] Comparisons for the Amuq valley in Chatal Höyük (Pucci 2019b, Pl. 90a, 134e) and Tell Tayinat (Osborne *et al.* 2019, Fig. 13.1, 3; Fig. 14.2). Similar shapes also from Tarsus (Goldman 1963, Fig. 121.274–278) and Zincirli Höyük (Soldi 2019, Fig. 4).

[59] Comparisons from the Northern Levant, Cilicia, and Islahiye valley (Pucci 2019b, Pl. 95; Mazzoni 1987, Fig. 9.17, 10.1–2, 11.11, 20.5; Goldman 1963, Pl. 121.268–278; Soldi 2019, Fig. 5).

[60] Comparisons from Tell Afis (Venturi 2007, Fig. 60.9–11), Tell Kazel (Badre 2006, Fig. 13.2–3), Tell Arqa (Thalmann 2006, Pl. 123.8–9), Chatal Höyük (Pucci 2013, Fig. 6.12), Tarsus (Goldman 1963, Fig. 114.33, 115.124, 119.252), and Zincirli Höyük (Soldi 2019, Fig. 6a).

[61] Similar cooking pots are from Zincirli Höyük (Soldi 2019, Fig. 8a–f); Tell Afis (Mazzoni 2014, Fig. 14); and Taşlı Geçit Höyük (Zaina 2013, Fig. 6).

[62] Similar items from Al-Mina VIII (Taylor 1959), Tell Tayinat (Osborne *et al.* 2019, Fig. 17.29), Chatal Höyük (Pucci 2019b, Pl. 99), Tarsus (Hanfmann 1963, Fig. 122: 391–397, 405), Tell Afis (Mazzoni 1987, Fig. 7), and Hama (Riis and Buhl 1990, Fig. 82:652, 53, 84:658)

[63] Anastasio 2010, Pl. 12.4, 15.5, 8; Pucci 2019b, Pl. 14b; Osborne *et al.* 2019, Fig. 29.8.

[64] Osborne *et al.* 2019.

[65] Pucci 2019b.

[66] Mazzoni 1987.

[67] Cooper 2006.

[68] For Al-Mina, see Robertson 1940; Vacek 2012. For Hama, see Kearsley 1989; Kerschner and Lemos 2014.

[69] Braemer 1986; Pucci and Soldi 2019.

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A Possible Neo-Babylonian House-Type for the New Seleucid Foundations?

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Abstract

This paper traces some common patterns in the layout of houses of new Seleucid settlements and investigates issues of continuity in regard to their local architectural traditions. Four settlements, located from Northern Syria to Western Iran, have been chosen as case studies: Jebel Khalid, Dura Europos, Seleukeia on the Tigris, and Susa-Seleukeia on the Eulaios. These sites provide sufficient archaeological evidence for a comparative analysis. Despite the chronological span of the examined houses, which date from the early Hellenistic to Parthian and Roman periods, and despite the variability of their forms, it seems that a major part follows some common design principles similar to those of the Neo-Babylonian house pattern. The latter is often combined with elements of Greek architecture such as porticoes or open *exedras*. These similarities support the hypothesis that the Seleucids and their architects used preconceived designs for the houses of their new foundations. Since there are indications of the founders having financed the building of the houses, such designs must have helped to estimate the cost of the building material and resources required for the housing of their new settlements more efficiently.

Keywords

Hellenistic Domestic Architecture, Seleucid Empire, Neo-Babylonian Pattern, Neo-Assyrian Pattern, Preconceived Design

Introduction[1]

The Seleucid kings pursued one of the largest colonization programs in the Hellenistic world. This program contributed to the founding of almost 122 new settlements in the Middle East, with forms ranging from smaller fortresses to larger-sized planned cities and often with a highly heterogeneous population.[2] Among these settlements, only a few can offer sufficient evidence of domestic architecture (**Figure 1**). The focus will be on four settlements where the excavated dwellings seem to conform to a quite similar layout. These four cases will be examined in chronological rather than geographical order, beginning with the settlements featuring Hellenistic material and proceeding to those including Hellenistic-Parthian and Parthian-Roman material. The method will focus on the formal examination of house typologies. Social aspects of architecture, will only be considered briefly. A functional analysis

[1] This study is part of my ongoing PhD dissertation on 'Hellenistic Domestic Architecture in the Seleucid Empire and its Successor States'. I am grateful to the organizers of this conference for giving me the opportunity to present this small part of my work. I am also indebted to all authors and institutions who granted me copyright permission for the images used here.

[2] Kosmin 2014, 183.

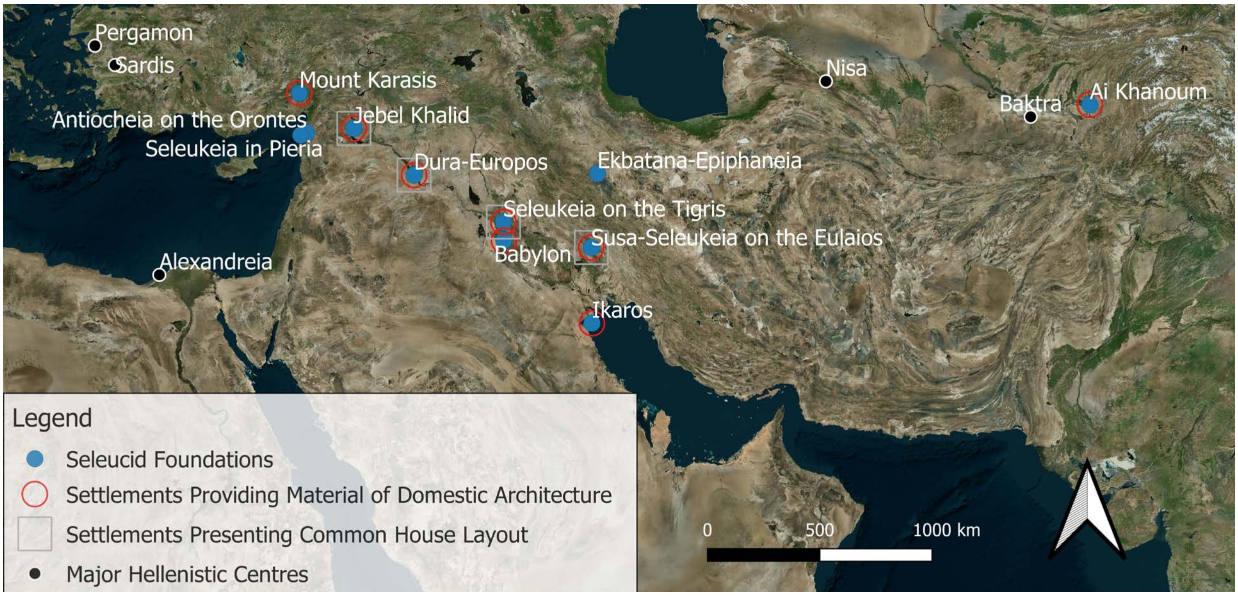

Figure 1: *Distribution of the archaeological material of domestic architecture in the Seleucid foundations (compiled by the author).*

based on the distribution of small finds and installations has also not been attempted here. Although scholars have successfully adopted such a method to reconstruct patterns of activities in the houses of Jebel Khalid and Dura-Europos, the documentation in Seleukeia on the Tigris and in Susa remains either unpublished or to a certain extent far too limited for such an approach.[3] Instead, in searching for a common pattern, a formal approach may offer some preliminary results without the danger of drawing hasty conclusions.

Jebel Khalid

The settlement of Jebel Khalid lies on the west bank of the river Euphrates, south of the Tishrin Dam, in the modern state of Syria. The settlement was founded in the beginning of the 3rd century BC, probably by Seleukos I. Nikator. Its occupation, though, lasted only until 70 BC, when Pompey annexed Syria in the Roman Empire. After that, the settlement was completely abandoned and its layout remained undisturbed by later occupation. Therefore, Jebel Khalid constitutes the most representative case of a Seleucid foundation. The strong fortifications of the settlement indicate its use as a military colony (*katoikia*) guarding the routes along the Euphrates. Since 1986, an Australian team has been working on the site. The mission was a joint project of the Australian National University and the University of Melbourne under the direction of Professor Graeme Clarke. In the northern part of the settlement, the team has excavated, among others, a complete residential *insula* measuring 35 x 90 m, which was part of a grid pattern. The block was divided by an east-west alleyway in two unequal parts and consisted of seven or eight houses.

Heather Jackson has provided a thorough study of the architecture of the *insula*. Although she rejected the idea of a ‘typical pattern’, she also proposed some common principles for at least four of its houses

[3] On patterns of activities in Jebel Khalid and Dura-Europos, see Jackson 2014, 565–603; Baird 2014, 155–200; on the problems of documentation and the use of some rooms in the houses of Seleukeia on the Tigris, see Pestle 1999, 59–73; see also Hopkins 1972, 36–66.

that indicate the design of a common layout already from the founding of the settlement. The principles identified can be summarized as follows: a) an arrangement around a central courtyard; b) an entry room with off-centered entrances that gives controlled access to the courtyard; c) a suite of three rooms on the northern side of the courtyard, used as the main living sector, which Jackson called an *oikos* suite. Despite all these similarities, the dwellings of the block are still characterized by flexibility, variability, and freedom of choice.[4] On the question of cultural influences on the layout or the continuity of local domestic architecture, Jackson suggests that elements like the room-type entries, the absence of a peristyle, or the *oikos* suites can be attributed to Neo-Assyrian and Neo-Babylonian traditions. Of course, these influences must be regarded with caution, since similar elements are sometimes attested also in Greek domestic architecture and some choices can be the result of practical needs rather than the result of a cultural preference.[5]

A closer look at the typology of Mesopotamian domestic architecture offers an additional perspective. Since Jebel Khalid lies in Northern Mesopotamia, it would be expected that the local Neo-Assyrian tradition had influenced the layout of these houses. Based on the evidence from Assur and Nimrud, the main feature of this tradition is the division between a public pre-house (Akkadian *bābānu*) and a private main house (Akkadian *bītānu*) with a broad reception room that works as a buffer zone between the two sectors.[6] In the case of Jebel Khalid, a division of that form is absent, even in the 'House of the Painted Frieze'.[7] Another variant of the Neo-Assyrian Layout is arranged as follows: an entry room/unit provides surveilled access to the house, while different clusters of rooms are organized around a central courtyard without specific order or orientation. These clusters include reception room suites, living room suites, and working/service areas. This type of house was most popular in the Eastern Tigris region (Tell el-Fakhar, Tell Billa) and is a continuation of the Hurrian courtyard houses of Nuzi.[8] Although these houses are more comparable with Jebel Khalid, their irregular layout constitutes a major difference.

The Neo-Babylonian layout (**Figure 2**), on the other hand, is more regular and bears more similarities with the houses of Jebel Khalid. Its main design principles include, like in the Neo-Assyrian layout, an entrance room/suite that gives a controlled access to a central court and is often used for the reception of guests. On the southern side of the court, however, there is a three-room suite with a concrete form, consisting of a broad main room with two narrow side rooms (Akkadian *bīt iltāni*, north-facing room/suite).[9] Since this suite can be self-contained, it constitutes the core and the most private sector of the house, although reception and entertainment could also take place here. The rooms on the eastern and western side of the court (Akkadian *bīt amurri* and *bīt* šadî, west and east -facing room/suite, respectively) have various uses as service rooms and working areas. One of the western ones is often used as a kitchen. A second room or a suite with different functions (a second private sector for colder days, an entrance

[4] Jackson 2014, 531.

[5] Room type entries and tripartite private suites can indicate not only the need of the new settlers for privacy, but can also indicate their fear of intruders. For comparanda from Greek domestic architecture and an analytical discussion on the topic, see Jackson 2014, 532–563.

[6] This principle is adjusted in a variety of layouts ranging from smaller houses with a central courtyard to complex arrangements around two or more courtyards. Nevertheless, there are also smaller houses, which do not follow this principle, probably because of lack of available space, see Miglus 1999, 131–175, pl. 71–79; Castel 1992, 57–62, questions this model of public-private duality. By using a structural analysis, the scholar reconstructs many houses in Nimrud and Assur as single courtyard houses including the Elite Red House in Assur, which she compares with the Neo-Babylonian houses. Regarding the smaller houses, she suggests that the density of the urban tissue in the two Neo-Assyrian settlements did not permit the evolution of a specific house-type.

[7] Although there is a division of a forecourt and a main courtyard, the reception room between them is missing. Apart from one case reception rooms are absent from the houses of the settlement, see Jackson 2014, 554–556.

[8] Miglus 1999, 142–143, pl. 67; on the Neo-Assyrian residences in Tall Šēḫ Ḥamad that also follow this pattern, Pucci 2008, 49–63, Fig. 2–5.

[9] This suite is sometimes extended to the south with a second series of rooms, Miglus 1999, 202–203.

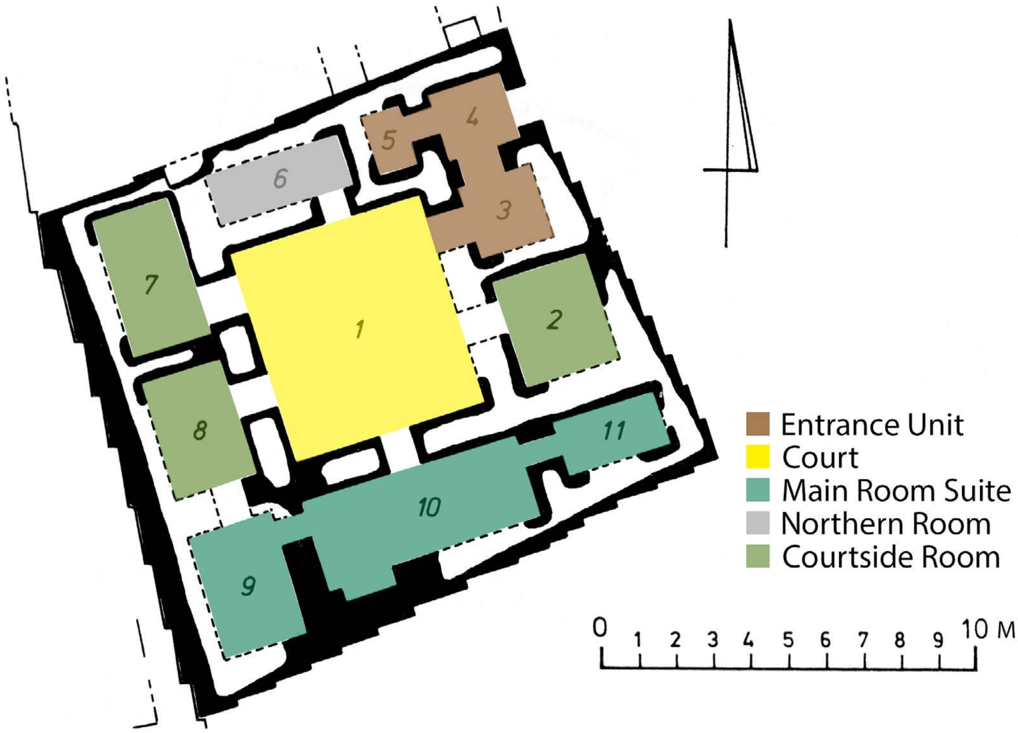

Figure 2: *Babylon, House XIII, plan with the most important room clusters highlighted (after Miglus 1999, pl. 89, Fig. 398, digitally processed by the author).*

unit, or a kitchen) usually lies on the northern side of the court (Akkadian *bīt šūti*, south-facing room/suite).[10] Most of these room clusters, in different variations, are also present in the four houses of Jebel Khalid.[11] The only difference is that the main room suites are located on the northern instead of the southern side of the court due to the different climatic conditions in Northern Mesopotamia (**Figure 3**).[12] Furthermore, elements connected to Greek architecture like porticoes, colonnaded *exedras*, masonry style frescoes, field stone masonries, and pitched roofs with Corinthian tiles give a more hybrid rather than purely Mesopotamian character to these houses.[13]

Neo-Babylonian houses were still in use during the Achaemenid, Hellenistic, and Parthian times in Babylonia, while in Northern Mesopotamia, there are also some cases of elite residences and houses which indicate that both patterns were also popular up to the Parthian period.[14]

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[10] On the typology and functional analysis of the Neo-Babylonian houses, see Miglus 1999, 179–213, pl. 89–100; on the social dimensions of the Neo-Babylonian houses as well as the Akkadian terms, still in use during the Hellenistic times, which match to the archaeological evidence, see Baker 2015, 371–407.

[11] On the individual houses and their features, see Jackson 2014, 45–507.

[12] The severe winter and the torrential rains in the region demand a south facing orientation for the principal rooms. In this way, they remain sunny during the winter and shadowy during the summer: Jackson 2014, 3; in contrast, in the dry and sunny climate of southern Mesopotamia, a north-facing orientation is more advantageous, since it affords the maximum of shade during the day: Miglus 1999, 189; Baker 2015, 377.

[13] Jackson 2014, 21–38.

[14] House I in the Merkes of Babylon shows a continuity in its habitation from Neo-Babylonian to Hellenistic/Parthian times, when it was repaired to integrate a peristyle courtyard, see Reuther 1926, 147–159; on a similar case in Ur, see Woolley and Mallowan 1962, 46; a possible Achaemenid Governor's palace at Tell-ed Daim, despite its eroded floorplan, seems to follow the Neo-Babylonian layout; Curtis and Al-Rawi 2016, 57–64. The so-called *Palazzeto* in Tell Mardikh seems to follow the Neo-Assyrian pattern, see Mazzoni 1990, 190; other Hellenistic residences and houses in Tell Halaf, Tall Šēḫ Ḥamad, and Tell Beydar are considered to follow the Neo-Babylonian layout as well; Katzy 2015, 45–49; Novak 2005, 70. House 4 in Tall Šēḫ Ḥamad, though,

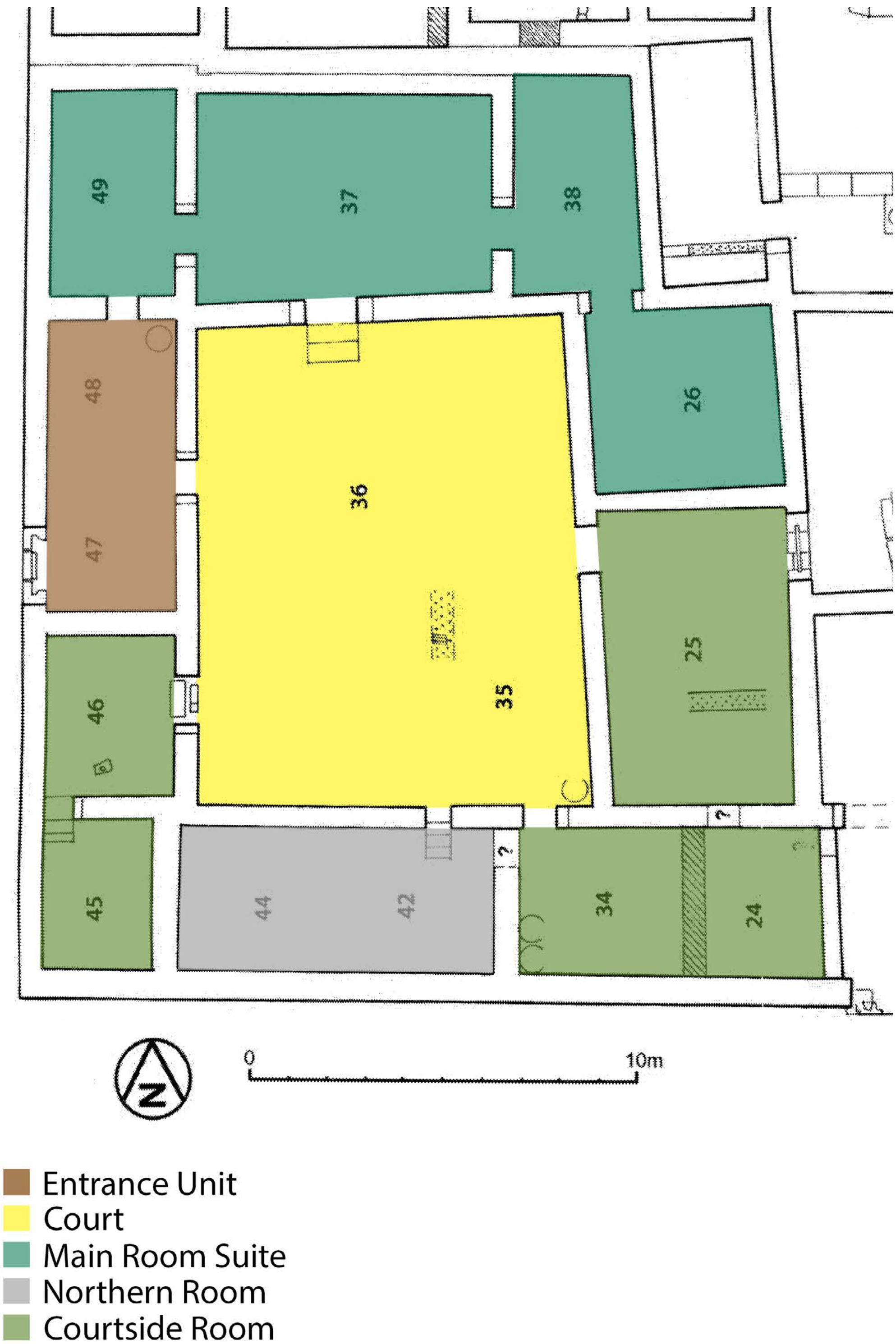

Figure 3: *Jebel Khalid, the so-called 'south-west house' in its earliest phase with the most important room clusters highlighted (after Jackson 2014, pl. III, digitally processed by the author).*

Susa-Seleukeia on the Eulaios

The second case leads us to the foot of the Zagros Mountains in the settlement of Susa. The city had been one of the major centers of Elam since the Proto-Elamite period; later, the Achaemenids chose it as one of their royal residences. In the Hellenistic period, the city was refounded as Seleukeia on the Eulaios, probably in the second half of the 3rd century BC, during the reign of Antiochos III, and received the status of a *polis*. Around 147 BC, the city came shortly under the control of the local Elymean kings, until 140 BC, when it passed on to Parthian Hegemony. From 1946 to 1967, the Louvre Museum organized the *Délégation archéologique en Iran*, which included Susa. Under the direction of Roman Ghirshman, this mission brought to light a part of a residential quarter, which was erected next to the old propylaea of the Achaemenid palace, to the north of the so-called mound of the *ville royale*. Laurianne Martinez-Sève, who studied the Hellenistic and Parthian layers during the last decades, provides us with a clearer image of the houses erected at this time.[15] Given the limited space of the excavated area, it is hard to tell whether this quarter was part of a planned settlement.[16] On the basis of epigraphic evidence, scholars have suggested that the Seleucids settled first a small military colony (*katoikia*) on the acropolis, while later, during the re-founding of the settlement as a *polis*, they extended it towards the area of the *ville royale*.[17]

In any case, the Hellenistic Layer consisted of two houses. House 1 is reconstructed as a house with a peristyle courtyard and for that reason has been the subject of much attention. In contrast, House 2 has often either been neglected as an example of indigenous Elamite architecture or is not even considered to belong to the Hellenistic layer.[18] Proceeding very cautiously regarding its problematic stratigraphy, this study focuses on this second house, since, apart from the Elamite architecture, its layout is comparable to the Mesopotamian architecture (**Figure 4**). Although its plan is fragmentary on its western side and any evidence concerning the doors between the rooms is lost, the arrangement around a central court is obvious.[19] In the same way, another feature is quite apparent: two broad rooms, flanked by some side rooms on the south side of the court, which we could reconstruct as two three-room suites. On the north-eastern corner, the sequence of the rooms can be identified as an entrance unit giving controlled access to the house. One narrower room that could lead into an adjacent room is to be seen on the northern side of the court.

We know indeed similar courtyard arrangements from the Middle Elamite residences that Ghirshman excavated in the settlement.[20] Thus, we have to keep in mind that Susa raises an issue regarding the continuity of the local architectural tradition. Our knowledge about Neo-Elamite and non-royal domestic architecture within the walls of the *ville royale* during the Achaemenid period is very limited,

has its main room on the west side of the courtyard, something not very common for a Neo-Babylonian house. Its attribution to the Neo-Assyrian pattern may be more correct; for the residence of Tell Beydar it is suggested that the antechamber, with its bent entrances before the main suite, must be an element derived from Neo-Assyrian palatial architecture; see Martín Galán 2008, 491–514. Similar antechambers are also attested in the Palace and perhaps in the 'house of the painted frieze' in Jebel Khalid. In the latter, the long antechamber is reconstructed by Jackson as a *pastas*; see Clarke 2001, 244; Jackson 2014, 99–101.

15 Martinez-Sève 2002, 39–45; 2011, 55.

16 Ghirshman 1953, 231–232 interpreted the quarter as part of a grid plan; Martinez-Sève 2002, 39, however, suggests that the quarter was *extra muros* because of an interment that was found close by.

17 Potts 2016, 357–364.

18 Ghirshman 1953, 232; 1962, 102; the similarity of the layout between House 2 and the later Parthian house at the same place along with the unclear stratigraphy of the excavated area led Martinez-Sève to the assumption that house 2 could belong to the Parthian layers; see Martinez-Sève 2002, 41.

19 Moreover, the artefacts found in the different rooms remain unpublished. Therefore, their function remains hypothetical.

20 Ghirshman 1965, 93–97.

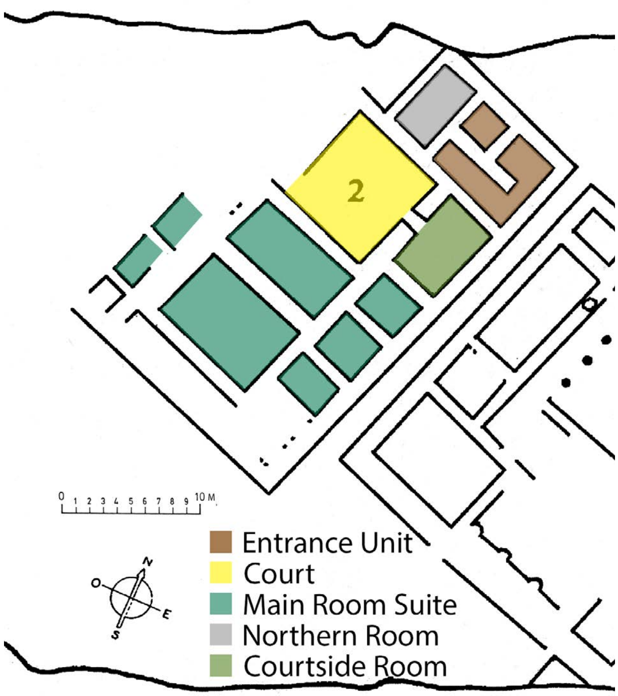

Figure 4: *Susa, Hellenistic House 2 with the most important room clusters highlighted (after Martinez-Sève 2002, Fig. 5a, digitally processed by the author).*

since the area seems to be empty of domestic constructions.[21] A survival of the Middle Elamite tradition in the region cannot be excluded. However, a comparison with the Neo-Babylonian Layout seems to be more fruitful, though not without problems. Apart from the controlled entrance and the courtyard arrangement, which are common also in the Middle Elamite houses, the rooms on the southern side of the court bear more similarities to a double Neo-Babylonian three-room suite (*bīt iltāni*). Although such a double arrangement is uncommon for the houses, the monumental architecture in Babylon and Kish can provide us with some examples of such a room sequence. All three palaces (*Südburg, Hauptburg, Sommerpalast*) along with the *E-mah* temple in Babylon present a similar sequence, namely two main broad rooms of identical width on the southern side of their courts. In the *E-hursagkalamma* temple in Kish, the same sequence consists of three broad rooms.[22] The same arrangement is also to be seen in the *cour de l'Ouest* in the Palace of Darius in Susa, the floorplan of which is influenced by the the *Südburg* in Babylon.[23] Whether such an element was the result of a conscious preference by the house owner, who may have intended to emphasize the monumentality of House 2, is still somewhat difficult to determine. Another possibility would be to reconstruct the first broad room as a portico. In that case, its layout would be similar to the houses in Seleukeia on the Tigris (see below). The building technique is the usual local one, based on the use of mud bricks, and does not differ from techniques used in

[21] Boucharlat 1990, 153–154; only a building complex, which was excavated in the so-called *ville des artisans*, consists of three phases from the Neo-Elamite up to the early Hellenistic times. Even this edifice bears no similarities with Hellenistic houses: Stronach 1974, 244–245.

[22] La Farina 2012, 276–282, suggests that small rooms behind the main room of the three-room suites in the Neo-Babylonian private houses follow this pattern as well but the second main broad room has been reduced in size.

[23] Amiet 2010, 1–13.

Southern Mesopotamia. At any rate, this type of house remains popular in the Parthian period, as we can clearly see in the layout of the houses in the succeeding Parthian layers.[24]

Seleukeia on the Tigris

The third case is Seleukeia on the Tigris in Babylonia. The city was founded by Seleukos I Nikator around 305 BC as one of the royal residences of the Seleucid Empire. In 141 BC, it was conquered by the Parthian king Mithridates I. and became one of the major cities of the Arsacid Empire. A mission from the University of Michigan was the first to conduct excavations at the site during the 1930s under the direction of Leroy Waterman. The team excavated an entire residential *insula* in the middle of the settlement, which was part of a grid plan. Its dimensions are approximately 70 x 140 m and its architectural history can be summarized in four different archaeological levels. Level IV, which represents the Seleucid founding of the settlement (305–145 BC), was inadequately excavated. Only in some rooms of Level III did the excavation go deep enough to reach the Seleucid layers. Therefore, what is known about the Hellenistic houses comes mostly from the Parthian Level III, which represents the period when the city was under Parthian control, but autonomous, with the status of a *polis* (141 BC–43 AD).[25]

Clark Hopkins, the director of the excavation for the last season, proposed a common layout for eight of the eleven sections and units that he distinguished in the block. He noticed that the main unit for most of the houses consisted of a central court, flanked on its south side by a portico with two columns *in antis*, behind which a broad main room is frequently located. On the other side of the court, there is one more room that is usually open to the court but without columns. All these rooms are equal in width, while the rest of the rooms of the house flank this basic unit, which he called *megaron* unit. Hopkins connected the sequence of the portico and main room with Achaemenid influences introduced to Seleukeia by the Parthians: more specifically, the sequence of an entrance portico and a central hypostyle hall. This sequence is also one of the basic principles in the buildings of the palace complex in Persepolis.[26]

Nevertheless, the Neo-Babylonian principles appear to be present also in this *insula* (**Figure 5**). An entrance room or an entrance unit leads very often to a secondary court, indicating the same concern for privacy as in the previous cases.[27] This is also confirmed by the position of the house cores on the inner side of the insula in order to shelter their privacy from the street's traffic. The core of the house consists of a number of rooms that flank a central court on three or four sides, while on its south side there is a portico that often forms a suite with one or more side rooms. Behind this, there is one more private suite, consisting of a broad room with at least one side room, conforming to the pattern of the Neo-Babylonian *bīt iltāni*. The latter is, however, in two cases either absent or, more likely, merged with the portico suite. The *bīt šūti* is also present in some houses, but is most often replaced by a room that is open to the court, which reminds us of the *exedra* of the Greek houses.[28] The rest of the rooms and secondary courts, which flank the main unit of the house, should also be considered to reflect Neo-Babylonian tradition, since richer Neo-Babylonian residences with more complex floor plans (*Komplexe Anlagen)* have similar annexes with groups of rooms and secondary courts separated from their main

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[24] Martinez-Sève 2002, 43–45, Fig. 5a–b. The layout of the Parthian houses seems in fact to be even more regular that the possible Hellenistic example, since there is only one three-room suite.

[25] Manasseh 1933, 1; Hopkins 1972, 28–29.

[26] Hopkins 1972, 32–35, however without detailed reference to more specific cases that include this pattern.

[27] In Seleukeia the controlled access can take even more complex forms including series of rooms or long angled corridors; Karampekos 2020, 186. Access is also possible through the blind alleyways of the *insula*, a practice that is also common for the Neo-Babylonian houses, Baker 2007, 70. At least five houses have more than one entrance.

[28] Karampekos 2020, 184.

Figure 5: *Seleukeia on the Tigris, Parthian house in Level III with the most important room clusters highlighted (after Hopkins 1972, Fig. 17, digitally processed by the author).*

units. Some of them had not only residential but also administrative functions and were still constructed during the Achaemenid period.[29]

Since Seleukeia on the Tigris lies in the heart of Babylonia and, as we have seen above, the Neo-Babylonian pattern was still in use during Parthian times, such design principles do not come as a surprise. The building techniques also follow the local tradition based mainly on the use of mud bricks, even for the columns of the porticoes. Saw-tooth walls, a typical element for the houses of the Merkes in

[29] Miglus 1999, 191–193; Baker 2011, 540; La Farina 2012, 271–287; two archives with a high percentage of official stamps on the preserved *bullae* that were found in two rooms of the Seleucid layer of the insula, allow us to assume that this block contained also similar residencies during the Seleucid period, Hopkins 1972, 30–31, 44 and 57.

Babylon, are also present here.[30] Yet the character of these houses was not exclusively local. Apart from the porticoes and the open *exedras*, elements of Greek architecture are attested in the masonry style wall decorations, the clay simas with lion head spouts, along with the clay palmette antefixes that decorated the flat roofs of the houses at Seleukeia.[31]

The crucial question is: do the Parthian houses of Level III reflect the original layout in the block during the founding of the city? The excavation in three areas of a house in the *insula* consisting of a court between two porticoes has shown that they had the same form and they were in the same place already in Level IV.[32] Although the side rooms of the unit were not excavated, the aforementioned conclusion is a very good indication that the house type described in Parthian Level III was also present in the preceding Level IV. This conclusion is further strengthened by the columns *in antis* or even the half-pilasters, which are also found as a part of some private houses in the early Parthian and perhaps the Seleucid level in the southern part of the settlement.[33] In addition, features traditionally related to Parthian architecture, like the *iwan* hall, do not appear before the succeeding Parthian Level II.[34]

Dura Europos

The last case to be examined here is Dura-Europos in Northern Mesopotamia. The city was founded during the reign of Seleukos I Nikator. In 113 BC it came under Parthian control until the Roman conquest in AD 165. During the 1920s and 1930s a French-American Expedition conducted excavations at the site organized by Yale University and the French Academy of Inscriptions and Letters under the direction of Franz Cumont and later of Michael Rostovtzeff. Since the 1980s, the Mission Franco-Syrienne d'Europos Doura has returned to the site under the direction of Pierre Leriche. Both teams uncovered a large part of the ancient settlement, including a large number of residential *insulae* of 35 x 70 m, forming a grid plan. Whether this planned settlement belongs to the founding phase or to an extension in the 2nd century BC that grew out of an originally small, unplanned settlement under the acropolis, is still a matter of debate between the two excavating groups.[35] Certainly none of the teams adequately reached the Hellenistic layers in the residential blocks. Our knowledge of the domestic architecture in the settlement comes mainly from the Roman, sporadically also from the Parthian layers.

The American excavators of the site have suggested from the very beginning that the Parthian-Roman houses of Dura can be attributed to a common 'typical' pattern, which includes a central court surrounded by rooms and a right-angled entrance room.[36] A Parthian house, later transformed into a Christian church, was also used as a typical example of a Durene house.[37] Based on this house and some other Parthian houses, Wolfram Hoepfner and Ernst-Ludwig Schwandner reconstructed a *Typenhaus*, which should correspond to the original layout of all the houses during the founding of the settlement. The scholars suggested that this layout was deeply influenced by Neo-Babylonian rather than Neo-Assyrian domestic architecture, but elements of the Greek architecture like collonaded *exedras* were also present.[38] Anny Allara confirmed that the layout of the Durene houses is local Mesopotamian in

[30] Manasseh 1933, 4–5.
[31] Karampekos 2020, 185.
[32] Manasseh 1933, 9–10 pl. 4:1; Hopkins 1972, 47 argues that these excavated rooms belong to the first phases of Level III.
[33] Negro Ponzi 1972, 21–25, the scholar attributes indeed this kind of inner court with the portico on one side to a 'Hellenistic style' indicating that it reflects the original layout of the houses.
[34] Hopkins 1972, 67–100.
[35] On the different views, see Rostovtzeff 1941, 483–485; Leriche 2003, 175–178.
[36] Hopkins 1934, 31–34, pl. VI.
[37] Perkins 1973, 21–13, Fig. 5.
[38] Hoepfner and Schwandner 1994, 257–292.

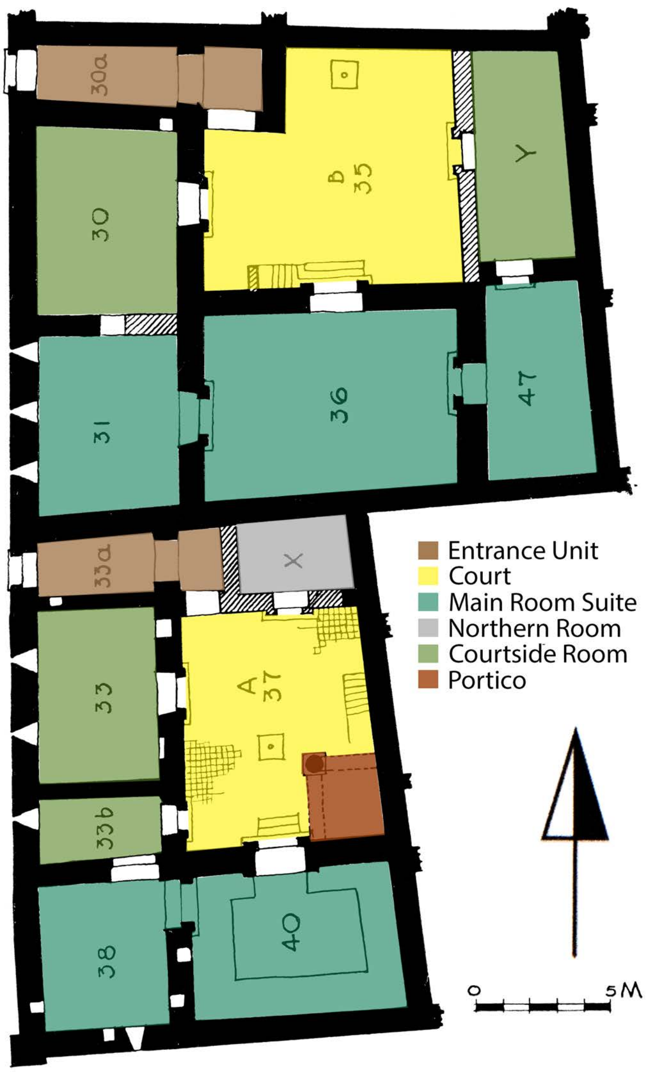

Figure 6: *Dura-Europos, Parthian houses in the insula L7 with the most important room clusters highlighted (after Pearson 1936, pl. XI: 2, digitally processed by the author).*

combination with some Greek elements like columns, moulded plaster cornices, and the use of benches in the main rooms.[39] Jennifer Baird has pointed out that despite the variety in terms of form concerning the Durene houses, there are some common features discernible almost in every house. These include an L-shaped entrance passage leading to a central court, on the south of which lies a broad principal living room, which is also used for reception. This principal room often, but not always, forms a two- or three-room suite with its side rooms. Baird, though, stresses that the origin of those features should be regarded with caution, since similar concepts are attested in both Greek and Mesopotamian domestic architecture.[40] The building techniques also consist of the combination of mud bricks on plaster or stone-rubble wall base, a common method in Mesopotamia.

It is quite evident that the later Parthian-Roman houses of the settlement provide us with design principles regarding the arrangement around a central court, an entrance room, and a main room/suite

[39] Allara 1997, 185–186.

[40] In Delos, for example there is also a broad main room, while in early houses of the Classical period there are blank exteriors indicating a concern for privacy exactly like in the Mesopotamian houses, Baird 2014, 62–86.

on the south side of the court. These features can, among others, be considered to have been inspired by the Neo-Babylonian pattern, with integrated elements of Greek architecture (**Figure 6**). Although it is hard to say if these houses are a continuation of the original Hellenistic houses, similarities in terms of the design principles of the Hellenistic Redoubt Palace on the site, along with the houses of our other three cases, could be a good indication for that. Excavated Parthian houses from other sites also bear some similarities with the houses of Dura, but do not follow the same pattern.[41] Apart from the houses that were built or transformed for Roman military use, there are no new types of Roman domestic architecture attested in the settlement either.[42]

A common, preconceived design?

On the basis of these four cases, it is legitimate to ask why the houses presented here show such similarities in their layout. Courtyard houses are indeed a very widespread house type all the way from the Mediterranean to the Middle East. Heather Baker has already pointed out common features between the Neo-Babylonian pattern and what Lisa Nevett called the 'single entrance, courtyard house' for the Greek world: namely, a single entrance from the outside, the screening of the house's interior, and a central courtyard that monitors access to the different rooms of the house.[43] All these features are also present in the houses of our four cases.[44] Nevertheless, even within Mesopotamia there are significant differences in the layout of the different courtyard houses, depending on the region and the period. Despite their similarities, for instance, Old Babylonian houses do not follow exactly the same design principles as the Neo-Babylonian houses.[45] Likewise, as we have seen above, striking differences appear between the Neo-Assyrian and the Neo-Babylonian layouts as well as the forerunners of the former in Northern Mesopotamia.[46] Among all the Mesopotamian layouts of the 1st millenium BC, it was the Neo-Babylonian one that included more regular main room suites with concrete form and orientation.

On the other hand, the Greek 'single entrance courtyard houses' show an even greater diversity in their layout, differing in many ways from Mesopotamian houses. Entry rooms, so common for the Mesopotamian layout, are only attested in Greek elite houses. Most of the average houses use mud brick walls or angled corridors to conceal their interior from the street.[47] In addition, some elite houses in Delos have entrances that allow a view from the street into their interior.[48] Three-room suites are also common for the elite Greek houses but, in contrast to the Neo-Babylonian cases, they consist of a colonnaded *exedra* between two reception rooms (*andrones*) and do not have a specific orientation.[49] Such a suite is also present in the palace of Jebel Khalid and must have played a key role in the design

[41] The layout of the Redoubt Palace seems to be also influenced by the Neo-Babylonian pattern; Nielsen 1994, 117. On the Parthian houses with *Iwan* in Assur, see Andrae and Lenzen 1933, 9–25; on the domestic complex in Tell Barri, Palermo 2012, 637–647.

[42] Baird 2014, 62.

[43] Baker 2015, 400; on the model of the 'single entrance courtyard house' Nevett 1995, 363–381.

[44] See for instance how Baird adopts the principles of the 'single entrance courtyard house' in the houses of Dura. Baird 2014, 80.

[45] Miglus 1999, 9–98 and 177–212; Baker 2014, 16; according to Baker 2011, 547, 'chapels' and rooms with altars, although typical for the Old Babylonian layout, disappear from the Neo-Babylonian pattern in the 1st millennium BC.

[46] Miglus 1999; although Castel 1992, 59–61 traces common prototypes for elite Neo-Assyrian and Neo-Babylonian houses, there is a great diversity among them. Neo-Assyrian private suites have no concrete form and orientation and there can be more than one of them within a courtyard.

[47] Ault 2015, 128; Nevett 1995, 368; Jackson 2014, 532–536.

[48] Nevett 2010, 63–88.

[49] For a discussion and comparison with the Greek three-room suites and the suites in Delos, see Jackson 2014, 542–545.

of the portico suites in Seleukeia on the Tigris.[50] Principal rooms in the houses of other Greek planned settlements are forming different kind of complexes.[51] Peristyle courtyards are a very popular feature of the Greek house during the late Classical and Hellenistic periods but are absent from our cases, with the exception of House 1 in Susa. On the contrary, while porticoes, colonnaded and open *exedras* compose a primary element in the layouts of Seleukeia on the Tigris, they appear more randomly in some houses in Jebel Khalid and Dura-Europos.[52]

In view of this, it becomes clear that the Neo-Babylonian pattern seems to have influenced the layout in our cases more than the other Mesopotamian or Greek layouts. Yet, was this just a spontaneous choice by the individual architects and house owners based on the local tradition, or did the city founders, the Seleucids and their officials, promote a central planning? Why did the inhabitants of the new settlements prefer the Neo-Babylonian design, despite their different cultural backgrounds? The factors that contribute to the choice of a house layout constitute, indeed, a complex topic that exceeds the length of this short paper. Since the Seleucids, however, come from the Graeco-Macedonian context, it would be interesting to see who designed, who built, and who financed the housing in the Greco-Macedonian foundations. Such topics have caused a heated debate since the 1980s.[53] Despite different opinions, all scholars agree that the planning and the building of each house lay within the responsibility of the households and their architects. Nevertheless, similarities observed in the elements of the house layouts indicate that some guidelines were established already before the construction. However, the financing of the housing lay within the responsibility of the founders, who made use of multiple resources (including treasure funds, special taxes, or even loans given by wealthier citizens) in order to provide the new settlers with the financial means for the construction of their houses.[54] Jamie Sewell has highlighted the financial aspect and importance of a predetermined house design for the logistics of a new settlement. By using such a design and with prior knowledge of technical details (length and height of the walls, the size of roofs, etc.) and the number of new houses, it would have been easier to estimate the costs of the building materials and the resources required.[55] Considering the ambitious urbanization programs of the first Seleucids and the number of new foundations they included, it is legitimate to assume such a strategy as a valuable aid for the logistics of housing in the new settlements.[56] The written sources concerning the Seleucid Empire also suggest that, except for the provision of pieces of land (*kleroi*) including dwelling plots (*oikopeda*), the Seleucid founders in some cases promoted the rebuilding of ruined houses or even the provision of dwellings and shops for the settlers of the new foundations. A similar strategy is also attested concerning foundations in other Hellenistic states.[57] The regularity and the monumentality of the houses of the Merkes in Babylon have led some scholars to suggest that also here preconceived designs must have been in use, perhaps conducted by the same architects who participated in the public projects under Nebukadnezar II.[58]

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[50] In Jebel Khalid, however, the central *exedra* serves as a main room, while the side rooms are service areas more reminiscent of the Mesopotamian than the Greek cases, see Clarke 2001, 238–242. In Seleukeia, it is more difficult to define its function, see Karampekos 2020, 187.

[51] On the so-called kitchen complex in Olynthos and similar complexes in Greek houses, see Cahill 2002, 153–161; Ault 2015, 128.

[52] Jackson 2014, 81–83 and 99–101, 452; Baird 2014, 67–68.

[53] On the different approaches, see Hoepfner and Schwandner 1994, 312–330; Cahill 2002, 194–222.

[54] Sewell 2010, 98–103; Ault 2015, 126–127.

[55] Sewell 2010, 101.

[56] On the urbanization programs of the first Seleucids, see Kosmin 2014, 183–221.

[57] An analysis of the written and epigraphic evidence is given in Cohen 1978, 45–71 and Billows 1995, 160–169. However, in contrast to the allotments (*oikopeda*) of the Greek planned settlements, the Seleucid allotments were unequally divided based on the military rank of the settlers or other social criteria. The *insula* in Jebel Khalid seems to be unequally divided from the very beginning; see Jackson 2014, 19–20.

[58] Miglus 1999, 181; Battini 2006, 82.

The preference for the Neo-Babylonian pattern as a preconceived design must have been connected to a series of advantages that it offered. As Miglus points out, this layout is very regular, but is not formalistic, since it leaves room for flexibility in the process of forming the room clusters.[59] Furthermore, because of its similarities with the Assyrian and the Elamite layouts (courtyard arrangement, entrance suites, and suites consisting of broad rooms with adjacent areas), the Neo-Babylonian pattern was also familiar to the inhabitants of Northern Mesopotamia and Elam. The addition of porticoes and *exedras* made it also attractive for the newcomers from Greece and Macedonia.

Conclusion

To summarize, based on the archaeological material of the four settlements treated here, which are spread from Northern Syria to Western Iran, we can suggest that the Neo-Babylonian house pattern, which was still in use in the early Hellenistic times, affected the way the houses were built in the new foundations in the wider region of Mesopotamia and Elam. Similarities between the house layouts in all these settlements allow us to assume that some common designs must have played an important role in the planning of the new cities of the Seleucids. Such designs were related to the hard logistics of their ambitious urbanization program. Yet, even if such designs were primarily influenced by the main principles of the Neo-Babylonian pattern, the character of the houses was not exclusively Mesopotamian. The architects working in those settlements modified these designs by adding or removing rooms, using Greek porticoes and *exedras*, flat roofs decorated with clay *simas* in Greek style, or even pitched roofs with Corinthian tiles. In this way, they responded to the complex taste of the culturally heterogeneous societies that settled in the new Seleucid foundations. These types of houses proved to be a successful invention, since they were in use even after the period of the Seleucid control in the region. Through this spectre, the Hellenistic, Parthian, and Roman houses in these settlements must be seen as dynamic entities, open to a synthesis of elements deriving from different cultural environments rather than the continuation of a local tradition.

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[59] Miglus 1999, 213.

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