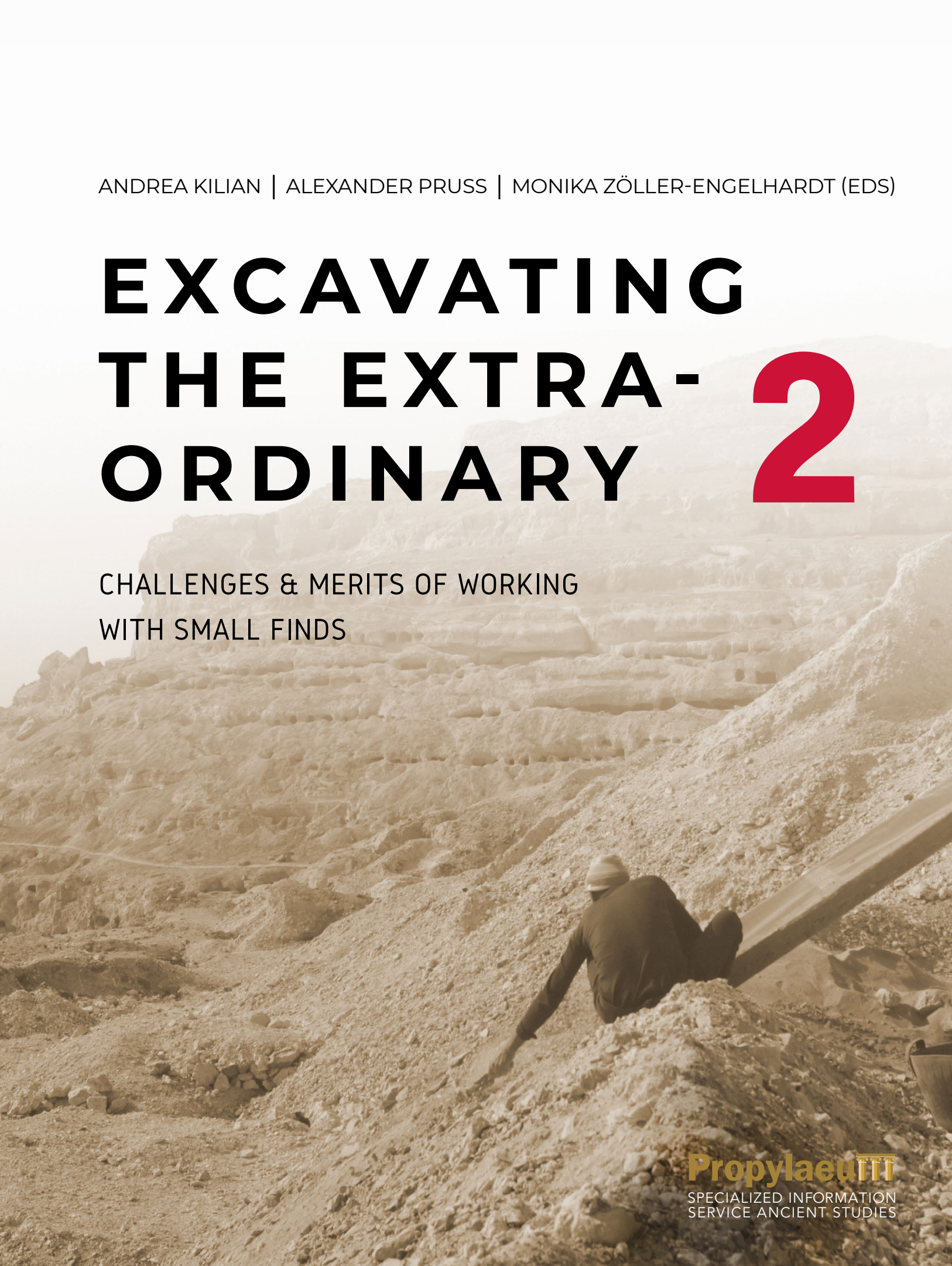
ANDREA KILIAN | ALEXANDER PRUSS | MONIKA ZÖLLER-ENGELHARDT (EDS)

EXCAVATING THE EXTRA-ORDINARY 2

CHALLENGES & MERITS OF WORKING WITH SMALL FINDS



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PROCEEDINGS OF
THE INTERNATIONAL WORKSHOP
AT JOHANNES GUTENBERG UNIVERSITY MAINZ,
25–26 NOVEMBER 2022

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Bibliographic information published by the Deutsche Nationalbibliothek
The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at https://dnb.dnb.de.

Propylaeum
SPECIALIZED INFORMATION SERVICE ANCIENT STUDIES

The electronic open access version of this work is permanently available at https://www.propylaeum.de.
urn: urn:nbn:de:bsz:16-propylaeum-ebook-1382-2
doi: https://doi.org/10.11588/propylaeum.1382

Published by
Heidelberg University / Heidelberg University Library, 2024
Propylaeum – Specialized Information Service Ancient Studies
Grabengasse 1, 69117 Heidelberg, Germany
https://www.uni-heidelberg.de/en/imprint

Cover illustration: Fritz Barthel 2017, © The Asyut Project

ISBN 978-3-96929-313-3 (Hardcover)
ISBN 978-3-96929-312-6 (PDF)

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Introduction: Expanding the 'Extra' in the 'Ordinary'

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Andrea Kilian (Freie Universität Berlin)
Alexander Pruß (Johannes Gutenberg University Mainz)

1 Background and aims of "Excavating the Extra-Ordinary 2"

Every archaeological project uncovers small finds, be they tools, vessels, figurines, jewellery, or models. Time and again these finds are so common and 'ordinary' that their potential for deeper insight is grossly underestimated. Often these finds are fragmentary, found in disturbed contexts, or occur in such large quantities that their recovery and analysis is a Herculean effort. In many cases only a small selection of such finds is adequately presented in final publications. Museums and collections frequently contain small finds from early excavations or from the art market whose contexts are not (sufficiently) documented or whose provenance can no longer be determined. Nevertheless, all these finds can provide invaluable scientific knowledge if researchers dare to take them on. In 2019, the workshop "Excavating the Extra-Ordinary. Challenges and merits of working with small finds", initiated by Monika Zöller-Engelhardt and Andrea Kilian, provided a first platform for excavators, museum staff and personnel from universities and institutions on all career levels to exchange ideas about methods, *modi operandi* and best practices, with a focus on dealing with largely disturbed contexts, managing large quantities of finds, identifying specific items in mixed groups, and coping with inconclusive results. The conference proceedings of this first workshop with more than fifty participants from all over the world and fifteen presentations resulted in a conference volume[1] that was published in 2021. This first fruitful conference and publication showed that there is still a great demand for this kind of exchange, so a continuation of the "Excavating the Extra-Ordinary" workshop format seemed useful.

"Excavating the Extra-Ordinary 2" aimed to continue and broaden the discussion on challenges and merits of working with small finds. Again, we wanted to bring together scholars from all areas of object-centered work and material culture, be it fieldwork, museological expertise or university staff as well as independent researchers. Since archaeological work and the exchange on methodological questions benefit greatly from interdisciplinary exchange, it was a great gain to extend the team of organisers with Alexander Pruß, whose expertise in Near Eastern

1 Kilian/Zöller-Engelhardt 2021.

Published in: A. Kilian, A. Pruß, M. Zöller-Engelhardt (eds), Excavating the Extra-Ordinary 2. Challenges and Merits of Working with Small Finds. Proceedings of the International Interdisciplinary Workshop at Johannes Gutenberg University Mainz, 25–26 November 2022, Heidelberg: Propylaeum, 2024, 1–28. DOI: https://doi.org/10.11588/propylaeum.1382.c19768

Archaeology complements the research questions on small finds in archaeological work. Once again, our broad understanding of 'small finds',[2] generated a great response, resulting in a two-day workshop with over fifty participants and seventeen papers. The keynote lecture by Aaron Schmitt, University of Heidelberg, on the potential of analysing records and findings from early excavations at Ur and Ashur, as well as four impulse papers set the tone for the lively discussions during the event.

Still, the focus of ongoing discussions lay on methodological challenges and the comparison of strategies and methods for dealing with all kinds of (extra-)ordinary archaeological objects. Participants were motivated by the challenges of working with large quantities of finds, insufficient early publications, or dealing with objects without context. Some new perspectives that were discussed included, to name just a few, microdebris, multidisciplinary approaches, and the re-use of objects. The present publication captures many of these aspects and we are grateful for the opportunity to include them in this volume.

2 Definitions and points of discussion

Monika Zöller-Engelhardt

During the previous "Excavating the Extra-Ordinary" workshop and in the conference proceedings, we initiated the topic with a brief discussion on the definition of 'small finds'. Since the introductory remarks were far from exhaustive, the subject shall be introduced here from a slightly different perspective.

While preparing an accompanying seminar on small finds in the winter semester 2022/23, the author found this rather unsatisfying definition of 'small finds' on Wikipedia:

> "Small finds is an archaeological term for artifacts discovered on excavations which are **somewhat special compared with the common finds** for that type site or type phase on multi phasic sites. The special nature of the find is dictated by research agendas and the information the artifact can provide. Examples of the increased importance of small finds over other finds would be coins being often thought of as small finds whereas pottery sherds as just finds. The reason is coins can be much more specific when it comes to dating evidence. Small finds are usually treated differently in the recording system; often they are recorded on plan rather than being attributed to a single context like other generic finds."[3]

2 Cf. Zöller-Engelhardt/Kilian 2021: viii–xvi.

3 https://en.wikipedia.org/wiki/Small_finds (accessed 24.11.2022), emphasis by MZE. In the meantime (March 2024), the Wikipedia article has been updated four times, but the content has remained largely unchanged. Several requests for citations have been added.

In response to definitions like these, it seems risky to regard one group of finds as more special than others, since it can result in uneven priorities in the consideration and analysis of various groups of finds on a site or in a museum. Consequently, it can distort the interpretation and perception of the context, as demonstrated in some older publications.[4] It is not entirely accurate to claim that a coin systematically holds more scientific value than a pottery sherd, a terracotta figurine, or a wooden fragment. These objects, often referred to as 'common' or 'generic' finds, are far from 'ordinary'. In fact, investing time, resources, and energy into analysing these 'ordinary' finds can lead to quite extra-ordinary results.

However, defining the term '(small) find' still presents a definite challenge. While already early researchers as William Matthew Flinders Petrie separated "small objects"[5], archaeological introductions mostly define terms like 'artifact', which is, however, often in contrast to a broad definition of 'find' or 'small find'. A definition of '(small) find' should include objects, or maybe more accurately *things*,[6] that may not necessarily fall under, for example, Renfrew and Bahn's characterization of artifacts as "[a]ny portable object used, modified, or made by humans; e.g. stone tools, pottery, and metal weapons"[7]. A find is only considered a find through the process of finding it. The item exists as a material (or even non-material)[8] entity without human intervention, but only gains its status as a find through human-thing-interaction.[9]

Therefore, in accordance with the workshop title, 'small finds' are here understood in the broadest sense, including pottery, fragmentary objects, botanical remains, or micro-debris. The one requirement for the broad concept is that the object (or thing) must be discovered by humans in a specific (in this case, archaeological) context to be viewed and analysed as a 'find'. Thus, also stone vessels, (re-used) pottery sherds, or fragments of wooden statues as well as metal 'blobs' belong to this category.[10] The term 'small' is also unclear and subjective. While it may certainly apply to most pottery sherds, coins, terracotta figurines, or wooden funerary models, it could be used, for example, for fragments of larger entities such as pieces of architecture (but not an entire building), or elements from a chariot (but probably not the entire wagon).

4 Cf., for example, the unbalanced ratio of small finds and pottery depicted in publications by William Matthew Flinders Petrie, as exemplified by Henning Franzmeier (Franzmeier 2021).

5 Petrie 1927.

6 For a comprehensive discussion on the German terms "Ding", "Sache", "Gegenstand" see, for example, Hahn 2014: 18–21; on "Artefakte", "Fund(stück)e", "Gegenstände", and "Objekte", see Keßeler 2016: 343–345. On thing theory in general, Brown 2004; Brown 2015.

7 Renfrew/Bahn 2015: 338. Against the definitional value of the term "portable object" see Tsouparopoulou/Meier 2015: 52, who state "Mit der Frage nach einer notwendigen Materialität von Artefakten geht auch die Frage ihrer Transportabilität einher [...]. Zumeist bezieht sich der Begriff ‚Artefakt' auf spezifische, bewegliche und normalerweise mobile Dinge, wobei für uns nicht erkennbar ist, woher dieser Konsens rührt. Die Auffassung, Artefakte müssten mobil sein, so dass es sich dabei um eher kleine Dinge handelt, schließt jedenfalls eine Vielzahl anderer materieller Dinge, die gleichfalls menschlichen Eingriffen unterlagen, aus (v.a. Immobilien und insbesondere Architektur), obgleich diesen definitorisch ebenso Artefakt-Status zugesprochen werden könnte."

8 Cf. the discussion in Tsouparopoulou/Meier 2015: 51–52 with further references.

9 In the terms of Hodder 2012. For a perspective informed by Actor-Network-Theory cf. Fitzenreiter 2023.

10 See examples for these in this volume by Robert Kuhn, Julia Budka, Tina Beck, and Martin Odler/Jiří Kmošek.

Fig. 1: Ancient Egyptian adze (New York MMA 96.4.7); © The Metropolitan Museum of Art, https://www.metmuseum.org/art/collection/search/547562 (accessed 12.03.2024)

In addition to the definitional questions, it is important to acknowledge that working with small finds presents unique challenges for researchers. The so-called common finds, such as pottery sherds, are abundant on excavation sites, but they are often fragmented, found in disturbed contexts, re-used, discarded, or lacking provenance. Here, it is particularly useful to discuss methodological approaches, theories, and best practices to fully utilise the great potential of these challenging finds.[11] Fortunately, in recent decades, archaeological research has again made significant progress in analysing, interpreting, and processing small finds. New approaches to material culture have been tested to overcome one-dimensional ways of thinking.

In addition to new scientific methods and technological possibilities, there are new conceptual frameworks such as agency,[12] affordance,[13] entanglement,[14] and the concepts of assemblages,[15] object biographies,[16] and other areas of the 'New Materialism'.

When using concepts of the New Materialism, one question that arises is the shift from asking what something *is* to what something *does*.[17] This approach allows for a broader understanding of objects beyond their 'primary function' – or presumed primary function – enabling the ascription of multiple functions and contexts to material culture. As Rune Nyord has pointed out, Egyptology tends to "decontextualize artworks to study them according to purely iconographic and stylistic criteria"[18]. The same can also be said for analysing small finds. When

11 The same can be said of unprovenanced finds in museums, cf. Stevenson 2019.
12 See, for example, Hodder 2012.
13 Knappet 2005; Fox et al. 2015: 63–70.
14 Hodder 2011; Hodder 2012.
15 Harris 2021: 10 (after Deleuze/Guattari 2004).
16 Kopytoff 1986; Harris 2021: 10. In Egyptology see, for example, Meskell 2004.
17 Cf. Harris 2021: 20.
18 Nyord 2020: 3.

Fig. 2: Reconstruction of a foundation deposit from the time of Hatshepsut and Thutmose III (New York MMA 25.3.39); © The Metropolitan Museum of Art, https://www.metmuseum.org/art/collection/search/544457 (accessed 12.03.2024)

looking at an object (Fig. 1), we might spontaneously categorise it as a tool and attempt to determine its primary function and method of use, potentially in a workshop or construction crew, and maybe try to reconstruct how it ended up in its current find spot.

When considering the same object in context (Fig. 2), we would clearly associate a different function and different background for the deposit. In the context of a foundation deposit,[19] the item serves a different function that is connected to ritual or religious-magical practices. This does not necessarily render it dysfunctional for its assumed 'primary function', as may be the case for models used as representations in foundation deposits.[20] However, it allows for a much broader perspective on the intention behind its creation and its object biography.

This approach can be expanded further. Regarding the relations of objects against the background of new concepts offers even broader possibilities of analysis and interpretation. For

19 A foundation deposit is a "type of votive offering placed in or beneath the foundations of a building or in its vicinity at the time of its founding", Weinstein 1973: xix. In ancient Egypt, it typically contains miniature tools, vessels, and further model objects connected to the rites of the foundation ceremony.

20 Cf. the discussion of the functionality of funerary models in Zöller-Engelhardt 2022: 155–159, esp. fn. 25.

instance, relations between humans and things, but also – in the words of Ian Hodder[21] – between things and other things as well as things and non-human entities. In the ancient cultures, these entities could include gods and goddesses, spirits, souls, or the deceased.

In recent years, there has also been significant interest in the interdependencies between objects and groups of humans or entire societies. Even the notion that humans must interact with material culture as a prerequisite for learning about the past has been challenged.

In his 2021 book "Assembling Past Worlds", Oliver Harris discusses seven challenges facing modern archaeology in developing not only a post-processual, but a post-humanist approach:[22] He recommends that scholars adopt a post-anthropocentric perspective, embrace the vibrancy of matter, acknowledge the significance of relations, process, and history, while still hold on to things themselves in their own right. Additionally, the author states that it is important to acknowledge that things can be more-than-representational, that researchers should work at multiple scales, and be open to creating new (especially non-western) concepts.

Scholars of Ancient Studies, particularly in Egyptology, may most likely observe a connection to the concept of more-than-representational, which is inherent in many aspects of Ancient Egyptian funerary culture. In the Egyptian funerary culture, texts, depictions, and physical objects create a transcendental reality that is not simply a representation of the real world, or the idea of a physical place that exists elsewhere. Instead, they convey complete concepts such as transformational and liminal processes, which are expressed as specific manifestations in the material culture. For example, Nyord discusses a specific type of Ancient Egyptian image, referred to as *sšmw*.[23] This image can be realised as three-dimensional sculpture in the round, that means a statue, but unlike other types of images that may be representations of the tomb owner and be part of the ongoing funerary cult, *sšmw* figures were not intended to be interacted with,[24] on the contrary: they were meant to be kept hidden and secret, secluded from the funerary cult after the deceased was interred. The function(s) of these objects is not to represent a real-world reference and act as a proxy to receive offerings or recitations. Instead, they serve to materialize the processes of 'guiding' and 'leading' the deceased, as implied by Egyptian funerary texts. As such, a material object acts as the focal point of a complex more-than-representational concept.

Without discussing all the challenges posed by Harris, a brief exploration on the idea of adopting a post-anthropocentric perspective may advance the understanding of pre-modern societies. From an ontological point of view, it can be challenging for humans to avoid perceiving everything else as a collection of non-human entities that require our input, handling, or consideration to have an impact or effect (Fig. 3). It is worth reflecting on how the world, in this case particularly the world of material objects, has influenced the development of not

21 Hodder 2011; Hodder 2012.
22 Harris 2021: 21–40.
23 Nyord 2020: 12–16.
24 For human interaction with statues regard, for example, the ritual of Opening the Mouth, on this recently Quack 2022.

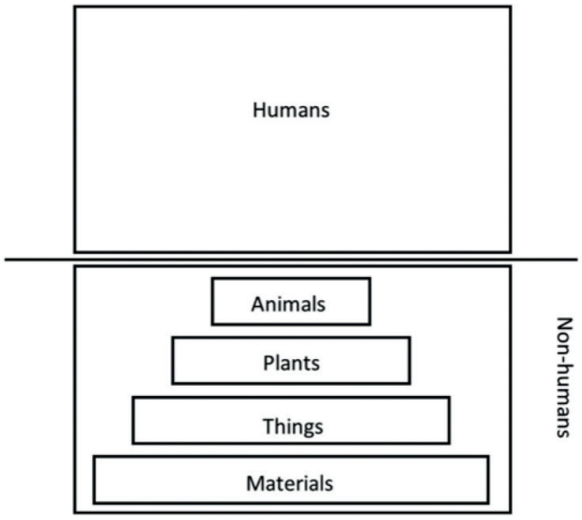

Fig. 3: Ontological elevation, after Harris 2021: 25, fig. 2.1.

only humans but also animals, plants, and objects in the past and present. A contemporary illustration is the smartphone, which has had a substantial influence on an entire generation since its invention two or three decades ago.

Ontological research has shifted the perception of this former dualism to considerate modes of being in a new way.[25] Harris provides the example of groups in Amazonia who conceptualize the world as highly animated.[26] They state that animals and people share a similar soul, which allows powerful humans to transform into animals. In the scientific modern western world view, this idea may be categorized as a 'local belief', which is an obstacle to a full understanding of this alternative conception of the world.[27] As Harris emphasizes, these observations are not solely about what people believe: motor functions of human hands can change in response to the tools they use; even the structure of the brain can be affected by learning new skills and interacting with physical objects or the surrounding world.[28]
Therefore, the analysis of small finds does not only open a window to understanding the past in terms of the manufacture, use, and disposal of things, but also prompts us to consider the nature of objects, what they actually are, which power or agency they emit and how these different perspectives can contribute to gain a more comprehensive understanding of the past. Or, as Amiria Henare, Martin Holbraad, and Sari Wastell observe:

25 Cf. Nyord 2020: 4.
26 Harris 2021: 23.
27 In this context it is worth noting that especially Ancient Egypt is well-known for its animal-headed gods and goddesses. This may suggest, as Nyord states, following Philippe Descola, "the presence of underlying connections and analogies between the different kinds of living beings." Nyord 2020: 5.
28 Harris 2021: 23.

> "So, if the first step to 'ontological breakthrough' is to realise that 'different worlds' are to be found in 'things', the second one is to accept that seeing them requires acts of conceptual creation – acts which cannot of course be reduced to mental operations (to do so would be merely to revert to the dualism of mental representation versus material reality). On this view, anthropological analysis has little to do with trying to determine how other people think about the world. It has to do with how *we* must think in order to conceive a world the way they do."[29]

This section of the introduction concludes with another definition of 'small finds', however, found in the Turkish variant of the Wikipedia article on the subject. It demonstrates a slightly better grasp of the concept and the organizers of "Excavating the Extra-Ordinary 2" especially wish to echo the final statement:

> "Small finds is the archaeological term **given to a large number and variety of small objects** such as pins, buckles, earrings, beads, pens, etc. made of various materials and used in daily life by historical peoples, as well as connecting parts used in furniture and architectural components. Depending on the use of the object, these materials are made of metal (gold, silver, bronze, iron, copper, lead, etc.), terracotta, bone, leather, stone (marble, alabaster, crystal, other precious and semi-precious stones), wood or glass. Since the processing of the materials used in small find groups varies, having information about the construction techniques of each material group is an important element in the periodic and typological studies of the materials. **By studying small finds in archaeological excavations and research, it is possible to obtain a lot of information about the social, religious, cultural and daily life of the civilization uncovered by excavations**."[30]

Case Study 1: Pottery

Andrea Kilian

As previously outlined, the question of the proper definition of 'small find' remains a matter of controversy. In particular, the status of the category of 'pottery' within this definition is a point of discussion.[31] We have determined that pottery should be included in this category due to the fact that many of the challenges associated with its treatment are similar to those encountered in the majority of other categories of 'small finds'.

29 Henare/Holbraad/Wastell 2007: 15.

30 https://tr.wikipedia.org/wiki/Küçük_buluntu (accessed 24.11.2022) emphasis by MZE, translated to English using DeepL. The article has remained unchanged (March 2024).

31 As already mentioned in Zöller-Engelhardt/Kilian 2021: ix.

Fig. 4: Keg from Kharga, early Ptolemaic (according to Gill 2020), Metropolitan Museum of Art Acc. No. 25.10.20.266, © Rogers Fund, 1925

When dealing with pottery, the 'fuzzy boundaries' between different object categories become apparent from the very beginning. A particularly illustrative example can be found in Julia Budka's contribution in this volume on the re-use of pottery, which also addresses the question of how to categorize the finds. Is a re-used sherd an object in its own right, or does it still belong to the category of 'pottery' in the broadest sense? Who decides on this matter, and what are the consequences? A comparable issue arises with ostraca and inscribed vessels. It is not necessarily obvious from the beginning whether an inscribed sherd is an ostracon or if it details information related to the vessel resp. its content, as is the case with e.g. *tituli picti*.

While an ostracon provides additional information not related to the sherd or the vessel from which it originates, the *tituli picti*[32] supplement the information gained through the study of the pottery, as they provide information related to the vessel such as the name of a recipient, the products once contained in the vessel, or the place of provenance etc.[33] So, while the ostracon will be of interest to linguists and philologists, the *tituli picti* are quite standardized and not of similar high interest to them concerning grammar and topic. However, a ceramologist will be able to 'read' the inscribed sherd, be it an ostracon or *tituli picti*, and provide additional information such as a relative date of the sherd, the vessel type that it belonged to, information on the manufacturing processes, whether it is an import or an imitation of another vessel type, etc. – information that cannot be gained through the study of the text alone. As Budka points out, it is essential to combine the strengths of both viewpoints to gain a comprehensive understanding of the information that can be gleaned through the study of objects.

32 On *tituli picti* and the information they can convey, see e.g. Chaufray/Redon 2020: 168–169.
33 Chaufray/Redon 2020: 169.

When working with small finds, some of the basic questions to be answered concern material, time and usage. I will address some of these questions using the example of *kegs*[34], a distinctive vessel type from the oases of Kharga and Dakhla (Fig. 4), in order to illustrate the challenges that arise when addressing seemingly straightforward or ordinary questions such as:

- Design of the object in question
- Manufacture
- Fabric/Material used for designing the object
- Chronology (still one of the main questions pottery specialists are being asked about)
- Function
- Recycling

The *kegs* under discussion originate from Gebel Asyut al-gharbi, Asyut's western mountain. It is situated in Middle Egypt, right between Cairo and Luxor, and is located on the west bank of the river Nile, opposite the modern town of Asyut. The mountain has been utilized by humans from at least 3000 BCE until today and has served different functions over time, including as a necropolis, quarry, military area, and more.[35] Moreover, the site has been subjected to both authorized and illicit excavations, which have resulted in the area being in a severely compromised state. This is especially evident when dealing with pottery, because the discovery of complete vessels is the exception, and most times, even the sherds retrieved from the same context do not match, not even if they are from approximately the same time span. Sherds from various epochs of the ancient Egyptian history are scattered throughout the entire mountain area, which presents a significant challenge to the work of a ceramologist.

Gebel Asyut al-gharbi is one of the locations in the Nile Valley where pottery from the oases of Khargha and Dakhla was found in significant quantities.[36] The sherds originate from numerous vessels that have been identified as *kegs*. To date, over 1,200 sherds belonging to this vessel type have been discovered, collectively weighing approximately 75 kilograms. As is characteristic for the material retrieved from Gebel Asyut al-gharbi, none of the vessels was found complete and the majority of the sherds did not match.[37] The sherds are widely dispersed all over the mountain; however, more than 50% originate from the area in and around the so-

34 On this vessel form, see e.g. Hope 2000; Aston 2007: 441–442; Marchand 2007: 491–492.

35 Kahl 2007: 59 and Kahl 2012: 9–22. Since 2003, the Gebel Asyut al-gharbi has been examined by a joint Egyptian-German Team under direction of Jochem Kahl, Ursula Verhoeven, Mahmoud El-Khadragy, Mahmoud El-Hamrawi, Ahmed Alansary and Mohamed Abdelrahiem. The following results have been achieved within the German-Polish project "Ancient Asyut – centre of ancient trade" within the framework of the Beethoven Classic 3 founded by the German Research Foundation and the National Science Centre under the dircection of Jochem Kahl and Teodozja I. Rzeuska.

36 Rzeuska 2017: 647, stressing the high number of sherds found in Asyut in comparison to other locations in Egypt (ibid. 649).

37 With the exception of one keg that was discovered in 2023 from the tomb of Mesehti, clearly in secondary find position because in 2022 the shaft it was found scattered in and around was almost empty, whereas it was completely refilled when work started in 2023. It also differs noticeably in its clay composition and surface color, the latter being a bright orangey-pinkish color easily detectable among the sherds. A similar phenomenon is noted by Dixneuf 2011: 144 for the regions of Peluse and northern Sinai.

called Tomb of the Dogs, which also yielded ostraca, papyri, and pottery from the Ptolemaic and Roman periods,[38] as well as some burials, which are believed to date to this period,[39] in the adjacent area.

Design and manufacture

A *keg* is a barrel-shaped vessel with a long or short neck. In the initial stage of today's production, the vessels are manufactured in a manner analogous to that of a beaker, employing a turning device.[40] The completed vessel is then closed at both ends and turned sideways. A hole is subsequently created in the middle of the container, and a rim is added to this hole on the side.[41] This means that, in this case, the rilling marks on the body are *not* parallel to the vessel's mouth, a phenomenon that is also observed in ancient vessels. This is a rare feature among clay vessels that have been turned, and thus stands in stark contrast to the majority of other contemporaneous ancient Egyptian vessels. The surface of the *kegs* is smoothed over with the hands which creates a distinctive pattern that was so characteristic that it was also imitated on *keg*-shaped vessels made of Nile clay.[42]

Challenge 1: fabric

The fabric is quite distinctive because of its reddish color, but comparing the Asyuti material to those from the oases can sometimes be challenging[43] when it comes to publications, because of the resolution, printing quality, color or black and white photos etc. – a challenge inherent to all clay-produced objects. Nowadays, there are better possibilities to share color and high-resolution photos, but when it comes to earlier publications, this is sometimes quite a challenge. Another challenge is perception: although there are tools that help to describe pottery fabrics,[44] there will always be differences in the description from one scholar to another.

The importance of fabric cannot be overstated. It can provide clues to production sites, sources of raw materials, how and whether they were traded, whether only the finished product

38 On the Tomb of the Dogs see Kitagawa 2016. On ostraca and papyri from this tomb see Vittmann 2016. On pottery see Rzeuska 2012: 221–223.

39 Prell 2011: 195.

40 The exact manufacture process is under debate: while some suggest a three-stepped approach (two parts are joined to form the body and in a third step the rim is added), others vote for a two-staged process (the body is formed in one go by hand and then the rim is added in a second stage). For references concerning the production mode see Henein 1997: 125, who also describes the two-staged manufacturing process used by modern potters, Henein 1997: 120–125.

41 Hope/Eccleston 2000: 189 suggest that animal skins used as water containers could probably have inspired the creation of the special form of the kegs.

42 Rzeuska 2017: 651.

43 Also emphasized by Rzeuska 2017: 649.

44 See e.g. Orton/Hughes 2013: 282, fig. A.4 showing the percentage inclusion estimation charts after Mathew, Woods and Oliver 1991, or the Munsell Soil Color Chart for describing color values.

or its contents were traded, technological developments, e.g. new recipes for pastes or innovations in kiln technology, and so on. It also provides important clues to the *chaîne opératoire* of an object, as Camille Abric, Maria Paola Pellegrino, and Michele Degli Esposti demonstrate in their contribution in this volume on clay figurines, where they expertly demonstrate how a pottery study approach can be applied to clay figurines.

This is true not only for clay and pottery, but also for metalworking, as Martin Odler and Jiří Kmošek show in their article on metalworking on Elephantine. Through meticulous study of even the smallest fragments they were able to demonstrate that not only were metal products used on Elephantine Island, but that the finds cover all stages of the production process of copper, which is all the more important since no corresponding installations have been discovered so far.

Challenge 2: chronology

The first *kegs* appear in the Late Period, starting around 600 BCE.[45] Their distinctive feature is the neck, which becomes shorter over time. Interestingly, this form is still in use today.[46] It is the most long-lived vessel form in Egypt, having been in use for more than 2000 years now. This poses quite a challenge for those who are not yet familiar with this type of vessel, because it is not easy to make a direct comparison between the fabric used in ancient times and those used in more recent times: it is difficult to get access to the modern vessels without very good knowledge of the (modern) local trading points, or to travel to the oases themselves or to contact one of the pottery specialists working there. And it is not always easy to transport modern vessels through Egypt, let alone abroad. This is an obstacle faced by all ceramologists in Egypt, regardless of the location they are working at or the time span they are concerned with, because it is not allowed to take samples and transport them through Egypt without special permits.

Challenge 3: functions and usage

Egyptologists used to (and sometimes still want to) asign a single function to each vessel type or object in general. In recent years, it has become clear that this does not work because vessels in particular are multi-functional tools used for storage, transport, or preparation of food, to name but a few. Sometimes special requirements are needed to fulfil special functions. For example, containers for liquids often use a special clay and/or surface treatment, such as polishing, to prevent liquids from evaporating too quickly. But sometimes that very feature, evaporation, is required because it cools the contents of the jar, so water is often stored in more porous vessels than, for example, wine. Such containers can still be found in rural villages in arid countries,

45 Aston 2007: 441.

46 Henein 1997: 125, stressing the fact that the oases are quite isolated compared to the Nile Valley and new technologies and ideas needed longer to reach them.

where they provide public drinking water available to all passersby. However, it is of the utmost importance not to transfer recent usage and project it back thousands of years onto the then used forms.[47] Modern *kegs* are used to prepare butter and to transport water, but, as far as is known, the ancient *kegs* were not used to make butter, but to transport water and produce from the oases.[48] However, no analyses of the vessel contents have been conducted so far to clarify this point. A similar problem is addressed by Robert Kuhn in his article on stone vessels and the thousands of fragments from the time of king Den (Dynasty 1, ca. 2930/2910 BCE)[49]. Kuhn points out that the contents of most of these vessels are unknown because not enough research has been conducted so far. In regard to the problem of function, Kuhn also addresses the challenges posed by different typologies and the insights that can be gained from a thorough examination of object and context, which allowed him to define stone vessels as luxury items and durable tableware for the afterlife, which were maybe also used in daily life. However, he also mentions that further evidence from settlement sites is needed to confirm the assumption.

Concerning function and usage, the modern *kegs* provide some important clues to consider when working with ancient material. The differences between the same type of vessels can be minimal in appearance, but important in meaning. In Henein's study, the differences in *kegs* seem to be quite marginal. They concern the capacity as well as the diameter of the mouth.[50] The form itself, thus, is the same, but the function is quite different and slightly but efficiently adapted to its use: The butter churn has a wider opening than the small water container – the former for easier removal of its contents,[51] the latter to prevent too much water from spilling over. So, there is a lot of information hidden in the pottery that can be discovered with infinite and often very painstaking care, because sometimes minor alterations can illustrate changes in the function of a vessel, its mode of transport, its commodity, or the like. These alterations, on the other hand, are the result of various factors, be it a changing environment that forces people to adapt, or new influences from abroad that trigger innovations, or the like.

Sometimes, this hidden information is only revealed when the object in question is broken. Certain manufacturing traces in pottery only become apparent if a vessel is fragmented or can be deduced from the breaking pattern of a vessel, e.g. along the coils from which it was constructed.[52] This is also true for other objects, as Tina Beck demonstrates in her contribution on wooden

47 Also stressed by e.g. Cedro/Żurawski 2019: 24.

48 For the modern use see Henein 1997: 161–166. For ancient use see e.g. Hope et al. 2000: 190 suggesting water and wine as contents or *ibid.*: 228 claiming that these vessels found along desert roads were most likely water containers; Dixneuf 2011: 145 suggesting water (transport as well as storage) and cultivated products for commerce like wine and olive oil; Rougeulle/Marchand 2011: 448–449 also suggesting wine and maybe olive oil based on the observation that the inside of some kegs are coated with resin. This was also observed with some of the Asyuti keg sherds whose interior sides are sometimes covered with a black shiny substance.

49 After Schneider 1996: 165.

50 Henein 1997: 161–166.

51 Henein 1997: 164–165.

52 Rice 2015: 138, fig. 8.5.

statues and the 'deities under cover' that are hidden in the joints or below the feet of the statues and only become visible when the statue is dismantled – and only if one looks very closely.

Another challenge is posed by the fact that two very different types can be used for exactly the same purpose.[53] In Henein's study,[54] the distinguishing features between the vessels in question are the volume (one type of vessel offers large and small volumes, the other a larger overall volume) and the mode of transportation (which in turn affects the appearance of the vessel). The choice between the vessel types depends on several factors:

- Capacity, which depends on who is transporting the filled vessel: people or donkeys/beasts of burden[55]
- The water source: *Kegs* require a wide stream to be filled, whereas with wells it is easier to use vessels that can stand on their own
- Means of transportation and the manner in which the vessels can be stacked, gripped or fastened to an animal or carriage

Challenge 4: recycling

Another important factor to be considered is recycling (or re-use). Quite a lot of the Oasis ware sherds have been re-carved to create a special shape (Fig. 5). So far, this peculiar shape is unique to the Oasis ware sherds deriving from *kegs*. This could be related to the particular hardness of the sherds which allows them to function in certain circumstances where strength of material is required, but unfortunately their function is completely unknown to the author. Some of these sherds, like the one depicted in Fig. 2, also show small drilling holes made after firing. These holes do not seem to be related to the vessel, so their existence is most likely related to the secondary use for which they were intended.

Sherds can serve multiple functions when re-used: they can be re-carved as lids, as funnels[56], or even be used in the construction of an oven[57]. The functions of these items are not necessarily obvious at first glance, as shown by the re-carved objects from Oasis ware vessels. This leads to the last and most challenging topic: context, or the lack thereof.

53 Another problem not addressed here is that of typology. The perception of vessels and the types they are classified into can vary considerably, see e. g. Rice 2015: 227–228 with fig. 13.2. One has to keep in mind that typology is a very useful tool when working with pottery or artefacts in general, albeit it is a completely artificial system normally not related to the *Sitz im Leben* a object had during its active use-life.

54 Henein 1997: esp. 164, 168.

55 Even today, different kinds of water vessels are used in the oases, see Henein 1997: 168, comparing the capacity of two different types of water containers and showing the mode of transportation of those vessels with greater capacity, suitable for transport via donkey. Concerning the same type but different capacities, Henein 1997: 164 states that the "petit format est destine aux fillettes."

56 Beckh 2013: 106. Thomas Beckh dedicates one chapter of his publication to the topic of recycling and re-use and discusses the reasons that could have let to re-using pottery in Roman-Byzantine times, ibid. 100–111.

57 Gates-Foster 2022: fig. 6.

Fig. 5: Re-used Oases Ware sherd, photo: A. Kilian, © The Asyut Project

The final challenge: context

Sherds can be classified in a lot of ways, wether as 'sherds/pottery', as 'partly complete' or 'partly reconstructed vessel', as an object in its own right, e.g. a scraper used for digging, or a re-carved sherd used as lid, or only part of a re-carved sherd used as lid, etc. But sometimes they may be the only remains that are left to us showing traces of ritual actions, as is discussed in Nora Kuch's article in this volume on stone vessels and the intentional breaking of these objects. Without the meticulous documentation of the context in which these sherds were found, it would not have been possible to detect all the 'hidden' information that Nora Kuch was able to obtain. This information cannot be gained from the object alone, because it does not leave any direct traces on the object itself other than that it is broken, which can have various reasons. So, the trait of ritual breaking is often not obvious when looking at a sherd, or an object in general, without any background information about its findspot and the assemblage it once belonged to and was associated with. However, even objects without this background can still provide valuable information. So, in the broadest sense, I agree with the invitation of Alexander Ilin-Tomich and Vanessa Boschloss: they emphasize the importance of documenting *all* sides of a scarab, not only the inscribed or decorated ones, because even features that are considered unimportant can provide significant information if studied closely. This is true for all objects – even small traces such as smoke clouds on the walls of a vessel can provide crucial insight into processes not obvious at first glance.[58] As this workshop and its proceedings have shown, even the smallest finds, the tiniest traces, and the most seemingly 'unspectacular' finds are worth the painstaking work that is necessary to extract the hidden information, because sometimes it is these tiny details that contain the most crucial information, if only one looks closely "beyond the most obviously interesting".

58 Baba 2011. For general merits of working with "knobbly bits", see Bader 2021.

Case Study 2: Spinning Whorls or Model Wheels? The Function of Disc-shaped Terracotta Objects from Bronze Age Syria and Mesopotamia

Alexander Pruß

The following remarks about a very specific category of small finds are intended to serve as another example of how a close look at the broader context might help to clarify the function of objects of disputed use and how important it is to publish full corpora of finds, including fragments.

Upper Mesopotamian and Syrian sites of the Early and Middle Bronze Age (ca. 3000–1550 BCE) have yielded significant amounts of small objects made of baked clay. Besides evident figurines in human[59] and animal[60] shape models of different shape – especially of vehicles[61] – are common, predominantly in the second half of the 3rd millennium.

In these sites, many circular terracotta objects with central piercing were found. Some are sherds of broken pottery vessels which were rounded and pierced (Fig. 6). This recycling usually produced not completely round objects, which were most probably used as weights for nets or looms, as spindle whorls or for other every-day purposes.[62] Plano-convex or biconvex discs which were pierced before firing (Fig. 7) are generally considered as spindle whorls.[63] Besides terracotta, these were also made of bone or stone. Discs with a thickened centre or a clearly separated cylinder around the piercing are traditionally interpreted as wheels belonging to the vehicle models (two-wheeled chariots and four-wheeled wagons).[64]

This traditional interpretation as wheels was challenged since the 1990s by several authors publishing finds from Early Bronze Age (EBA) Upper Mesopotamian sites.[65] The arguments for this re-interpretation were the following:

1. the discs were rarely found together with the vehicle models to which they purportedly belonged,
2. the chronology does not match – 'wheels' were found in levels predating the occurrence of vehicle models,
3. there are too many wheels compared to the number of model vehicles.

59 Sakal 2018 on 3rd millennium figurines with further references to earlier publications. For early 2nd millennium figurines, see Marchetti 2001 and Pruß 2010: 46–110.

60 Peyronel/Pruß 2018. See also the contribution of Abric/Pellegrino/Degli Esposti in this volume on more recent animal figurines.

61 Pruß 2018 with further references.

62 Britsch/Horejs 2014: 234; Rittig/Strommenger 2010: 90–91; Wissing 2009: 212–215.

63 Britsch/Horejs 2014: 229–231; Rittig/Strommenger 2010: 90–91; Wissing 2009: 213–218; Baccelli 2014: 3–5.

64 See for an overview on the different opinions concerning these objects: Helms 2010: 208–210.

65 Among others: Yener 1990: 401–402; Wattenmaker 1998: 142–149; Pfälzner 2001: 220–221; Hempelmann 2013: 250.

Fig. 6: Rounded pottery sherd with secondary central piercing, Tell Beydar, Field P, surface find (unpublished). Photo: Mission Tell Beydar

Fig. 7: Conical-shaped spindle whorl, terra-cotta, Tell Beydar, Field P, no. 42340-M-1, surface find (Pruß 2014: 124, fig. 14). Photo: Mission Tell Beydar

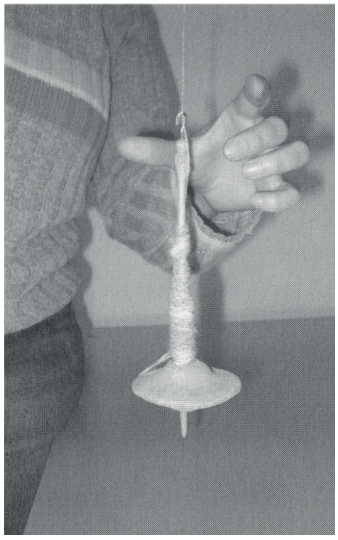

Fig. 8: Experimental use of a terra-cotta wheel as spindle whorl (Helms 2010: 215-216, fig. 4,2)

Fig. 9: Terra-cotta model wheel with incised constructive details, Tell Beydar, Field P, no. 42521-M-1, final EJZ 3b (ca. 2340 BCE; Pruß 2014: 123, fig. 13). Photo: Mission Tell Beydar

Combined with the fact that only few evident spindle whorls were found in most of the excavated sites, these authors concluded that the so-called wheels were actually spindle whorls or that at least they were made for different purposes, including the use as spinning whorl. Tobias Helms proved that actual 'wheels' found at the site of Tell Chuera can be used as spinning whorls (Fig. 8).[66]

However, a close look at the evidence shows that the finds under discussion can indeed be explained as wheels of chariot and wagon models, at least in their primary function. This

66 Helms 2010: 215–216, fig. 4. See, however, the very sceptical remarks of Strommenger 2010: 82–83.

Fig. 10: Fragment of a relief plaque with depiction of a chariot, limestone, Ur, Early Dynastic (ca. 2600 BCE; Hrouda 1991: 333)

interpretation is most obvious with a group of objects with crescent-shaped incisions on both sides (Fig. 9), which depict the actual structure of the tripartite disc-wheels in use in 3rd millennium Mesopotamia.[67] Such wheels are visible on several wagon images from the EBA, e.g. on the famous 'Standard of Ur'[68] or on relief plaques from Early Dynastic temples (Fig. 10).[69] The actual wheels were solid wooden objects made of three pieces. The central piece included the hub, while the outer, crescent-shaped pieces could be replaced by spare-parts when the wheel became worn by its use. The identification of these terracotta objects as model wheels has never been doubted. However, only a minority (at most sites clearly below 10%)[70] of the objects under discussion show these incisions.

Several of the undecorated discs show wear traces at one side of the hub. This corresponds with similar traces at the sides of the boxes of several wagon models (Fig. 11a–b).[71] These observations demonstrate that at least some of the model vehicles were indeed assembled with wheels and were regularly moved on these wheels. The lack of matching finds of model vehicles and wheels remains puzzling, but as the vast majority of finds were made in domestic contexts, this is not unexplainable by usual depositional habits. As these traces of wear (as well as the

67 On these wheels: Littauer/Crouwel 1979: 18–19.

68 Woolley 1934: 61–62, 266–267, pl. 92.

69 Hrouda 1991: 333 (from Ur).

70 Only sites from which the whole corpus of wheels is available can be used here: Tell Beydar: 8 out of 202 (4%; Pruß forthcoming); Tell el-ʿAbd: 4 out of 23 (17%; Pruß 2019: 65); Mozan C: 5 out of 115 (4%; Wissing 2009: 220–224, pl. 51–59); Halawa A: 2 out of 70 (3%; Neufang/Pruß 1994: 162). Tell Biʿa has 6 out of 35 published wheels (Strommenger 2010: 83). However, only a selection of surely/at least? several hundred wheels was published, with a clear bias on decorated examples.

71 Wissing 2009: 196; 218 on model vehicles and wheels from Tell Bderi and Tell Chuera.

Fig. 11a and b: Chariot model with wear traces of the wheel, terra-cotta, Tell Beydar, Field B, no. 54451-M-2, EJZ 3b (ca. 2370 BCE; Van der Stede/Devillers 2011: 28, fig. 59). Photo: Mission Tell Beydar

incised constructive details) occur only on objects with clearly visible hub, only such discs should be discussed as possible wheels.[72]

It is true that the earliest attested terracotta wheels were found in levels predating the first occurrence of vehicle models. Two rather small but formally evident wheels were found in an EJZ 0/1 (ca. 2900 BCE) context at the site of Tell Brak.[73] Other examples were found at contemporary levels at Tell Chuera.[74] Vehicle models are attested only starting from the EJZ 2 period (ca. 2750 BCE).[75] It has, however, to be kept in mind that early 3rd millennium levels are generally only rarely attested in Upper Mesopotamia and that the lack of vehicle models in these levels might be not more than chance.

Before comparing the numbers of attested vehicle models and wheels from different Upper Mesopotamian sites, one must keep in mind that fragmented wheels are easily identifiable, while fragments of model vehicles are sometimes hardly recognizable as such. This is particularly true for a variety of models of tilted wagons, which were made from re-shaped wheel-thrown goblets.[76] Some fragments can only be recognized by the non-radial curving of the rim or by the punched holes made for the fixing of the drought pole. Other fragments can also appear unspecific. In several publications, vehicle model fragments were thus not recognised as such.[77] It is thus advisable to use only published terracotta corpora of whole sites or excavation areas within sites for statistical purposes. If such corpora from later 3rd millennium Upper Mesopotamian contexts are investigated (Tab. 1), the alleged surplus of wheels compared to vehicle models is hardly existing. As most sites have yielded more wagon models (with two axles

72 See Oates 2001: 284, Wissing 2009: 211 or Strommenger 2010: 81 for the same conclusion.
73 Matthews 2003: fig. 5.78, 19–20.
74 Granda 2023: 128, tab. 5.
75 Pruß 2011: 248.
76 Bollweg 1999: 29–30, with further references.
77 E.g. Lebeau et al. 1987: pl. IX, 2 (a chariot model interpreted as animal figurine).

requiring four wheels) than chariot models (with one axle and two wheels), the expected ratio between wagons and wheels should be around or slightly above 1:3. This is nearly the case for Tell el-ʿAbd[78], while Mozan C[79] and Tell Beydar[80] have a ratio of around 1:4. The significant lower ratios at Halawa A[81] and Chuera[82] are probably the result of a selective registration process at the site. It is thus simply not true that there are far too many wheels compared to the low number of vehicle models.

Table 1: Relation between the numbers of vehicle models and wheels at Upper Mesopotamian sites

Site (date range)	Chariots (2 wheels)	Wagons (4 wheels)	Total (incl. undetermin.)	Wheels	Ratio (rounded)
Tell Chuera (2800–2200)	20	359	384	749	1:2.0
Tell Beydar (2500–2200)	16	30	51	202	1:4.0
Tell el-ʿAbd (2500–2000)	4	2	8	23	1:2.9
Tell Biʿa (2500–1760)	41	111	235	?(35+)	?
Tell Mozan C (2400–1800)	12	12	25	115	1:4.6
Tell Halawa A (2300–2000)	35	31	86	108	1:1.3

There is thus every reason to assume that the terracotta discs with clearly marked hub were indeed made as wheels of model vehicles (and of animal figurines on wheels[83], which are, however, not very frequent). They were, of course, recycled for secondary uses as tools[84] or weights, but this was not the primary reason for their manufacture.

After our introduction, the case studies serve as examples to amply illustrate the importance of working with small finds and illustrate the merits that can be gained from their meticulous study. This is also evident in the collected contributions in this volume.

78 Pruß 2019: 63–68.
79 Wissing 2009: 193–237.
80 Pruß forthcoming.
81 Neufang/Pruß 1994: 161.
82 Granda 2023: 123.
83 Peyronel/Pruß 2018: 92, type Z.13.
84 Helms 2010: 213–214; Strommenger 2010: 84–85.

Acknowledgements

We are grateful to the the Internal University Research Funding of Johannes Gutenberg University, Mainz, Department of Research and Technology Transfer, for their financial support of the workshop. We would also like to express our gratitude to Johannes Gutenberg University Mainz, Institute of Ancient Studies, Department of Egyptology, especially Ursula Verhoeven-van Elsbergen, for her support and valuable advice; and the Department of Ancient Near Eastern Archaeology, as well as Freie Universität Berlin, Department of History and Cultural Studies, Egyptological Seminar, for their support. We would also like to extend our gratitude to Ruth Kreis-Thies, as well as our student assistants Denise Koch, Conrad Nilles, Emma Sakal, and Ricarda Totzke. Finally, we would like to thank all of the speakers, participants, and chairs of "Excavating the Extra-Ordinary 2" for making this event a fruitful and special workshop due to the inspiring talks, amazing presentations, and constructive discussions.

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Papers presented at the interdisciplinary workshop "Excavating the Extra-Ordinary. Challenges & Merits of Working with Small Finds 2", Johannes Gutenberg University Mainz, 25–26 November 2022

Camille Abric, Maria Paola Pellegrino & Michele Degli Esposti
A Pottery Study Approach to Small Find Analyses. The Zoomorphic Clay Figurines from Tell Abraq (Umm Al-Quwain, UAE)

Tina Beck
What to Do with All These Fragments? Challenges and Possibilities of Reconstructing Fragmented Wooden Tomb Statues

Vanessa Boschloos & Alexander Ilin-Tomich
Beyond the Most Obviously Interesting: Aims and Methods in Documenting and Processing Scarabs

Julia Budka
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Silvia Prell
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Jana Richter
Finding Meaning in Microdebris: Challenges of Working with very small Finds at an Iron Age Site in Iraqi Kurdistan

Keynote Lecture: Aaron Schmitt
Uncovering the Potential of Early 20th Century Excavations in Mesopotamia: Ur and Ashur as Case-studies

A Pottery Study Approach to Small Find Analyses

The Zoomorphic Clay Figurines from Tell Abraq (Umm al-Quwain, UAE)

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Abstract

Recent excavations at Tell Abraq (Umm Al-Quwain, UAE) yielded an unexpectedly rich corpus of zoomorphic clay figurines, ranging in date from the beginning of the Iron Age II period (c. 1100/1000 BC) to the Late Pre-Islamic Period (up to the 2nd–3rd century AD). With a few exceptions coming from stratified contexts, the majority was found in disturbed, superficial sand layers not linked with any occupational remains.

Nevertheless, all the fragments were studied and will be presented here. Some are of difficult interpretation due to excessive fragmentation, yet all the figurines but one could be identified as representing either horses or camels, despite the fact that more than half of them consists of isolated animal legs that could not be re-joined to the body.

At the basis of these results stands the application of methods traditionally used for pottery studies – such as fabrics characterization and technological analysis - that allowed the inclusion of the figurines into a chrono-typology that is not based solely on morpho-stylistic analysis.

The results show the perdurable fashion of the represented subjects, while highlighting the changing materials and techniques used to create these figurines over time, arguably mirroring the changing taste of the communities to which these products were destined. At the same time, they offer an insight into possible contact with, and influences from, the wider Arabian Peninsula and beyond – finally underlining the importance of this class of 'small finds'.

1 Introduction

Recent excavations at Tell Abraq (Umm al-Quwain, United Arab Emirates) yielded an unexpectedly rich corpus of clay figurines, dominated particularly by zoomorphic figurines, ranging in date from the Iron Age II period (c. 1100/1000–600 BCE) to the Late Pre-Islamic Period (up to the 1st–2nd century CE). With a few exceptions coming from stratified contexts, the majority was found in disturbed, superficial sand layers not linked with any occupational remains.

Published in: A. Kilian, A. Pruß, M. Zöller-Engelhardt (eds), Excavating the Extra-Ordinary 2. Challenges and Merits of Working with Small Finds. Proceedings of the International Interdisciplinary Workshop at Johannes Gutenberg University Mainz, 25–26 November 2022, Heidelberg: Propylaeum, 2024, 29–57. DOI: https://doi.org/10.11588/propylaeum.1382.c19769

Some of them are of difficult interpretation due to excessive fragmentation, yet all the zoomorphic figurines but one could be identified as representing either horses or camels, even though more than half of them consist of isolated animal legs that could not be re-joined to the body.

Due to the highly fragmented nature of the assemblage, the size and composition of each figurine calls for the application of methods traditionally used for pottery studies, such as fabric characterization and technological analysis. This choice allowed the inclusion of the figurines into a typo-chronology that is not based solely on morpho-stylistic analysis.

After a brief overview of the recent archaeological work carried out by the Italian Archaeological Mission in Umm al-Quwain (IAMUQ) and a concise presentation of the corpus of figurines brought to light, an attempt will be made to explore and question the heuristic potential of a particular concept, the *chaîne opératoire*, applied to the study of a clay figurines corpus. Inherited from the field of anthropology of techniques and used in ceramology, this method was applied to the study of zoomorphic clay figurines to try and find a convincing and discriminating method to include the most fragmentary figurines in the examined dataset. This method raises questions about their materiality and manufacturing techniques, as well as their production context and producer-consumer interactions.

2 The zoomorphic figurines of Tell Abraq: archaeological and material context

2.1 The site of Tell Abraq: location, history of excavation and chronology

The site of Tell Abraq, located on the border between the emirates of Umm al-Quwain and Sharjah (Fig. 1), was first intensively investigated by Daniel T. Potts between 1989 and 1998[1] and then by an international team led by Peter Magee between 2007 and 2017.[2] It has indeed become a key site for the comprehension of the chronology of south-east Arabian archaeology thanks to its rich and continued chronological sequences expanding from c. 2500 BCE to 300 CE.

Since 2019, the Italian Archaeological Mission has resumed stratigraphic excavations in the Umm al-Quwain part of the site.[3] The major aim of this research is the investigation of the Late Bronze Age/Iron Age I period transition and the nature of the late pre-Islamic occupation of the site.

1 Potts 1990; Potts 1991; Potts 1993; Potts 2000.
2 Magee et al. 2017.
3 Degli Esposti et al. 2022; Degli Esposti et al. 2023.

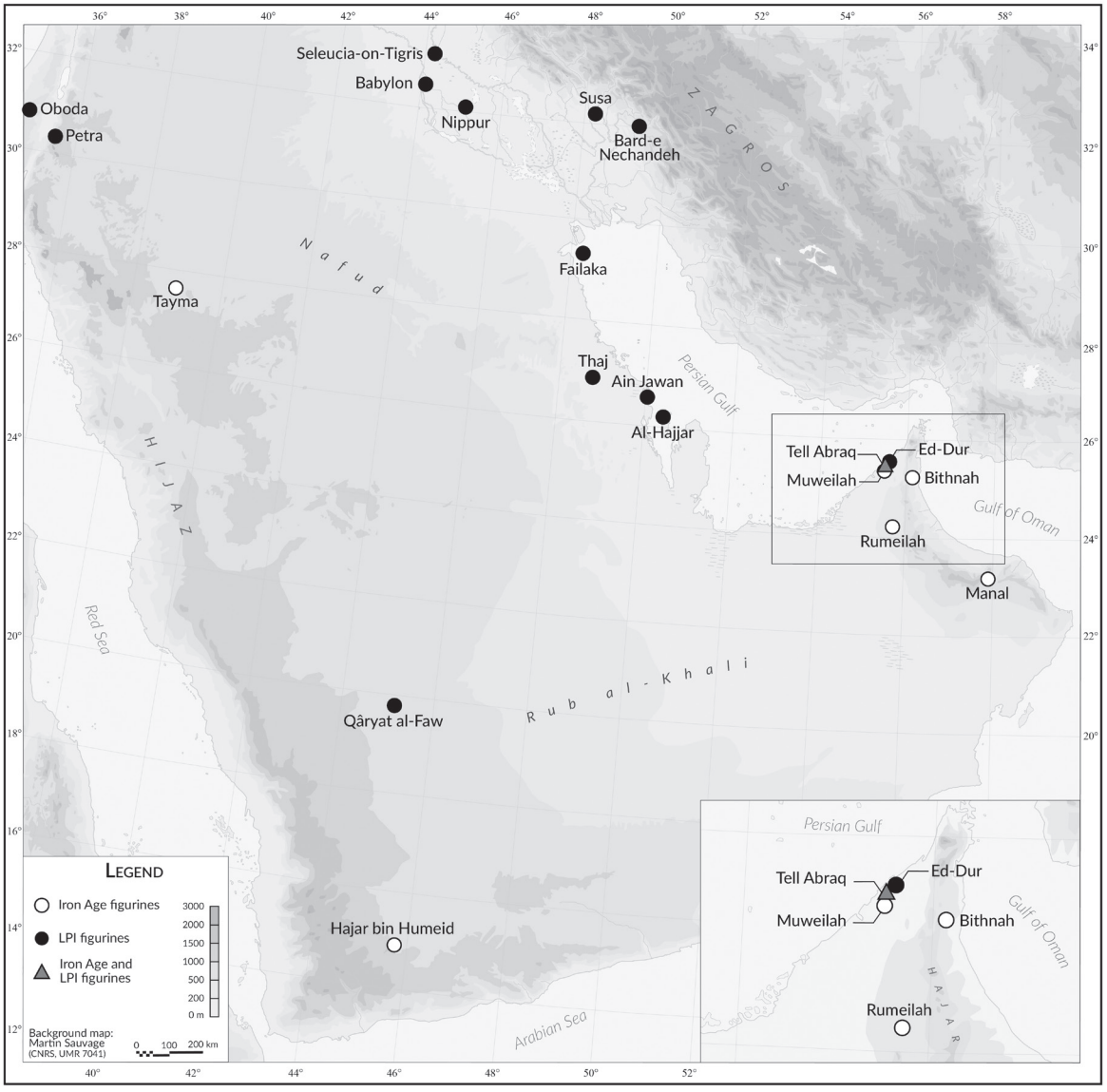

Fig. 1: Map showing the location of Tell Abraq and the other sites mentioned in the text (background map: M. Sauvage; adapted map: C. Abric)

The work of the Italian Mission entailed the excavation of several trenches targeting different areas along the eastern slope of the site's mound and near its northern edge (Fig. 2). They bear witness to a range of different features that belong to different periods in the site's long history, with no need to replicate their description here.[4]

4 Degli Esposti et al. 2023.

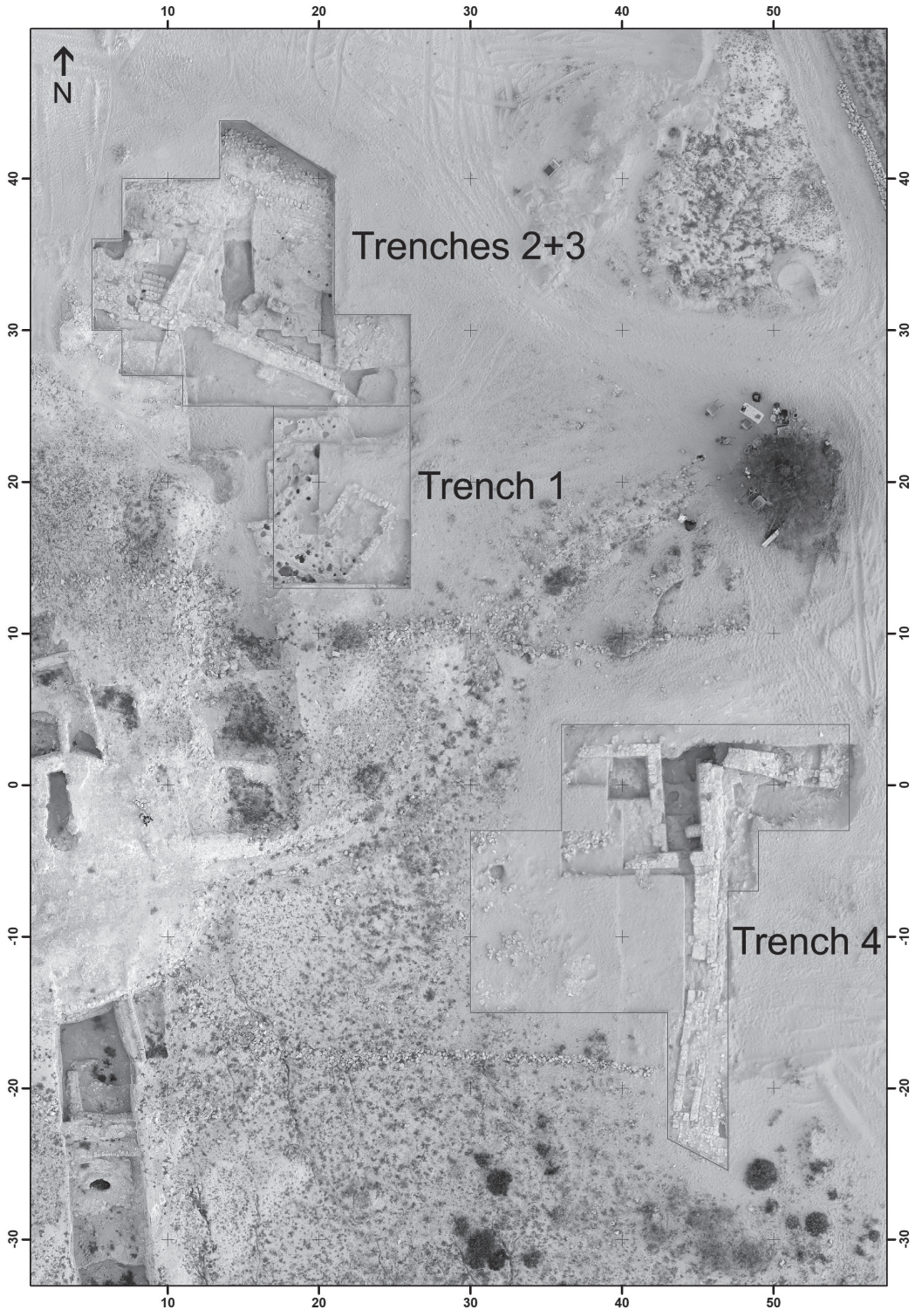

Fig. 2: Aerial view of the trenches excavated at Tell Abraq by IAMUQ in November 2020. The grid is at 10 m intervals (orthophotograph F. Borgi)

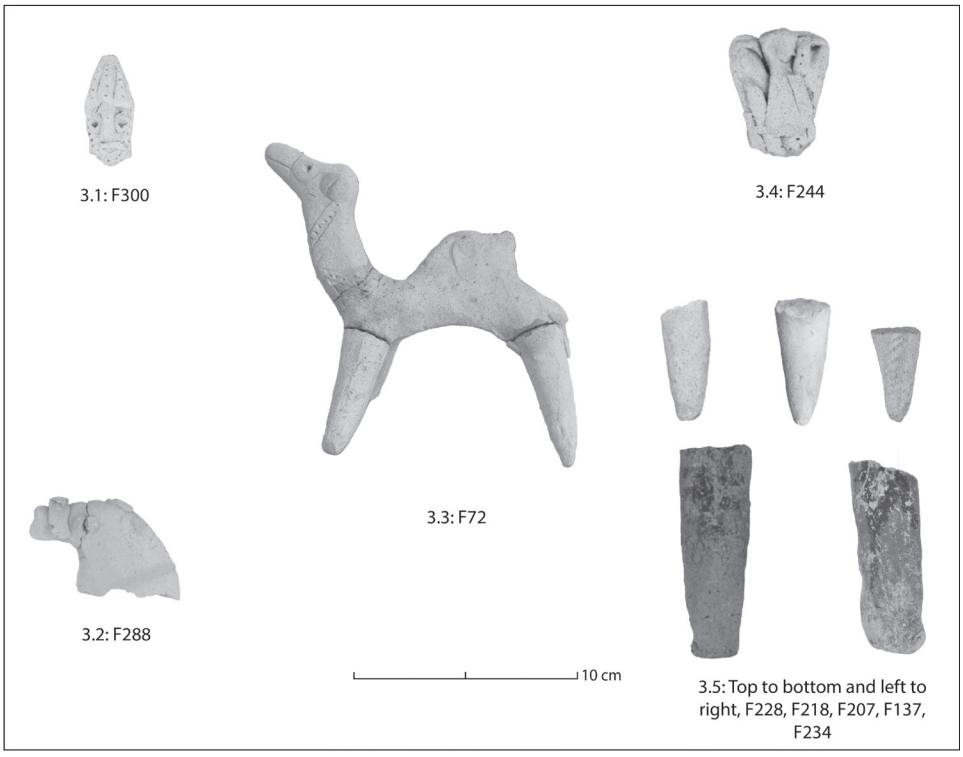

Fig. 3: A rich iconographic repertoire with anthropomorphic and zoomorphic figurines, accessories and non-diagnostic fragments (photographs: C. Abric, M. P. Pellegrino, N. Gilbert)

2.2 The figurine corpus

During the 2019, 2020 and 2021 field seasons, a total of 57 clay figurines were discovered. The iconographic repertoire of the corpus is remarkably rich. Several typological classes are represented (Fig. 3 and Tab. 1[5]): anthropomorphic figurines (n=11, Fig. 3.1), zoomorphic figurines (n=14, Figs. 3.2 and 3.3) and accessories for the latter (n=2, Fig. 3.4). It is also interesting to note that the zoomorphic figurines represent almost exclusively[6] camels (n=9) and horses (n=4).

Nevertheless, the majority of the specimens (n=30, Fig. 3.5) are fragments which, at first sight, are not diagnostic and cannot be connected to a specific category of figurine. To add to the difficulty of interpreting this corpus, the majority of these figurines come from topsoil or demolition contexts with mixed material. Despite this, it can be noted that they are absent from contexts earlier than the Iron Age II period while they are found in Late Pre-Islamic contexts datable to the 1st–2nd century CE.

5 Note that Tab. 1 includes only the figurines studied in this article. It therefore does not include anthropomorphic figurines or non-diagnostic fragments that are too small.

6 Apart from F18, a painted zoomorphic figurine from the Iron Age II, whose species could not be determined. Also noteworthy is the undetermined fragment F295, whose shape and decoration are very reminiscent of the applied decoration depicting snakes found on certain Iron Age II vessels (see for example at Bithnah: Benoist 2007: 48, figs. 11–12).

Tab. 1: List of figurines from Tell Abraq studied in this article

Inv. Number	**Campaign**	**Sector**	**SU**	**Group**	**Sub-group**
F1	2019	T2	SU 6	Zoomorphic	Camel
F203	2020	T3	SU 119	Zoomorphic	Camel
F214	2020	T4	SU 43	Zoomorphic	Camel
F68	2020	T4	SU 82-SU 95	Zoomorphic	Camel
F326	2020	T4	SU 43	Zoomorphic	Camel
F331	2021	T3	SU 119	Zoomorphic	Camel
F363	2021	T2	SU 197	Zoomorphic	Camel
F221	2020-2021	T4	SU 43	Zoomorphic	Camel
F236	2020-2021	T4	SU 43	Zoomorphic	Camel
F72	2020-2021	T4	SU 43-SU 95	Zoomorphic	Camel
F137	2020	T4	SU 108	Zoomorphic	Horse
F288	2021	T4	SU 220	Zoomorphic	Horse
F291	2021	T4	SU 43	Zoomorphic	Horse
F297	2021	T4	SU 43	Zoomorphic	Horse
F295	2021	T4	SU 43	Zoomorphic?	Snake?
F18	2019	T2	SU 17	Zoomorphic	Undetermined
F207	2020	T3	SU 119	Undetermined	
F216	2020	T4	SU 43	Undetermined	
F218	2020	T4	SU 43	Undetermined	
F330	2020	T4	SU 43	Undetermined	
F224	2021	T4	SU 43	Undetermined	
F225	2021	T4	SU 43	Undetermined	
F228	2021	T4	SU 43	Undetermined	
F229	2021	T4	SU 43	Undetermined	
F230	2021	T4	SU 43	Undetermined	
F232	2021	T4	SU 43	Undetermined	
F234	2021	T4	SU 43	Undetermined	
F284	2021	T4	SU 95	Undetermined	
F285	2021	T4	SU 220	Undetermined	
F289	2021	T4	SU 43	Undetermined	
F299	2021	T4	SU 218	Undetermined	
F301	2021	T4	SU 218	Undetermined	
F303	2021	T4	SU 43	Undetermined	
F329	2020-2021	T4	SU 43-SU 220	Undetermined	
F313	2020	T4	SU 43	Saddle	
F244	2021	T4	SU 43	Saddle	

2.3 Dating the zoomorphic figurines: the Iron Age and Late Pre-Islamic periods

Such zoomorphic figurines are frequently found on other sites of the Arabian Peninsula (Fig. 1). For instance, similar examples of camel figurines can be found in the Arabian Peninsula at the Iron Age sites of Muweilah,[7] Manal,[8] Tayma,[9] Hajar bin Humeid,[10] and Rumeilah.[11] Similarly, they are known from the Late Pre-Islamic (LPI) sites of Ed-Dur,[12] Qaryat Al-Fâw,[13] Thaj,[14] Tell Khazneh (Failaka Island),[15] and Ain Jawan.[16] For the same period, camel figurines were also discovered outside the Gulf region[17] but differ in their manufacturing and decoration from the ones from Tell Abraq, suggesting a different tradition.[18] On the other hand, comparable LPI horse figurines in the Arabian Peninsula seem to be scarcer.[19] However, some horses' figurines were discovered at Ed-Dur,[20] in the necropolis of al-Hajjar,[21] and at the site of Failaka.[22] In fact, whether associated with camels or horses, figurines of riders seem to be increasingly common at this time.[23] Overall, the distribution of these animal figurines seems to outline a horizon of visual representations shared by the populations of the Arabian Peninsula of the times, lasting several centuries with no evident hiatus.

7 Magee 1996: 210, fig. 28; Magee 2007, fig. 30; Magee 2015: 263, fig. 11.
8 Elmahi/Ibrahim 2003: 92, fig. 16.
9 Eichmann et al. 2010: pl. 4.27.
10 Van Beek 1969: 301, fig. 125.e and 375, pl. 54.a.
11 Boucharlat/Lombard 1985, pl. 65.4–10.
12 Daems 2004a: 231–234, figs. 3–4.
13 Al-Ghabban et al. 2010: fig. 148.
14 Eskoubi/Abu al-Aila 1985: pl. 36A–C; Gazdar/Potts/Livingstone 1984: 75, pl. 80B.
15 Calvet/Caubet/Salles 1985: 26, figs. 7.9–10.
16 LeBaron Bowen 1950: 40, fig. 21D.
17 Nabatean camels dated to the 1st century AD are found at Petra and Oboda (see Parlasca 1986: 200–213, figs. 1–10). Parthian examples are found at Seleucia-on-the-Tigris (Van Ingen 1939: pl. 76, fig. 557).
18 Daems 2004a: 230. See also Parlasca 1986: 203.
19 They are nevertheless found in nearby regions, such as Susa, Iran, in the Seleuco-Parthian period (Martinez-Sève 2002: 504–515, figs. 816–839) and Sassanid period (Martinez-Sève 2002: 644, fig. 110). They are also documented in Bard-e Nechandeh (Ghirshman 1976: pl. 11, Fig. 6) and Babylon (Karvonen-Kannas 1995: pl. 82, figs. 634–636; 643–644; 651–652; 671).
20 Daems 2004a: 234, figs. 11–12.
21 Lombard 1999: fig. 341.
22 Salles 1986.
23 On importance of riding in pre-Islamic Arabia, see Daems 2004b: 97.

3 Methodology: a multiscale approach

3.1 The need to study terracotta figurines between iconography and materiality

Quite frequently, the products of coroplasty are primarily considered as iconographic supports and, therefore, most usually interpreted using methods specific to art history studies, such as iconographic or symbolic analyses.[24] But what about their materiality? What importance should be given to their properties, such as the nature of the clay, the gestures that produced them and the context in which they were used?

Over the past few years, several researchers have tackled these questions and have developed innovative approaches to the study of terracotta figurines.[25] These problems seem to be of growing interest to archaeologists, who are becoming aware of the theoretical paucity of the field of study of figurines. Indeed, there is no established protocol commonly shared and used by the scientific community for figurine analysis,[26] unlike what happens, for example, in ceramology.

3.2 Aims and theoretical frame of the study

In this respect, the protocol chosen for the study of the Tell Abraq figurine corpus falls within the scope of this new impetus. The aim was to investigate these distinctive objects in the framework of their materiality, insofar as they are manufactured objects made of a specific material: clay. The latter has its own particularities, linked to the cultural choices made by the producers, both in terms of the paste recipe used and the gestures and tools employed to shape them. In addition, the Tell Abraq figurines are fired: as in the case of ceramics, they undergo a firing process that transforms the raw clay material into terracotta, which has the advantage of fixing in the mass the stigmata left intentionally or not by the producers, providing information on how these objects were manufactured. These particular stigmata can thus be decoded thanks to the technological approach and the concept of *chaîne opératoire*.[27]

24 Bolognani/Knudsen 2022: 1.

25 As illustrated by the workshop organized by Barbara Bolognani and Nadeshda B. Knudsen during the 12th International Congress on the Archaeology of the Ancient Near East (ICAANE) in 2021 with presentations focusing notably on experimental archaeology, archaeometry and semantic studies applied to figurine analysis (Bolognani/Knudsen 2022).

26 Despite several books or manuals, whether general (such as Insoll 2017) or on more specific subjects or chrono-geographic periods but with an interdisciplinary approach (Darby/de Hulster 2021).

27 For a more comprehensive historical account of this theoretical concept, see in particular Pigeot 2011. For a critical historiographical approach, see Djindjian 2013.

This notion originates from the anthropology of techniques and the works of French anthropologists such as Marcel Mauss[28] and André Leroi-Gourhan,[29] who both emphasize the processual and sequential nature of any technical activity. Robert Creswell then sets out the commonly accepted definition in 1976.[30] In his words, a *chaîne opératoire* is "a series of operations that transforms any raw material into a finished product, whether it is an item of consumption or a finished tool."[31]

As early as the 1980s, under the impulse of ethnoarchaeological studies and anthropology of techniques, several ceramologists such as Sander van der Leeuw,[32] Owen Rye,[33] or Valentine Roux[34] suggested using this concept to study ceramic production in their diachronic and synchronic variability, as well as the anthropological implications of adopting a particular *savoir-faire*.[35]

Therefore, describing the *chaîne opératoire* of ceramic production consists in identifying the main steps necessary to obtain a finished product: selection and preparation of the clay material, shaping the vessel, surface finishing, surface treatments, and firing. The variability of each of these steps depends on the technique chosen by the potter. Theoretically, these can be identified thanks to the traces left unintentionally or on purpose during production. These marks are called macrotraces, and it is precisely their reading and systematization that allow us to account for the production processes.

Testing this particular approach on the zoomorphic figurine assemblage of Tell Abraq appeared potentially relevant for several reasons. One main question lies at the basis of this investigation: does this approach help the interpretation of non-diagnostic fragments that, if only considered from a typological perspective, would have been ignored? In addition to this methodological reasoning, this particular approach also allows us to address other questions of a more anthropological nature regarding the persons who produced them.

In fact, although the notion of *chaîne opératoire* has been applied in a limited but growing way in the field of figurine studies, it seems to be increasingly implemented in archaeological studies, particularly with regard to techno-social questions.[36]

28 Mauss 1923-1924.

29 Leroi-Gourhan 1943; Leroi-Gourhan 1945, and especially Leroi-Gourhan 1964 and Leroi-Gourhan 1965.

30 Creswell 1976.

31 Creswell 1976: 13. In the original: "série d'opérations qui transforme une matière première en un produit fini, que celui-ci soit un objet de consommation ou un outil fini".

32 Van der Leeuw 1984; van der Leeuw 1993.

33 Rye 1981.

34 Roux 2010; Roux/Courty 2016; Roux/Courty 2019.

35 See also Lemonnier 1983; Lemonnier 1993; Balfet 1991; Dobres 1999; Dupont-Delaleuf 2023.

36 Pizzeghello et al. 2015; Kreiter et al. 2021; Arntz 2022; Forte/Miniaci 2023.

3.3 Combining multiple observation protocols and criteria

The following methodology was systematically applied to all figurines, regardless of their degree of fragmentation. Three criteria of observation were adopted on a macroscopic scale, and then combined: clay fabrics, macrotraces, stigmata of production processes, and, finally, typology.

3.3.1 Fabrics

Ceramic pastes were observed using a x20 magnifying glass. Several observational criteria were taken into account when defining the different types of paste in the Tell Abraq zoomorphic figurines assemblage. First, the colour of the inner and outer surfaces of the fragment, along with its core, were examined. Next, the percentage of non-plastic elements was taken into account as well as their nature. When they were visible, a brief description of their morphology and colour was provided.

In some cases, it was found useful to further subdivide the main fabric groups, while awaiting further petrographic and/or chemical analyses that might enable us to group them.[37]

3.3.2 *Chaînes opératoires* analysis

All macrotraces specific to the production processes were observed and described on each fragment. The descriptive lexicon used follows the suggestions made by Valentine Roux and Marie-Agnès Courty in their pottery technology manual.[38] The features observed included surface topography, networks of cracks, hollows and bumps, breakage morphology and location, and the appearance and layout of surface striation networks. As in the case of pottery sherds, fractures were also observed on a macro- and meso-scale: voids and vacuoles layout, as well as the internal layout of the fine fraction and the orientation of non-plastic particles present in the clay were also described.

All these elements bear witness to specific technical actions which, when systematized and organized together, allow the reconstruction of *chaînes opératoires*, corresponding to the stages preferentially followed by craftspeople in their production.

3.3.3 Typology

A typological discrimination was carried out. To do so, the most complete specimens were selected, along with those from other sites documented in the archaeological literature. Formal

37 Several studies on figurines have taken into account the analysis of clay fabrics, based on different archaeometric methods and petrography, in order to characterize the nature of the raw material (see Ignat et al. 2018; Braekmans et al. 2019).

38 Roux/Courty 2016.

elements such as the shape of the body, legs, head, and tail were combined as well as saddles and decorative elements.

3.3.4 Establishing techno-morpho-stylistic categories

In order to test its heuristic potential for this category of small finds, the Tell Abraq figurine corpus was studied according to a method inherited from pottery technology studies.[39] Consequently, the figurine assemblage was studied using a combination of three successive stages of analysis: analysis of the technical groups by observing the traces that provide information on the production methods used by the craftsperson; macroscopic examination of the raw materials used to describe their characteristic, as well as the preparation of the paste; and the morpho-stylistic characteristics of the assemblage. Nevertheless, to be complete, the fabric analysis should include a petrographic study, which has not yet been carried out for the Tell Abraq corpus.

Therefore, after an observation process, these three criteria were hierarchized, crossed and classified to define major techno-morpho-stylistic groups. As mentioned above, most of the objects come from superficial topsoil stratigraphic contexts. *A priori*, it would then be impossible to cross-reference these data with chrono-stratigraphic information. However, it is precisely this method, combined with published data from figurines found in relevant stratigraphic contexts, that has enabled us to propose a relative dating, and therefore gather archaeological information, for these figurines.

4 Results

This procedure led to the following observations on the assemblage:

4.1 Fabric Groups

Six main fabric groups were identified within the whole assemblage, most probably corresponding to different paste recipes used by the craftspeople. If we exclude the anthropomorphic figurines, which are beyond the scope of this study, along with small unidentified fragments, five fabric groups are represented (G1, G2, G4, G5 and G6).[40] A brief description of each fabric group is given in Tab. 2.

39 Roux/Courty 2016; Roux/Courty, 2019.

40 G3 has only been identified on anthropomorphic figurines.

Group 1 is by far the most common since it constitutes 61 % of the studied assemblage (Fig. 4). Group 4 is the second largest, accounting for 22 %. Finally, Groups 2, 5, and 6 all account for 6 %.

In the absence of more petrographic or chemical analysis, it has not been possible to propose an identification of the mineral inclusions, except mica. Nor has it been possible to determine whether these mineral inclusions were genuine tempering agents added deliberately by the craftspersons, or if they were naturally present in the clay. It was also impossible to establish whether the preparation of the clay paste involved decantation or purification stages. Nevertheless, it is possible to conclude that, in certain fabric recipes, producers voluntarily added a vegetal temper (Groups 2, 4 and 6).

Tab. 2: Fabric description and associated number of figurines

Group Name	**Characteristics**	**Number of individuals**
G1	Beige to light orange. Compact and semi-fine. Numerous small brown and dark grey mineral grits and micas.	22
G2	Dark red. Compact and fine. Abundant vegetal temper. No visible mineral inclusions.	2
G4	Beige. Compact and sandy. Abundant vegetal temper.	8
G5	Dark orange to light brown. Compact and coarse. Brown to dark grey grits, mica and large angular red mineral inclusions.	2
G6	Orange to red. Compact and very fine. No visible mineral inclusions and very scarce vegetal temper.	2

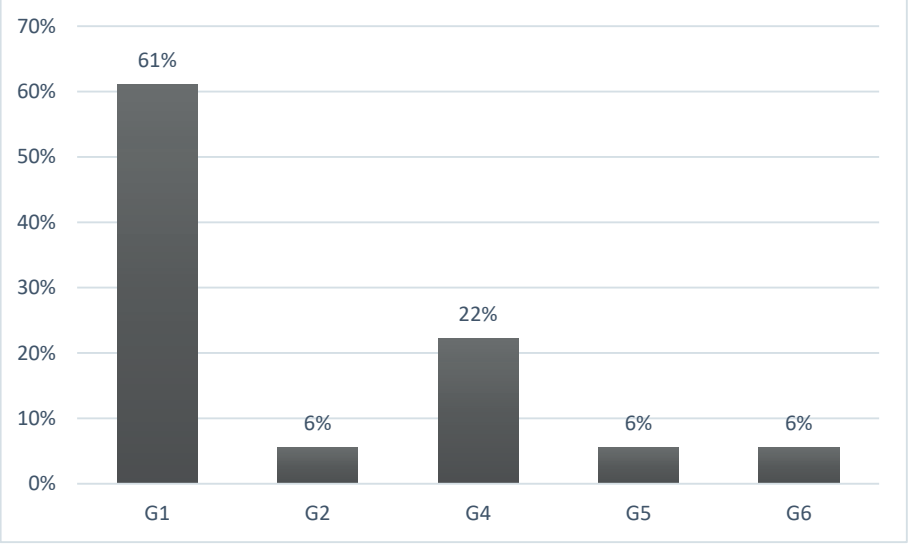

Fig. 4: Percentage of figurines per fabric group

4.2 Technical analysis: production steps

Macrotraces indicated the use of several techniques to produce the zoomorphic figurines, for each stage of production steps, which are shaping, finishing touches, surface treatment, and firing process.

4.2.1 Shaping

The shaping of the body always entails the preparation of separate elements that are later joined together. This technique, however, comprises two variants (Fig. 5).

The first technique (S1) consists in deforming a lump of clay by stretching it to form altogether the body and the legs. A lump of clay is indeed stretched sideways and then bent slightly. In this case, the fractures are characteristic: they often occur in the central part of the body (Fig. 5.1). This precise spot constitutes a point of weakness as it constitutes the centre from which the shaping force is exerted. Another lump of clay is then added to shape the saddle. The figurine is then flipped a first time, resting on the saddle, which causes the characteristic compaction and flattening of the surface (Fig. 5.2). The shaping of the legs is probably done during this step. They are thinned and reshaped, as indicated here again by the nature of the breakage (Fig. 5.3), which suggests another point of weakness. The head is probably the last element to be added, as suggested here again by the characteristic breakage (Fig. 5.4).

In the second technique, S2, the body, the legs, and the head are shaped separately using small lumps of clay and then joined. In this case, the breakage is also characteristic: they affect the legs in their proximal part, where they are attached to the body (Fig. 5.5). The section of some of the breaks display a particular organization of the non-plastic particles, following a circular movement (Fig. 5.6). This suggests that they have organized themselves according to the movement in which they were rolled between the craftsperson's hands and fingers. This interdigital rolling is also evidenced by the aspect of the surface topography, which displays an alternating pattern of bumps and hollows arranged in a spiral movement (Fig. 5.7). The shape of the foot is then either refined by small pinches to obtain a more or less pointed end or flattened directly against the support surface to obtain a flat one (Fig. 3.5). The elements are then joined together by smoothing, as indicated by the presence of striations and overflowing of the paste.

The head is always added at a later stage and is made from a gradually deformed coil of clay. Nevertheless, there is some ground to suggest the existence of a mixed technique combining a hand-modelled body and a moulded head. In fact, the care taken in shaping the head of certain camel figurines compared to the rest of the body (Fig. 5.5) and the striking regularity of their dimensions (Fig. 5.7) could suggest the use of this type of technique, that is also documented from other sites such as Nippur, in southern Mesopotamia.[41] After moulding the

41 See the Parthian horse and rider figurine (B15473) from Nippur currently housed at the Penn Museum, Philadephia (https://www.penn.museum/collections/object_images.php?irn=287508#image1).

Fig. 5: Shaping technique macrotraces (photographs: C. Abric, M. Degli Esposti, M. P. Pellegrino. Drawing: N. Gilbert)

Fig. 6: Finishing touches macrotraces (photographs: C. Abric)

matrix, the artisan would then add the decoration, incised in the case of these camel heads from Tell Abraq. Experimental archaeology could confirm or refute this hypothesis. In any case, if this is indeed hand-modelling and not a mixed technique combining moulding and hand-modelling, the homogeneity of this type of production testifies to great technical mastery on the part of the producers.

4.2.2 Finishing touches

After the shaping step, the figurines underwent a finishing stage that aims to regularize the surface and mask any defects. The majority of the figurines thus show streaks of careful scraping with a tool (Fig. 6.1) or smoothing (Fig. 6.2), probably with the hand. It is associated with a compact aspect of the surface topography, which could indicate these operations were done at the leather consistency stage (Fig. 6).

4.2.3 Surface treatments

The surface treatments are primarily decorative. Indeed, no slip or other coating techniques were observed. However, the surface of some fragments displays a greenish colour that contrasts with the original colour of the clay, still visible in the core section of broken fragments (Fig. 7.1). Is it a decayed coating due to taphonomic conditions? One could also wonder about the possible presence of a now lost greenish glaze, as shown by the decayed surface of some

glazed terracotta figurines from the site of Susa, in Iran, dating from the Seleuco-Parthian period.[42] As the case may be, several decorative surface treatments can be distinguished.

1. Painted decoration: several figurines show either a preserved painted decoration or ephemeral traces of paint (black and dark red as in Fig. 7.2, and sometimes purplish as in Fig. 7.3), applied following a continuous or discontinuous gesture. In the latter case, geometric patterns or possible real elements (such as the horse harness) are represented.
2. Modelled decoration: the decorative details can be directly shaped in the clay mass, as suggested by the absence of limits associated with bumps and hollows, corresponding to the continuous or discontinuous pressure applied to the clay mass by the artisan's fingers or a tool. For instance, the clay is finely pinched to suggest horses' mane or camels' ears (Fig. 7.4).
3. Applied decoration: many small details are shaped with small lumps of clay firstly shaped separately and then applied to the main body in a second step. This technique is mainly used for the eyes, tail, or elements such as bridles (Fig. 7.3). Sometimes these elements have detached, leaving only their negative impression (Fig. 7.5).
4. Incised decoration: many figurines are incised with a pointed tool and combine straight lines and punctuations (Fig. 7.6, see also Figs. 5.5 and 5.8). A dotted and impressed decoration is also often used to represent the eyes (Fig. 5.8).

These different types of decorations can also be combined, as perfectly illustrated by a detached camel saddle (Fig. 7.7). Its components are skillfully arranged together before a fine-applied decoration is added to represent the accessories belonging to the rider. Moreover, on the same item, some areas are decorated with impressed dots.

4.2.4 Firing process

Regardless of the fabric group, the surface colour of the figurines is quite light, ranging from beige to red ochre, suggesting that they were fired in an oxidizing atmosphere. However, it is not possible to define whether the figurines were baked in an open fire or a kiln.

Nevertheless, for the figurines of Group 1, the hardness and compactness of their paste suggest a kiln firing, with high temperatures. Likewise, if the traces found on certain figurines are indeed glaze and not just slip, then this technique requires a very high temperature, only reachable in a kiln to trigger the vitrification process.

42 See the following figurines currently housed at the Louvre, Paris (SB 3605: https://collections.louvre.fr/ark:/53355/cl010177534; SB 3553: https://collections.louvre.fr/ark:/53355/cl010177498; SB 8650: https://collections.louvre.fr/ark:/53355/cl010181320).

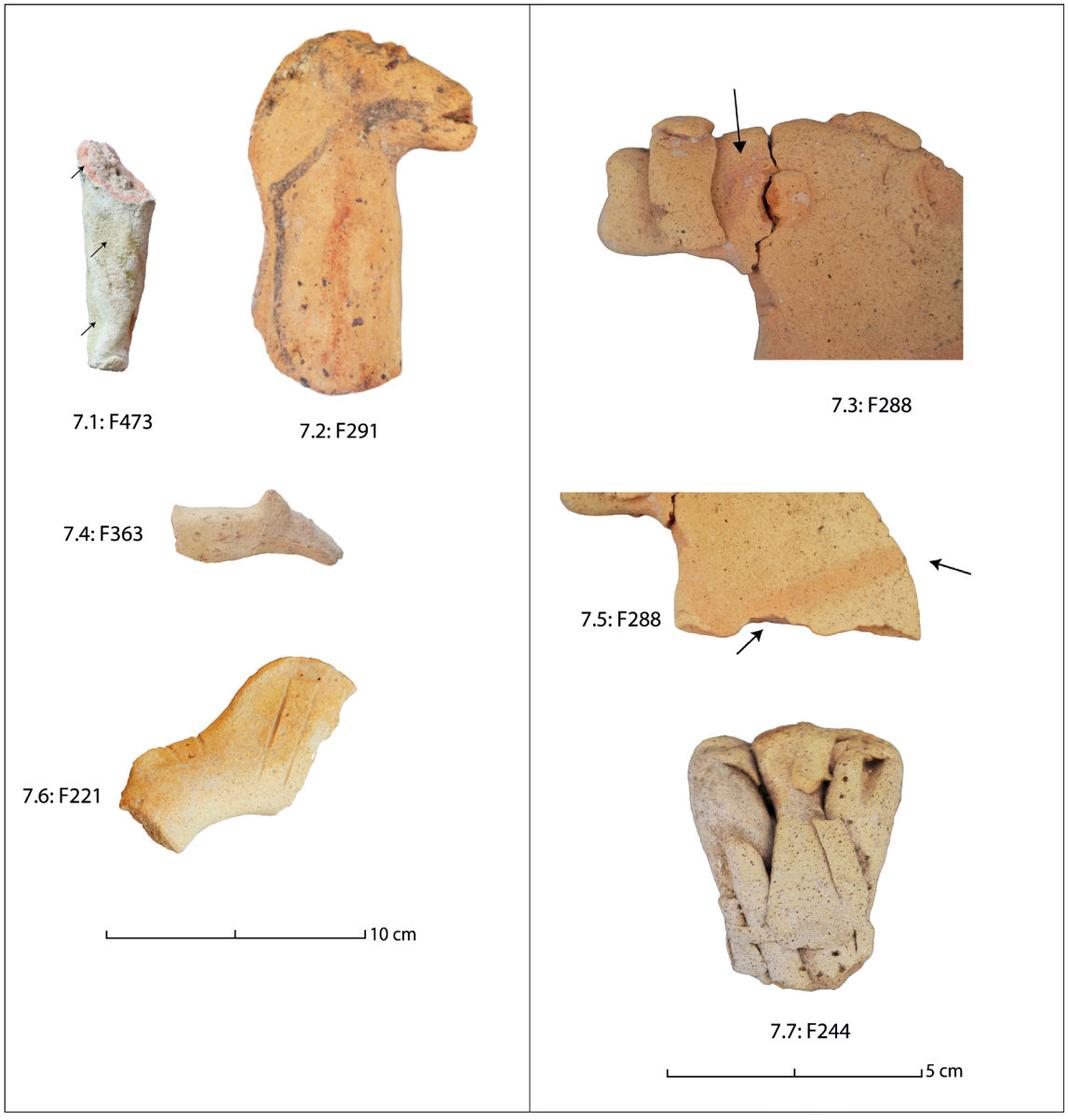

Fig. 7: Different types of surface treatments (photographs: C. Abric, M. P. Pellegrino)

4.2.5 Reconstructing *chaînes opératoires*

Based on the observations discussed above, several *chaînes opératoires* have been identified. They are mainly divided according to the method used to shape the body of the figurine (S1 or S2), the surface treatment[43] and the fabric group (Fig. 8).

43 To keep the analysis as simple as possible, we decided not to include the modelled decoration as a diagnostic feature in its own right but rather to consider it as part of the figurine's main clay mass.

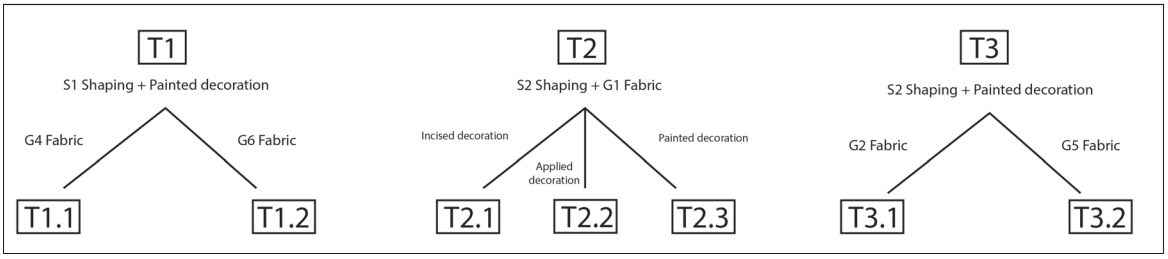

Fig. 8: Schematic representation of the *chaînes opératoires*

The first one (T1)[44] combines S1-type shaping and painted decoration. It is divided into two sub-groups depending on the paste used: T1.1 when Group 4 is used and T1.2 when Group 6 is used.[45]

The second *chaîne opératoire* (T2) combines S2-type shaping and Group 1-type fabric, with several variants depending on the decoration used: T2.1 when incised, T2.2 when applied, and T2.3 when painted.

Finally, a third *chaîne opératoire* (T3) has been identified, combining S2-type shaping and painted decoration. Variant T3.1 uses a Group 2 fabric and T3.2 a Group 5 fabric.

4.3 Typology

Lastly, typologically speaking, apart from one figurine that could not be identified,[46] two major classes are represented within the assemblage: camels (in fact, one-humped *camelus dromedarius*) and horses (Fig. 9).

4.3.1 Camel figurines

Camels all have a single hump, sometimes hidden by the saddle (Fig. 9.1). Some feature the surface for a lost rider (Fig. 9.2), while others are associated with a saddle that can be placed directly on the figurine (Fig. 9.3). There are two main types of saddles: either flat and sub-circular (Fig. 9.4) or rounded and semi-circular (Fig. 9.5). The heads are also of two types: elongated with a long muzzle and small pointed ears (Fig. 9.6), or straight with a round muzzle, rounded ears and sometimes incised and dotted eyes (Fig. 9.7). The tail can be placed on one side (Fig. 9.8) or between the legs (Fig. 9.9). Nevertheless, the main constant of this category is the shape of the legs that, despite a small variability, are generally conical and pointed (Fig. 9.10).

44 'T' stands for 'tradition', as each *chaîne opératoire* corresponds to a specific way of doing things, i.e. a technical tradition, see Roux/Courty 2019.

45 It is also worth noting the relative proximity of the nature of these two fabric groups, with similar colours and the common presence of an added vegetal temper, although the quantity seems to differ. Only a petrographic study can confirm or refute this apparent difference.

46 Figurine F18.

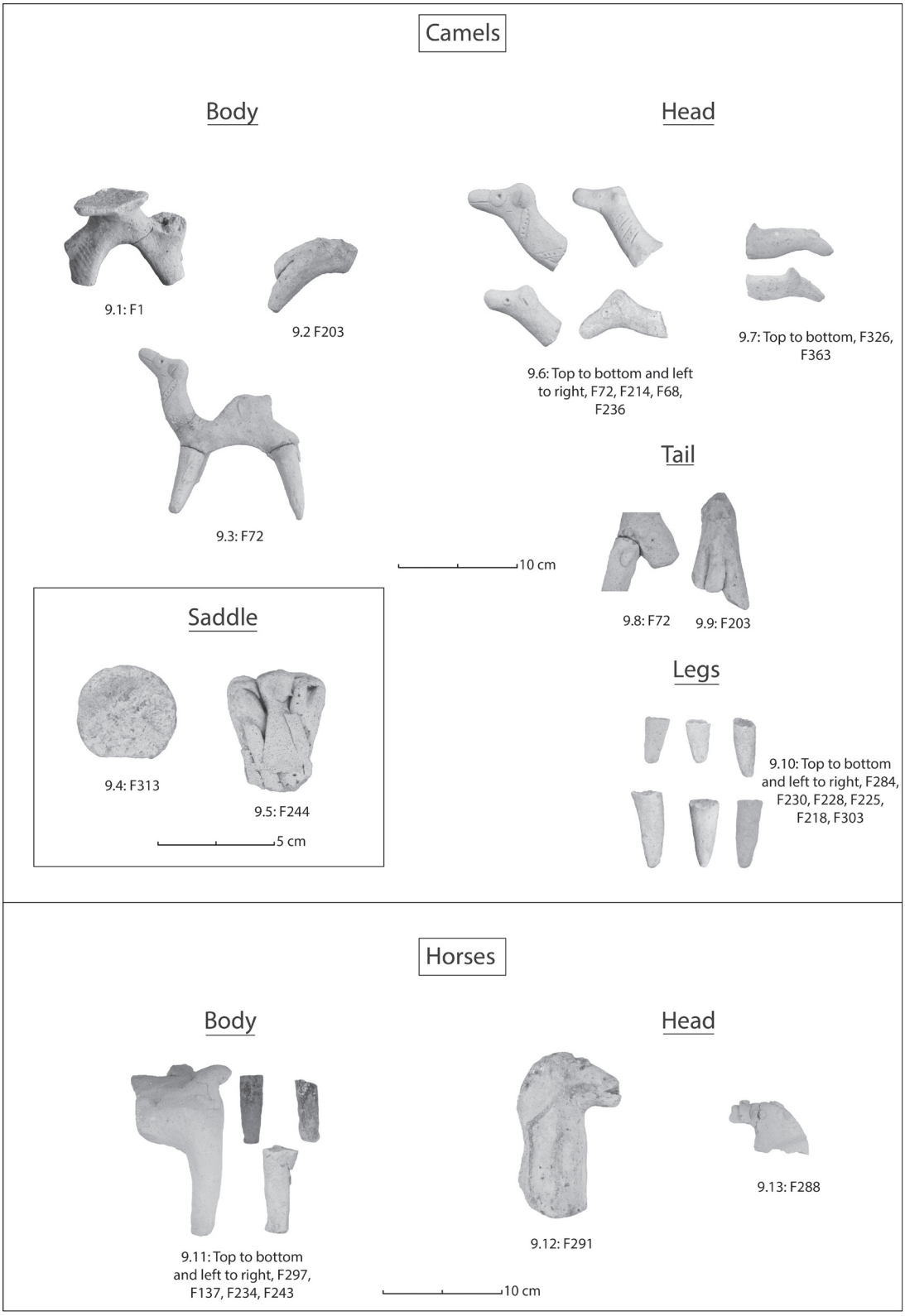

Fig. 9: Typological categories (photographs: M. Degli Esposti, C. Abric, M. P. Pellegrino, N. Gilbert)

4.3.2 Horse figurines

The horse figurines are rarer. The legs are again the main discriminating typological element as they are all cylindrical, of regular thickness and with a flattened foot (Fig. 9.11). The heads are of 2 types: rounded (Fig. 9.12) or flat (Fig. 9.13). The eyes, the ears, the mane, and the bridle are always indicated.

4.4 Techno-morpho-stylistic categories

In an attempt to link the non-diagnostic fragments to broad categories, several techno-morpho-stylistic groups have been identified according to the parameters previously presented. The three main *chaîne opératoires* identified were then combined with the various typological classes (Fig. 10).

The first broad category (C1) comprises figurines belonging to the T1 *chaîne opératoire*, along with sub-variants T1.1 et T1.2, *i.e.* those whose body and legs are shaped together with a head added later and painted decoration, probably lost due to taphonomic conditions for the ones that bear no trace of it. This *chaîne opératoire* concerns only camels with pointed legs and ears, and elongated heads. A typological difference should be noted, however: figurines made according to *chaîne opératoire* T1.1 have a rounded saddle while the T1.2 types have a hump surface prepared to host a rider.

The second and third categories (C2 and C3) comprise figurines made according to *chaînes opératoires* T2 and T3, i.e. those whose parts are shaped separately and then joined in a second step. C2 concerns the camel figurines and C3 the horses.

First, all camels belonging to the C2 category fall within the scope of *chaîne opératoire* T2: they thus all follow the same production process and were made using a clay of G1 group. Interestingly, they all belong to the sub-type T2.1 (i.e. with incised decoration), except saddle F244 which features a mixed decoration (incised and applied). Morphologically speaking, they are very homogeneous and all display pointed legs, rounded muzzles, dotted eyes, and a bump sometimes including a separated saddle.

The *chaîne opératoire* of horse figurines included in the C3 category, all of which have rounded and flat legs but differ typologically in the shape of their heads, is variable. In fact, they can have both a painted decoration, in the case of pastes belonging to groups G2 and G5, or an applied decoration in the case of group G1. It is also worth noting the peculiar case of a flat horse's head (F288), whose fabric belongs to G1 and the surface treatment seems to combine painted and applied decoration.

Based on stratigraphic information from Tell Abraq and comparisons with data from other sites in the wider Arabian region, it is possible to assert that the figurines belonging to the C1 category are more ancient and can be dated to the Iron Age II period (c. 1000/1100–600 BCE). In the case of categories C2 and C3, a chronology into the Late Pre-Islamic period (up until the 1st–2nd century CE) is proposed. Thus, not only can the scattered leg fragments be linked to a particular assemblage, but their reliable dating is possible.

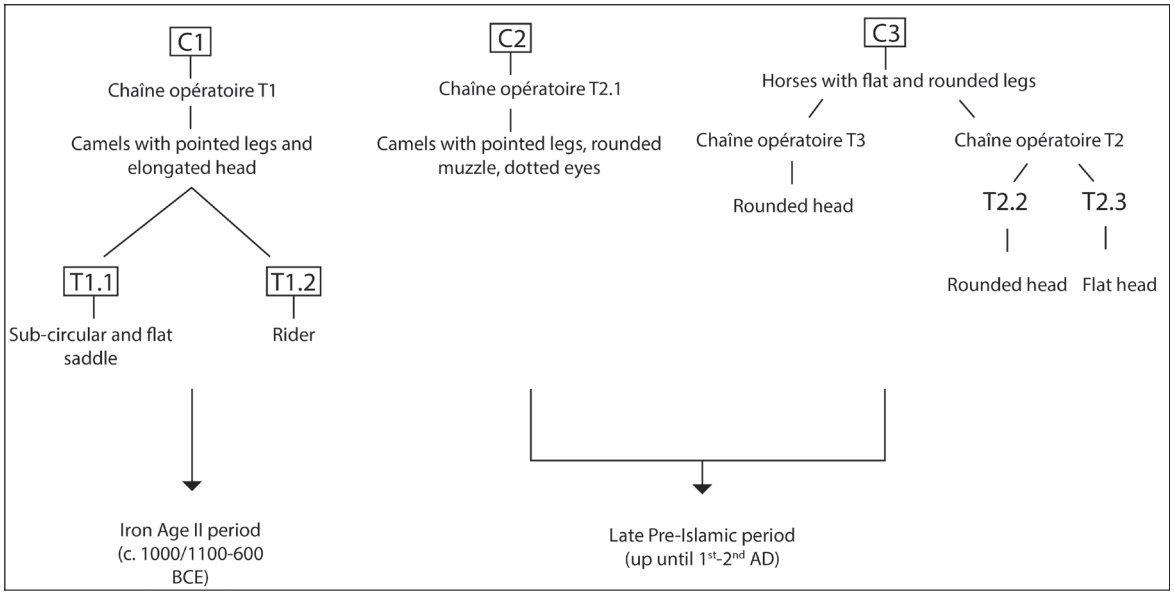

Fig. 10: Schematic representation of the techno-morpho-stylistic categories with their associated chronology

5 Discussion

Beyond chrono-stratigraphic considerations, useful to date a stratigraphic unit or a site's occupation, this kind of cross-disciplinary approach also raises techno-social questions concerning modes of production and organization of ancient societies. But, at the same time, as iconographic supports and objects *a priori* manipulated or, at least, manipulable, figurines could provide an opportunity to consider how ancient populations perceived and experienced their environment.

Nevertheless, it is important to avoid excessive over-interpretation, especially in the case of Tell Abraq figurines, since most of them are not associated with a reliable stratigraphic context. Several questions can, however, be raised, meant, for the time being, to provide suggestions and food for thought.

5.1 Who produced these figurines?

Studying technical processes, particularly in ceramology, allows profiling the individuals who produced these finished products,[47] individuals whose existence is often diminished by the sources and for whom archaeology reveals only minute traces in the absence of genuine testimony. Applied to figurines and combined with other methods such as the study of fingerprints,

47 Roux/Courty 2016; Roux/Courty 2019.

it is possible to restore a semblance of life to these producers and to envisage the organization of these productions and their status in society.[48]

It is worth noting a persistent presupposition about hand-made figurine production: as a miniaturization of the real world,[49] and sometimes with a simplification of it, they would be produced by children. They could produce them either as toys or as a way to familiarize themselves with clay as part of a particular apprenticeship, notably that of the potter.[50] However, the contribution of ethnoarchaeology[51] or experimental archaeology[52] would be necessary to support this hypothesis. In fact, in the Tell Abraq assemblage, zoomorphic figurines display a certain degree of standardization, as well as *chaînes opératoires* that require the mastery of specific gestures and techniques.

It is also impossible to determine whether the same person shaped a figurine of Tell Abraq and decorated it. In any case, whether the decoration is painted, applied or incised, its execution requires a certain technical mastery. It would seem that firing LPI figurines with G1 paste requires a certain amount of expertise in terms of controlling the firing atmosphere and temperature stages, all the more so if certain figurines turn out to be glazed. In any case, all these clues point to specialized craftsmen[53] rather than apprentices or even children.

5.2 Why produce these figurines?

Without a sound stratigraphic context, historical texts or ethnoarchaeological study, it is difficult to know why a figurine was produced. They are often interpreted as children's toys or ritual objects. [54] At Tell Abraq, it is impossible to decide which of these interpretations (or another) applies to zoomorphic figurines. However, the specimen with a detached saddle (F72 and F244) might suggest a toy. Similarly, a camel's head muzzle is perforated (F236), perhaps to thread a cord through the hole. Here again, the mimicry of such a leash could suggest a toy function, even if there is not, for the moment, any comparable example from other contemporary sites.

In addition, several studies focus on the voluntary or involuntary destruction of figurines, perhaps in a ritual context.[55] In the case of Tell Abraq corpus, we consider that this is not the case, or at least that there is not enough evidence to support it. Here, the breakage is preferential and conditioned by the modes of production already explained above.

In any case, even if the function of these figurines cannot be demonstrated, they seem to offer a glimpse into the mental landscape of Southeast Arabian populations during the

48 Sanders 2015; Dyowe Roig et al. 2023; Forte 2023.
49 On this subject, read Davy/Dixon 2019.
50 See Murphy 2020.
51 Bugarin 2005; Ember/Cunnar 2015; Fassoulas/Rossie/Procopiou 2020.
52 Murphy 2020.
53 Moreover, the links between figurine and pottery production are yet unknown.
54 Tooley 1991; Quirke 1998; Langley/Lister 2018.
55 Murphy 2018; Forte 2023; Miniaci 2023.

Iron Age II and LPI periods. Indeed, the camel and horse figurines provide insights into the processes of domestication of these animals and their integration into human-environment dynamics.

According to scholars, the domestication of the camel in the Arabian Peninsula was mastered around 1000 BCE, as shown by the cross-referencing of representational, textual, and archaeozoological data,[56] and Tell Abraq itself provided supporting evidence for a shift between the end of the Bronze Age and the start of the Iron Age.[57] The camel was used for economic and transport purposes, and then gradually as a war mount. The horse was used for the same purposes. As Aurelie Daems clarifies, however, the horse was been better represented in regions bordering the Arabian Peninsula (Mesopotamia, southwestern Iran) than in the region itself, as it would have probably been less suited to the arid desert climate.[58] In any case, horses are less represented in the Tell Abraq assemblage than camels and only appear in the LPI period. This is likely consistent with the general introduction of the horse in the area.[59]

In addition, the morphology of camel saddles may provide information on the evolution of mounting methods. The flat saddles of the Iron Age II period may simply represent a cushion placed on the camel's hump.[60] In contrast, during the LPI period the artisans represented a very detailed saddle, with all the details necessary for a long crossing journey (or battle?). It appears to be a saddle placed at the rear of the camel's hump, as is still the case today in Bedouin communities in the southern Arabian Peninsula.[61] Interestingly, the decorations found on camel figurines, whether painted, incised, or applied, could just as well represent a harnessing system as ritual or symbolic decorations.[62] In the case of the horses, however, the decoration clearly indicated harnessing elements.

6 Conclusion

Combining three complementary methods (the reconstruction of the *chaînes opératoires*, the macroscopic characterization of the fabrics, and the typological approach) in order to create a techno-morpho-stylistic typology allows a cross analysis which provides distinctive but complementary data. In the case of our study, it provided us with a chronological context for the figurines and thus allowed us to link even the most fragmented items to a precise production context, a precise corpus, and to include them in the analyses.

56 Magee 2015.
57 Uerpmann 2001: 228; Uerpmann/Uerpmann 2002.
58 Daems 2004a: 273.
59 See Schiettecatte/Zouache 2017.
60 Bulliet 1990: 80-85.
61 Baum 2018.
62 Tecirli 2018.

The proposed methodology also has limits and needs to be tested on a larger assemblage. The Tell Abraq corpus remains statistically limited and therefore hampers any precise seriation suggestion. We intend to test this method on the anthropomorphic figurines from the site in order to try and link the two sub-assemblages and detect the possible existence of common features, thus further indicating a possible joint production, especially for camels and possible riders. It would also be interesting to deepen this study with experimental archaeology and to attempt to recreate such figurines according to the observed techniques.

From a broader perspective, we believe that this method could also enable a re-evaluation of figurines from ancient excavations. Besides, when applied at a regional scale, it could help in pointing out possible shared technologies and *chaînes opératoires*. Intriguingly, while providing insights on figurine production at the intra-level scale, the application of this method can raise questions which beg for new efforts in search of possible answers: do the *chaînes opératoires* differ from site to site for a given period? Or does it depend on a chronological difference at the regional level? And what would be the economic and anthropological implications for the populations of the time? Terracotta figurines, both fascinating iconographic support and used manufactured items, remain ambiguous objects that deserve to be studied from production to museum, from a biographical perspective.[63]

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63 Appadurai 1986; Bonnot 2015.

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Made of Many Pieces, Protected by Deities, and Fallen Apart: Studying Wooden Statue Fragments from Ancient Egypt

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Abstract

Most of the wooden statues that are now part of museum collections or were found during archaeological fieldwork in Egypt are incomplete. This paper demonstrates the possibilities that lie within studying wooden statue fragments. Modes of statue reconstructions and the technical aspects of wooden statue production will be shown based on single wooden fragments. It will be shown that the application of incised and hidden deities at the inner sides of the shoulders of the separately made arms and under the feet of a wooden statue were made to protect it at its weakest points. This procedure was most part of a ritual activity that is deeply connected to the materiality of the wooden statues, and consequently to their production and purpose as an everlasting representation of the deceased during the funerary rituals and the subsequent mortuary cult. Thus, the wooden statue fragments are analysed within dynamic entanglements concerning statue production, materiality, and ritual functions.

Introduction[1]

The manufacture of statues as representations of deities, kings, queens, and high officials occurs from the early dynastic period (2920–2649 BCE) onwards at the latest.[2] Even though most ancient Egyptian statues seem to be made of stone, statues made of other materials like wood, metal or clay exist as well, a fact that is often overlooked because of the less favorable conditions for their preservation. Especially wooden statues occur not only since the early dynastic period (2920–2649 BCE) and alongside statues made of stone, but often several wooden statues of the same person were deposited in tombs of high officials from the late Old Kingdom until the early 12th dynasty (2649–1783 BCE).[3] Most of the wooden statues now in museum collections as well as those that have been unearthed in recent fieldwork in Egypt are fragmented. The reasons for this are many-faceted and concern not only the preservation by humans and the respective object biography as a cultural item of ancient Egypt but also the materiality and the

1 I am thankful for the remarks and comments by Ulrike Dubiel, Jochem Kahl, and the editors of this volume, Andrea Kilian, Alexander Pruß, and Monika Zöller-Engelhardt.

2 For the chronology of ancient Egypt used here, see Baines/Malek 2000.

3 See the study by Wendy Wood (1977) on early wooden statues from ancient Egypt, and the compilation of wooden statues from the Old Kingdom by Julia Harvey (2001).

Published in: A. Kilian, A. Pruß, M. Zöller-Engelhardt (eds), Excavating the Extra-Ordinary 2. Challenges and Merits of Working with Small Finds. Proceedings of the International Interdisciplinary Workshop at Johannes Gutenberg University Mainz, 25–26 November 2022, Heidelberg: Propylaeum, 2024, 59–81. DOI: https://doi.org/10.11588/propylaeum.1382.c19770

affordance of wood as a raw material for statue production. Wooden statues are usually made of more than one piece, wood can be fragile, it is not water-resistant, it is an easy victim of insect infestation,[4] and it can be reused as firewood. Often it is the arms, feet, or the bases that remain in a disturbed burial proving that a wooden statue was once part of its original equipment. Compared to statues made of stone, wooden statues are rather underrepresented in Egyptological research, and their fragments simply overlooked. For this reason, this paper will mainly focus on wooden statue fragments, discussing the challenges of working with them but will also highlight the possibilities and the merits of studying fragments as opposed to ignoring all but whole wooden statues. To do so, this study is organized in six sections. First, some preliminary remarks concerning fragments in archaeological research as well as a definition for the term itself will be made, followed by an overview of the wooden statue material from Middle Egypt of the First Intermediate Period and the Middle Kingdom (2134–1640 BCE). Section three is concerned with the technical aspect of wooden statue production, and the succeeding section will focus on the possibilities of statue reconstructions based on a single wooden fragment. Section five will bring to light the occurrence and function of hidden deities at a statue's weakest spots, namely the separately made arms and bases, and the final section will conclude this paper.

Preliminary remarks on studying fragments

Before presenting the many fragments of wooden statues, the study of fragments in archaeology and the definition of the term itself need to be addressed. The term fragment derives from Latin *fragmentum* and refers to bits and pieces of things, like food or textiles.[5] Kay Malcher et al., define a fragment as a material entity; emotions and ideas cannot be considered as fragments.[6] A fragment is part of something 'bigger' that has vanished by now,[7] yet one can see the 'bigger' thing in the remaining fragment. But to see the 'bigger' in the fragment, the fragment needs to be somehow diagnostic and relatable, at least for the scholar. There is thus a fine line between a wooden fragment of a specific wooden object and a random piece of (worked) wood. Furthermore, as Alexandra Verbovsek pointed out, pottery sherds are fragmented pottery vessels, however, if they contain script, they are classified as ostraca in Egyptological research and gain therefore a new function or quality as historic objects.[8] During her presentation *What makes a pottery sherd a small find? Processing re-used pottery from settlement contexts* at the Excavating the Extra-Ordinary Workshop 2, Julia Budka also addressed the challenge that comes along with the different classification or attribution of inscribed pottery sherds to etic object

4 See Kühnen/Wagenführ 2014: 104–111.
5 Most 2009: 10–11.
6 Malcher, et al. 2013; see also Philipowski 2011: 98.
7 Philipowski 2011: 98.
8 Verbovsek 2013: 77.

categories by philologists (ostraca) and ceramicists (pottery), when the researchers of each group have their own research methods and interests (see Budka, this volume).

Recently, Gianluca Miniaci stated that "archaeological remains are 'fragmented by definition'"[9]. Most objects are not in a completely state of preservation for many reasons, some were fragmented as part of their purpose, others in the cause of history.[10] In 2000, with his study Fragmentation in Archaeology, that focuses on the prehistory of Southeastern Europe, John Chapman layed the foundation for studying fragments in the archaeological record.[11] Ever since, studies concerned with intentional mutilation during ancient times increased, but are still rare.[12] Also, as stated by Lea Hagedorn, the fragmentary condition in which most museum objects are, has hardly ever been the focal point of their presentation or study in museums.[13] The reasons why objects are fragmented are manyfold. Miniaci indeed differs between accidental, intentional, or semi-intentional fragmentation of objects, he also states that nowadays it is often impossible to reconstruct which form of fragmentation actually took place that led to the incomplete state of an ancient Egyptian object.[14] Katharina Philipowski, on the other hand, differentiates between *überlieferungsbedingte Fragmente*, things that became fragmented over time, *produktionsbedingte Fragmente*, things that have not been fully produced, that are left unfinished and lastly, konzeptionelle Fragmente, meaning things that were never intended to be finished.[15] At this point, the questions arise: who decides when something has been completed and what about later modifications?[16] What if an object was mutilated accidentally at one point and intentionally at another? What if an object that was left unfinished was in addition mutilated later? How can these distinct processes and intentions be differentiated with only the objects left?

According to the approach of symmetrical archaeology, humans and things are entangled with one another.[17] These entanglements are dynamic and are not limited to a specific timeframe. Not only do the entanglements change and the people involved within but also the object itself: its function and location might change as well as its condition or state of preservation.[18] In the case of the wooden statues I could not trace any 'intentional' mutilations or identify a certain point in time or practice that led to the numerous fragmented wooden statues.

9 Miniaci 2023a: 3.
10 Ibid., 3.
11 Chapman 2000.
12 Miniaci 2023a: 3–4. For Egyptology, see i.e. Miniaci 2023b; Kuch 2018; Kuch 2021; Connor 2019, Connor 2022, Birk 2023.
13 Veldhues 2022: 37–39; see also Hagedorn et al. ibid.: 8.
14 Miniaci 2023a: 4.
15 Philipowski 2011: 95.
16 Verbovsek pointed out that only parts of a funerary text were used in the sense of *pars pro toto* (Verbovsek 2013: 84–85). This example illustrates the interplay and biased relationship of an object's completeness to scholars in relation to ancient practices and their actors.
17 Olsen 2012: 209; Beck 2023. For an introduction to symmetrical archaeology, see Olsen 2012: 209–211. For different approaches influenced by symmetrical archaeology, see e.g. Witmore 2007; Hofmann/Schreiber 2011; Schreiber 2018: esp. 38, 76–77; Beck 2023.
18 Beck 2023.

For that reason, this paper is less concerned with the questions why, by whom and when wooden statues fell apart but will focus on the fragments and point out what information can be drawn from them and which support system was built to prevent the wooden statue from falling apart.

A question of definition: wooden statues and fragments

In the case of wooden statues from ancient Egypt, their identification as a fragment is complicated and depends on the definition of the Egyptological category 'wooden statue'. I have defined the term wooden statue as an image of a historic person carved in wood, standing or standing-striding on a wooden platform or seated on a wooden seat.[19] This definition excludes other figures made of wood typically labelled as wooden models as well as so-called offering bearers/estate figures[20] in Egyptological studies.[21] This definition does not depend on its materiality and technical aspects. As mentioned above, wooden statues were usually made of various pieces, only their combination results in a wooden statue per definition. Thus, a completely preserved wooden arm or wooden base, the latter even inscribed, can therefore only be treated as a fragment of a wooden statue, even though its state of preservation has not changed since the day of its production.

Different reasons and modes of fragmentation were addressed above, but the degree of fragmentation remains open, and the question arises, how to address the state of preservation of a wooden statue? In Egyptology there is no consensus in how to refer to the state of preservation of an ancient Egyptian object. Designations and estimations like (almost) complete, incomplete, (very, highly) fragmented, fine, (very, slightly, little) damaged, broken, fair, destroyed or (very) good are regularly used. The decision whether an object is damaged or slightly damaged, well-preserved or in fair condition, relies on the subjective evaluation by each scholar combined with his or her expectations of how the object supposedly had looked after its production process was completed. The core problem is situated within a scholar's expectations which are often not compatible with the possible varieties of ancient object production and its entanglements. For instance, wooden statues can be completely covered in plaster and painted from head to toe, including the base, they can be partially painted (eyes, coiffure, and/or skirt) or not painted at all. Often pigment has faded, or the plaster chipped off and one cannot decide whether or to which extent a wooden statue had been painted. Even though, as mentioned above, materiality and its affordances and consequently technical aspects of wooden

19 Seated wooden statues are rare; only two examples from the First Intermediate Period and the Middle Kingdom are known (see Cairo CG 458, Turin S. 14781).

20 For the term 'offering bearer/estate figure', see Zöller-Engelhardt 2022: fn. 8.

21 For more information on wooden models and offering bearers, see i.e. Barker 2022, Eschenbrenner-Diemer 2017; Eschenbrenner-Diemer 2021; Tooley 1989; Zöller-Engelhardt 2016; Zöller-Engelhardt 2023.

statue production are not included into the definition of the term wooden statue, however they determine its state of preservation: wood is an organic material which attracts insects and fungi and can develop cracks over time caused by humidity or temperature stress,[22] and the statues had to be made of more than once piece. Not only is each wooden statue singular, their state of preservation is also unique, making it, in my opinion, impossible to qualify between different grades of fragmentation. For that reason, I decided to only differentiate between complete and incomplete wooden statues, with the remark that the occurrence of coloring has no impact on a wooden statue's assignment to one or the other category, because often the lack of pigment does not indicate that coloring was intended. Also cracks in the wood of the human figure or in the wooden base, were not determining but were, of course, recognized in the object's description.[23]

Wooden statues from ancient Egypt

This study is based on my PhD research that focused on wooden statues from Middle Egypt (from Akhmim to Beni Hasan) from the First Intermediate Period and the Middle Kingdom (2134–1640 BCE) (Fig. 1).[24] The study included 311 wooden statues. Most of the wooden statues come from the necropolis of Asyut (Tab. 1).

Tab. 1: Overview of the wooden statues from Middle Egypt

Provenance/ Necropolis	**Wooden statues**
Asyut	215
Meir	49
Deir al-Barsha	15
Beni Hasan	8
Deir Rifeh	7
Qaw el-Kebir	6
Al-Hawawish	5
Asyut or Meir	5
Antinoe	1

In this study the wooden statues were perceived as archaeological objects and funerary images, meaning that the wooden statues were not only studied using art historical methods, like

22 Mergny et al. 2016.
23 Beck 2023.
24 Ibid.; the study is currently in the process of publishing.

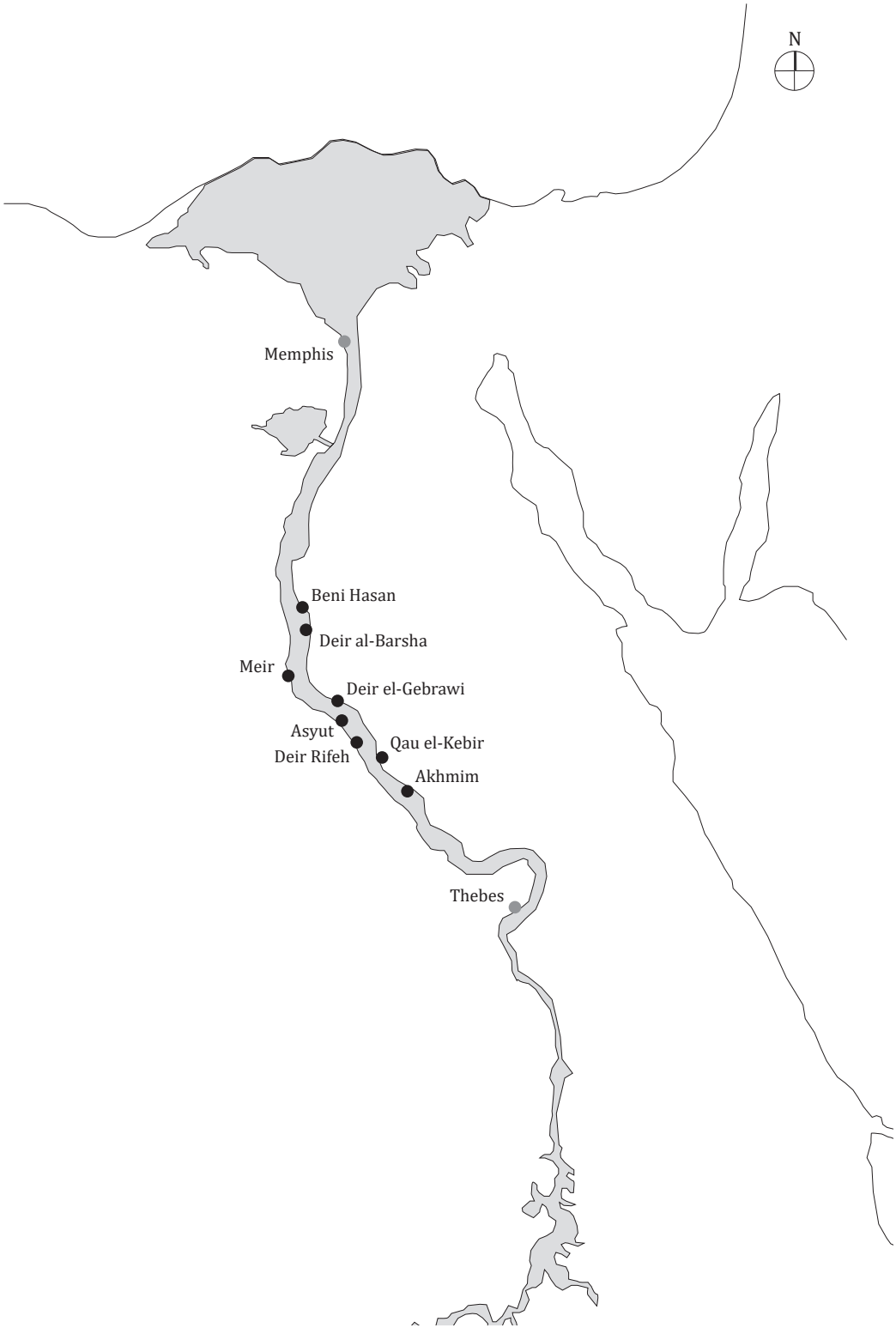

Fig. 1: Map of Egypt. Image: Oliver Hasselbach & Tina Beck

a structural description of each pictorial element, but all available data (excavation reports, archaeological context, socio-historical data of the deceased) was collected, discussed, and evaluated for each wooden statue. Based on the collected information, the relative-chronological dating of each burial and wooden statue was discussed as well as the role(s) and function(s) of the wooden statues during the funerary rituals using the framework of ritual entanglements. Furthermore, differences and similarities between tomb contexts and the different necropoleis were highlighted and discussed. This approach encompassed wooden statues of all kinds of states of preservation. As briefly mentioned above, no pattern of intentional mutilation was detected, rather the grade of destruction was manifold and unique for each wooden statue. However, often only arms, legs and front parts of the feet remain; all those parts were often carved separately and attached to the torso by tenons or nails, as will be demonstrated in the section below.[25] All together the study encompassed 205 incomplete wooden statues and 99 complete wooden statues; the state of preservation of seven wooden statues is uncertain or unknown.

The composition of a wooden statue

The size and the technical composition of a wooden statue depends mainly on the available material and its planned size. The height and width of a wooden trunk is decisive for the measurements of a wooden statue and its composition. Most wooden statues were thus made of various parts and plugged together with wooden nails or tenons. In the following, the focus will be set on the separately made arms and the insertion into the separately made bases.[26]

Arms

In most cases both arms were carved separately and attached to the torso at the shoulders.[27] Thereby the following techniques were applied (Fig. 2 a–c):

a. A wooden tenon was directly carved from the shoulder joint of the arm and inserted into a rectangular or square mortise at the torso's side (Fig. 2a)
b. A wooden tenon was carved separately and inserted into a rectangular mortise on the shoulder joint of the arm and at the torso's side (Fig. 2b)

25 This observation that more often arms, bases, and toes remain instead of bodies or heads is curious. One can only imagine that these parts would get lost easier in a hasty process of looting, or simply over time. Also, body and torso would serve as better burning material or can be more of use for other secondary purposes that would lead to the destruction of a wooden statue.

26 This study will not focus on ancient modes of repair work (see Louvre E 26915) or rare characteristics like the attachment of the middle flap from a shendjit skirt with wooden nails (see Cairo JE 40372).

27 For exceptions, see i.e. Louvre E 12633, E 11937, WAG 22.11, 22.12, 22.13 (Asyut), Manchester 4735 and 4737 (Deir Rifeh).

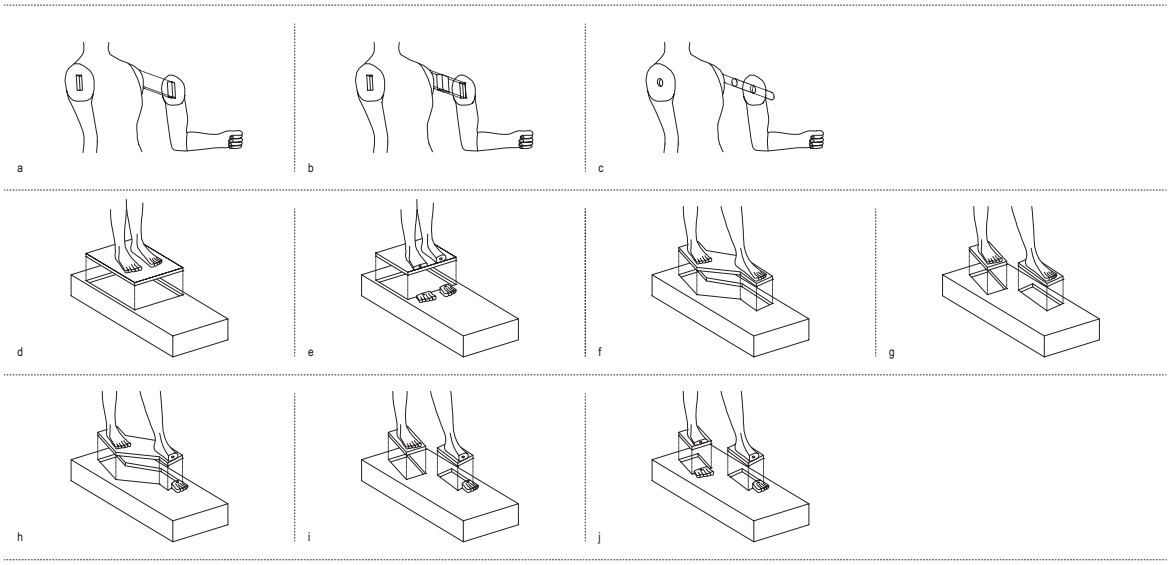

Fig. 2: Model for the construction and composition of a wooden statue
to affix arms and the feet into the wooden base. Image: Oliver Hasselbach & Tina Beck

c. A wooden nail was carved separately and inserted into a drilling hole on the inner side of the shoulder joint and at the torso's side; occasionally the nail was inserted through a drilling hole piercing the whole width of the shoulder and was therefore visible on the shoulder's surface (Fig. 2c)

Whether the arms are connected with nails or tenons to the torso does neither depend on the wooden statue's provenance nor the sex of the depicted but there is a tendency that especially larger wooden statues use tenons in favor of nails. Clearly, rectangular wooden tenons offer more support and stability compared to wooden nails; however, occasionally two wooden nails or wooden tenons were used to affix one arm.[28] Furthermore, there is no example that uses a tenon for one arm and a nail for the other arm. Occasionally, a bent left arm for male wooden statues can also be carved of two different pieces that were connected to each other at the elbow or the wrist.[29] Wooden tenons were then carved from the hand or the forearm and inserted into the connecting mortise.

Bases

All wooden statues are inserted into their wooden base. The cut-out necessary for the insertion depended not only on the posture of the wooden statue (whether it was standing or

28 See BM EA 45066 (Asyut).
29 See i.e. BM EA 45048, EA 45062, Turin S. 14810 (all Asyut).

standing-striding), but also whether the front parts of the feet (toes and midfoot) were made separately. The following techniques can be found (Fig. 2 d–j):[30]

1. Standing statues, feet made of one piece:
    a. Platform-like extension beneath both feet was inserted into the base's cut-out (Fig. 2d)
2. Standing statues, front parts of feet made separately:
    a. Platform-like extension beneath both heels was inserted into the base's cut-out; front parts of the feet were inserted into hindfoot with a tenon (rectangular or square); front parts of the feet rested on the surface of the wooden base and were occasionally fixed with vertically inserted nails beneath the toes (Fig. 2e)
3. Standing-striding statues, feet made of one piece
    a. Platform-like extension beneath the striding feet was inserted into the base's cut-out (Fig. 2f)
    b. Tenon-like extensions beneath each foot were inserted into the base's cut-out (Fig. 2g)
4. Standing-striding statues, front part of left foot made separately:
    a. Platform-like extensions beneath the right foot and left heel were inserted into the base's cut-out; front part of the left foot was inserted into the hindfoot with a rectangular/square tenon; front part of the left foot rests upon wooden base's surface and was occasionally fixed with a vertically inserted nail beneath the toes (Fig. 2h)
    b. Tenon-like extensions beneath the right foot and left heel were inserted into the base's cut-out; front part of the left foot was inserted into the hindfoot with a rectangular/square tenon; front part of the left foot rests upon wooden base's surface and was occasionally fixed with a vertically inserted nail beneath the toes (Fig. 2i)
5. Standing-striding statues, front parts of both feet made separately:
    a. Tenon-like extensions beneath both heels were inserted into the base's cut-out; front parts of the feet were inserted into hindfeet with rectangular/square tenons; front parts of the feet rest upon wooden base's surface and were occasionally fixed with vertically inserted nails beneath the toes (Fig. 2j)

Occasionally, the insertion into the base is further supported by vertically inserted wooden nails into the sides of the wooden base, further affixing the tenon-like extensions or platform-like extensions.[31]

30 There are different techniques to insert a wooden statue into its wooden base: a tenon-like extension beneath the foot or the heel or a platform-like extension beneath both feet or both heels together.

31 See Turin S. 14797/04 bis.

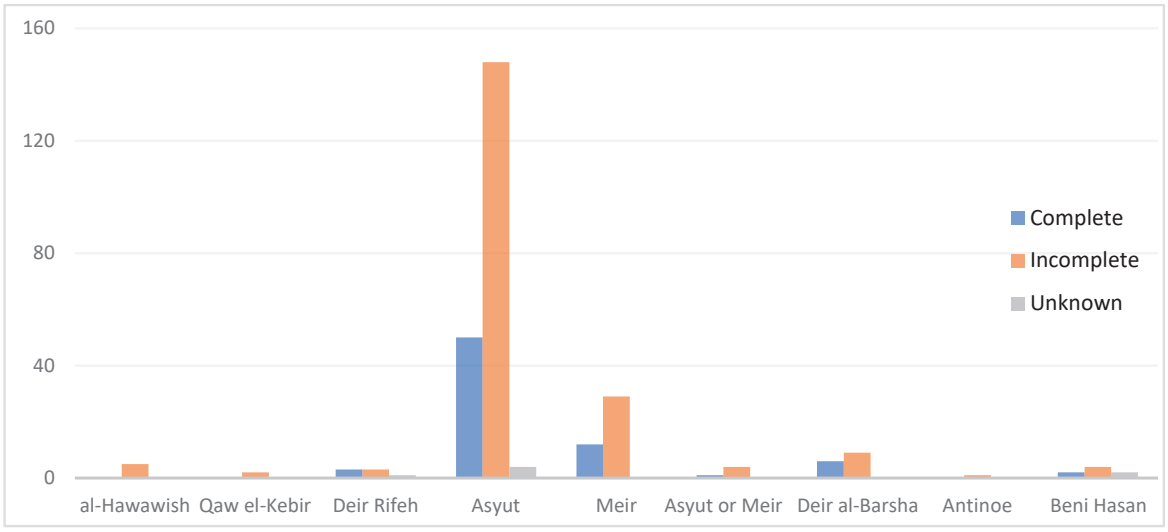

Fig. 3: Overview of the state of preservation of wooden statues from Middle Egypt

Factors determining the technical composition of a wooden statue are the intended size and the materials available, whereas the place of manufacture and the sex of the depicted do not seem to play a role. However, regional preferences concerning wooden statue types, or the composition of different pictorial elements and their stylistic execution were detected. Fig. 3 shows the distribution of complete vs. incomplete wooden statues for each necropolis. Especially for Asyut, where the available data is sufficient, it is possible to reconstruct fragmented wooden statues to a certain extent as will be demonstrated in the following section.

The possible reconstructions of wooden statues

While stylistic details, such as the facial features or the execution of an echelon-curl wig cannot be deduced from a remaining arm; one can reconstruct certain characteristics, pictorial elements or a statue's type based on one single fragment.[32] In Asyut all male wooden statues are standing-striding and some hold a scepter in their right hand and a long staff in their left hand. In turn, all the ones with staff and scepter wear an echelon-curl wig and a short white skirt with or without a middle flap (*shendjit*-skirt) (Fig. 4).

Consequently, this type of wooden statue can be reconstructed based on a remaining left arm that is bent at the elbow or a remaining wooden base that not only has a cut-out to insert a

32 The term pictorial element derives from the German Bildelemente, see Fitzenreiter 2021: 55.

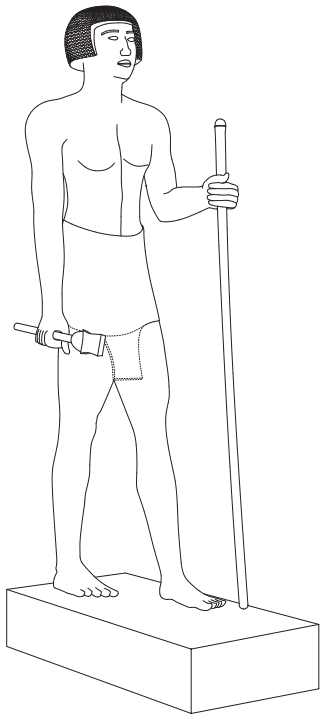

Fig. 4: Reconstruction of a male standing-striding wooden statue with staff and scepter from Asyut. Image: Oliver Hasselbach & Tina Beck

Fig. 5: Wooden statue base (BM EA 45070) of Sedekhiqer with small round depression for the long staff. Photo: The Trustees of the British Museum (CC BY-NC-SA 4.0)

standing-striding wooden statue but also shows a small round depression on the surface of the base in front of the left foot (Fig. 5). This notch once held or supported the end of the long staff to stabilize it.

Apart from the reconstruction of this specific statue type, one can also attribute the sex of a wooden statue, as illustrated in Tab. 2.

Tab. 2: Characteristics of female and male wooden statues from Asyut.

Male	**Female**
Predominately ochre-red/brown skin color	Predominately yellow skin color
Indicated musculature	Slender arms and legs
Fists	Open hands
Standing-striding posture	Standing posture or standing-striding

Even though a wooden arm can be interpreted as once belonging to a female wooden figure, based on its slenderness, lack of musculature, open hand, and yellow skin color, one cannot reconstruct with certainty its coiffure or choice of dress or whether the female wooden statue was standing or standing-striding. With only a wooden base left, one can at least reconstruct whether the wooden figure was standing or standing-striding depending on the cut-out in the wooden base. While standing statues from Asyut seem to belong all to female wooden statues, the base of a standing-striding wooden statue can belong to both sexes unless it is inscribed and identifies the person represented by the wooden statue. However, one cannot be certain that a single arm, especially when it is female, or a remaining base did not belong to an offering bearer or model figure.[33]

Deities under cover

Analyzing fragments as thoroughly as complete wooden statues offers the unique possibility to better understand the production process, to reconstruct the appearance of a wooden statue and even to gain insight into ideas and beliefs that surrounded the creation of a wooden statue. Case in point: there are small incised and occasionally also painted figures of deities or small inscriptions in the shoulder joints next to the mortise of the tenon or the wooden nail. Nine examples are so far known, most come from Asyut. The first scholar who came across these inscriptions was Ludwig Borchardt who published in the *Catalogue Générale* of the Egyptian Museum Cairo a facsimile of a hieratic inscription on the inner side of a wooden statue's shoulder (Cairo CG 781),

33 Zöller-Engelhardt 2023: 633. Future research that goes beyond traditional Egyptological (etic) object classifications focusing on the material wood and its affordances concerning the production and usage of anthropomorphic figures in ancient Egypt is desperately needed. Therefore, an article that discusses wooden statues, offering bearers and estate figures together by focusing on their material and form is currently in preparation by M. Zöller-Engelhardt and T. Beck.

Fig. 6: Left wooden arm (Cairo CG 781) with inscribed deities on the inner side of the shoulder. Image source: Borchardt 1930: 90, revised by Tina Beck

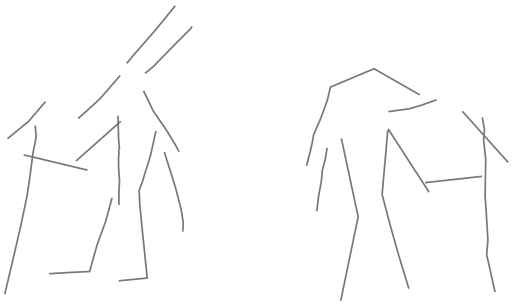

Fig. 7: Incised figures of Horus (right) and Seth (left) on the torso of the wooden statue of Nakht, Miho Museum. Drawing: Tina Beck, based on study images provided by the Miho Museum

Fig. 8: Overview of the incised figures of Horus and Seth (BM EA 45205, 45206, 45207, 45049). Photos: The Trustees of the British Museum (CC BY-NC-SA 4.0), drawings: Tina Beck

Fig 9: Overview of the incised figures of Isis and Nephthys (BM EA 45208, EA 45209). Photos: The Trustees of the British Museum (CC BY-NC-SA 4.0), drawings: Tina Beck

referring to numerous deities (Fig. 6).[34] In 1998, Lawrence Berman briefly mentioned the depictions of two deities on the torso's side of the shoulder joint on the wooden statue of Nakht, now in the Miho Museum, however without any photos or facsimile (Fig. 7).[35] In a recent article, Marie Vandenbeusch published six wooden statue fragments (arms and feet) from the British Museum with incised figures of Horus, Seth, Isis and Nephthys (Fig. 8, Fig. 9).[36] Apart from these examples, two more can be added: The left arm of the wooden statue of Khenu, now in the Museo Egizio in Turin,[37] has a depiction of presumably Horus, and another wooden foot from the BM shows traces of the inscribed name Nephthys *nb.t ḥw.t* (Fig. 10, Fig. 11).[38]

Tab. 3 gives a brief overview of the wooden statue fragments, and one can see that Horus and Seth are incised on six wooden arms; Horus occurs once on a left arm and thrice on a right arm. Seth is incised on two left arms, Nephthys on two left feet and Isis once on a right foot. The wooden statue of Nakht has an incised figure of Seth on the left side of the torso and an incised figure of Horus on the right side of the torso.[39] Cairo CG 781 bears more than one deity,

34 Borchardt 1930; Chappaz 1993: 90.

35 Berman 1998. Many thanks to Lawrence Berman and Hajime Inagaki who kindly provided me with images of the depictions.

36 Vandenbeusch 2019. See BM EA 45205, 45206, 45207, 45208, 45209, 45049.

37 Turin S. 14757. At this point I want to thank Paolo del Vesco and Valentina Brambilla from the Museo Egizio for their help and support during my research visit in 2019.

38 BM EA 45210.

39 Apparently, no figures were detected on the arms sides and it remains unknown whether there are incised figures of other deities (perhaps Isis and Nephthys) below the feet.

Fig. 10: Figure of a deity, presumably Horus, Turin S. 14757. Photo: Tina Beck, courtesy of the Museo Egizio Turin. Drawing and DStretch: Tina Beck

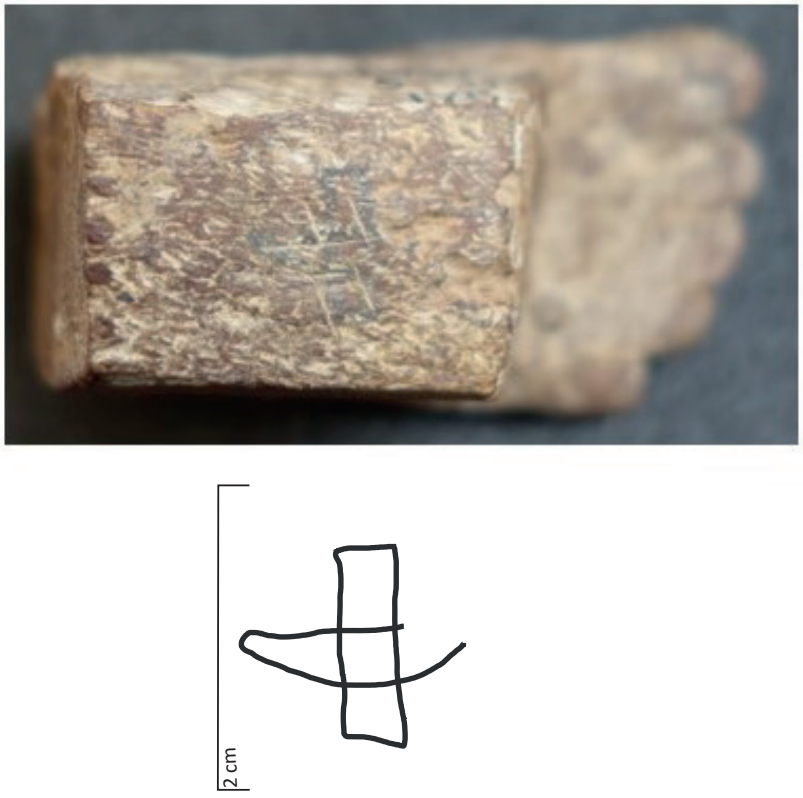

Fig. 11: Underside of left wooden foot BM EA 45210 with the inscription *nb(.t)-ḥw.t*. Photo: The Trustees of the British Museum (CC BY-NC-SA 4.0), drawing: Tina Beck

one can read Horus or Horus-Harachte, Isis and Osiris.[40] This arm that is – according to the information in the *Catalogue Générale* and the *Journal d'Entrée* of the Cairo Museum – either from Meir or Saqqara, clearly follows a different system than the arms from Asyut.

Tab. 3: Wooden statue fragments with incised deities

Wooden Statue	Provenance	Tomb	Short Description	Deity
BM EA 45049	Asyut	?	Left arm, bent at the elbow; depiction on inner side of the shoulder	Seth
BM EA 45205	Asyut	HO Tomb 7	Right arm, pendent; depiction on inner side of the shoulder	Horus with scepter and *ꜥnḫ*
BM EA 45206	Asyut	HO Tomb 7	Right arm, pendent; depiction on inner side of the shoulder	Horus with *wꜣs*-scepter
BM EA 45207	Asyut	HO Tomb 7	Left arm, bent at the elbow; depiction on inner side of the shoulder	Seth with *wꜣs*-scepter
BM EA 45208	Asyut	HO Tomb 7	Right foot; depiction below the foot on the tenon-like extension	Isis with *wꜣs*-scepter and *ꜥnḫ*
BM EA 45209	Asyut	HO Tomb 7	Left foot; depiction below the foot	Nephthys with *wꜣs*-scepter
BM EA 45210	Asyut	HO Tomb 7	Left foot; traces of an inscription below the foot on the tenon-like extension	Nephthys
Cairo CG 781, JE 18081, SR 2/263	Meir? Saqqara?	?	Left arm, bent at the elbow; cursive inscription on inner side of shoulder naming various deities	Horus or Horus-Harachte, Osiris, Isis
Nakht, Miho Museum	Asyut	?	Standing-striding statue, left arm bent, right arm pendent, short echelon-curl wig, shendjit-skirt, staff and scepter; depictions on either side of the torso at the shoulder joints	Horus (right side), Seth (left side) both with *wꜣs*-scepter
Turin S. 14757	Asyut	?	Left arm, bent at the elbow, wooden base with feet; depiction on inner side of the shoulder	Horus with *wꜣs*-scepter and *ꜥnḫ*

The figures of Horus are falcon headed, Seth is depicted with the head of a donkey, and the female figures of Isis (BM EA 45208) and Nephthys (BM EA 45209) are accompanied with an inscription naming them precisely; BM EA 45209 has no female figure and only an inscription.[41] The depiction on Turin S. 14757 and its identification with Horus needs to be further addressed (Fig. 10). The figure itself is clearly visible, as well as the *ꜥnḫ*-sign in its right hand and *wꜣs*-scepter in its left hand. However, the outline and shape of the head and thus its identification with a precise god is challenging. In reference to the wooden statue of Nakht (Miho Museum) and the two left wooden arms from the BM (EA 45207 und 45049) a donkey-headed deity – Seth – can be expected on a left wooden arm.[42] In case of Turin S.14757

40 Many thanks to S. Töpfer (Museo Egizio Turin) for her thought on the reading of the hieratic script.

41 According to Vandenbeusch, BM EA 45049 and EA 45207 are the oldest attestations of Seth depicted with the head of a donkey (Vandenbeusch 2019: 259).

42 See below fn 55.

a (donkey-headed) Seth can hardly be recognized. It seems that the lines between scepter and head and above the head might not belong to the figure, even though they seem intentional. It is noteworthy that the line between head and scepter goes vertically along the grain and if this line was accidentally drawn one would not be able to erase it without damaging the surface of the wood. If one would identify these lines with a donkey's ears, the head of the figure would be dislocated from its shoulders. Based on these considerations the figure will be identified as a falcon headed Horus.

BM EA 45207 can be linked to a tomb excavated by David Hogarth in Asyut in 1906 (HO Tomb 7). Based on their similar sizes (especially for EA 45206, EA 45208 and EA 45209), their comparable manufacture and their registration in the BM with consecutive numbers, one can argue that BM EA 45205–45210 were all found in HO Tomb 27.[43] EA 45207 is a bent left arm and in combination with EA 45206, EA 45208, and EA 45209 one can reconstruct a male wooden statue that once held a long staff in its left hand and a scepter in its right hand. Furthermore, one can assume that this posture was combined with a short echelon-curl wig and a short skirt with or without middle flap (see previous section). This reconstructed wooden statue would then have Horus in its right shoulder, Seth in its left shoulder, Nephthys under the left foot, and Isis under the right foot.[44] All these depictions of deities were not meant to be seen after the production process of the wooden statue was completed. They were hidden and acted under cover. Their presence can be well compared to the mitre inscriptions of coffins. Silke Grallert, who has studied the mitre inscriptions of wooden coffins, argues that they work as a 'virtual' glue that would prevent evil spirits to enter the wooden coffins through the mitres and cause the destruction of the coffins.[45] By attaching a god or goddess to the most delicate parts of a wooden statue, namely the separately made arms and feet, the wooden statue was further protected from falling apart.[46] This shows the complicated and dynamic entanglements of materiality, human practices, statues and (ritual) functions. Apparently, the technical mechanism to hold a wooden statue together (tenons and nails) were not perceived as sufficient to stabilize a wooden figure. Thus, another mode of protection was applied that goes beyond the materiality, but is at the same time a direct result of the choice of material. The position of these deities clearly bears witness to their protective function for the wooden statue and therefore also for the deceased, since the wooden statue plays a vital part during the offering rituals performed during the funerary as well as at the succeeding and ongoing mortuary cult.[47] It seems likely that the placing and carving of the deities was connected to a ritual element. Furthermore, the deities protecting the wooden statues might have been called upon during

43 Ibid.: 256. Vandenbeusch did not include EA 45210 in her study. See also Beck 2023. For more information on the tomb, see Ryan 1988: 47–48; Zitman 2010a: 25–26.

44 Whether the complete preserved wooden statue of Nakht now in the Miho Museum has incised figures of Nephthys and Isis below his feet is unknown.

45 Grallert 2007: 70. See also Grallert 1996.

46 Vandenbeusch 2019: 259.

47 See Beck 2023.

the funerary rituals as well as in the light of the mortuary cult in order to keep up their protection.[48] Unfortunately, no ritual texts are known that can be connected with the deities and their involvement as protective gods and goddesses for (wooden) statues.[49]

The choice of deities for the Asyut fragments, namely the pairings Isis – Nephthys and Horus – Seth and their position in the arms and under the feet is not selected at random. Isis and Nephthys co-occur regularly, protecting the deceased.[50] The same can be postulated for Horus and Seth[51] The pairing of the deities is also common in texts of the so-called *Gliedervergottung*, meaning the identification of a body part with a deity.[52] There is no consistency within these texts concerning a fixed or strict attribution of one body part with a specific deity,[53] however, the tandem of Isis and Nephthys is often reflected in their identification as twofold body parts like the lower legs or thighs, but also as the ears, the bud cheeks, the upper lip (Isis) and the lower lip (Nephthys).[54] And several examples identify Horus and Seth with a person's arms.[55] One can assume that many more arms and feet of wooden statues from Asyut have incised figures of deities, possibly also on wooden models, offering bearers and other objects that are made of more than one piece. It is furthermore noteworthy that Cairo CG 781 follows a different system than the Asyut arms and feet which might indicate regional preferences for the application and choice of deities.[56]

Conclusion

The previous sections have highlighted the possibilities and the merits of studying wooden statue fragments. It was shown that – in the case of the necropolis of Asyut – the appearance of a wooden statue can, to a certain extent, be reconstructed *pars pro toto*. Furthermore, the

48 See Beck 2023.

49 Comparable contemporary figures of deities on statues made of stone are not known. Since these statues are usually made of one piece, there was no need to affix the limbs further by the placing of deities on their surface. However, one cannot know whether the arms or feet were nevertheless addressed or called out in reference to deities in order to protect the statue.

50 Leitz, et al. 2002a: 63; Leitz, et al. 2002b: 97; Hollis 2019: 92–102, Ahmed-Mohamed 2016: 94.

51 Barta 1973: 131.

52 For the so-called Gliedervergottung, see Quack 1995: 104; Eschweiler 1994: 81; Stöhr 2009: 175.

53 Ranke 1924: 558–559. See also Altenmüller 1977: 625.

54 Leitz, et al. 2002a: 63–64; Leitz, et al. 2002b: 97.

55 Leitz, et al. 2002c: 233; Leitz, et al. 2002d: 693. Vandenbeusch has suggested to connect the depictions with PT 359, where Horus is identified with the king's right side and Seth with his left side. The example of Turin S. 14757, a bent left arm of a male wooden statue with a falcon-headed Horus however shows that this idea cannot fully be applied (Vandenbeusch 2019: 258; see Beck 2023). Interestingly, in pTurin CGT 54053, a hymn to Thot, 19th dynasty, Nephthys is identified with the left side and Isis with the right side (Rossi/Pleyte 1869: 15, pl. XXIII). Another example can also be highlighted, namely pBerlin 3027 that comprises spells for mother and daughter (Erman 1901; Yamazaki 2003). Spell U identifies Horus and Seth with the arms and Isis and Nephthys with the legs of a child (Erman 1901: 48–49; Yamazaki 2003).

56 For regional characteristics concerning the coiffure and dress of wooden statues, see Beck 2023.

so far little-known depictions of deities in the shoulder joints and under the feet would never have come to the attention of scholars who focus only on complete wooden statues. It was argued above that the deities protected the wooden statue from falling apart at its weakest spot. A measure that had to be applied and depended on the object's materiality and its affordance concerning the production process. However, it goes beyond the technical possibilities of the plug-in system of wooden statue pieces by incorporating deities and therefore a divine level of protection. These relationships between materiality, human practices, including the production processes, ritual practices and deities bear witness of the dynamic entanglements of wooden statues with other humans and things.

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Processing Re-used Pottery from Settlement Contexts in Egypt and Nubia: Challenges & Potential

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Abstract

There is evidence for the use of re-cut pot sherds as tools for different functions at a variety of archaeological sites over time, making material-saving recycling processes cross-cultural. This chapter presents examples of re-used sherds, primarily from the New Kingdom town of Sai, but also a number of other domestic sites in Egypt and Nubia.

The function of sherd tools is often unclear without contextual data. Their most common function is as scrapers, but re-shaped ceramics were also frequently used as lids – normally by re-cutting the lower parts of dishes and plates.

Re-used pottery sherds offer many intriguing lines of research: (1) the recycling process and questions related to object biographies and use lives, (2) the multiple functions of the tools created from re-cut sherds allow us to investigate different sets of tasks and practices in settlement contexts, (3) lids and covers created from pottery sherds reflect the blurred boundaries between find categories in archaeological documentation – especially between ceramic small finds and pottery, since lids are normally included in ceramic typologies when produced as individual vessels.

This chapter addresses some terminological and methodological issues arising from processing re-used pottery sherds as small finds, as well as problems in dating them. The recording procedure established for the ERC AcrossBorders Project for New Kingdom Sai is first outlined and then discussed through case studies.

1 Introduction

There is often a somewhat artificial division and categorisation of different types of archaeological evidence in Egyptology and Egyptological publications. This categorisation leads to a separation of different types of evidence – such as architecture, reliefs, inscriptions, finds or pottery – even when they are from the same context (e.g., a single decorated tomb).[1] This is to say nothing of the study of the human, botanical, or faunal remains which are even more specialised and considered by a relevant expert. The separation of objects from the same site by material or function has been widespread in Egyptian archaeology since it was first established by William M. Flinders Petrie.[2]

1 See, e.g., the publications on the Memphite tomb of Horemheb: Martin 1989 (reliefs and inscriptions); Schneider 1996 (finds); Bourriau/Aston/Raven/van Walsem 2005 (pottery); Strouhal 2008 (human remains).

2 For Petrie see Stewart-Peters 2014; for examples of relevant publications see: Petrie 1886; Petrie 1900. See also Zöller-Engelhardt/Kilian 2021: ix–x.

Published in: A. Kilian, A. Pruß, M. Zöller-Engelhardt (eds), Excavating the Extra-Ordinary 2. Challenges and Merits of Working with Small Finds. Proceedings of the International Interdisciplinary Workshop at Johannes Gutenberg University Mainz, 25–26 November 2022, Heidelberg: Propylaeum, 2024, 83–124. DOI: https://doi.org/10.11588/propylaeum.1382.c19771

In more recent projects and publications, pottery, objects, tools and other equipment are assessed in relation to associated finds, architecture and past human actions. The study of material culture is now often complemented by an assessment of the environmental remains.[3]

However, pottery represents a considerable challenge in Egyptian archaeology, in part because of the large quantities which means site-specific approaches are often needed.[4] The large amount of ceramic material is part of the reason that the ideal "One context, one publication"[5] is often simply not feasible in Egyptian archaeology.[6] Although hybrid publication styles, which are partly online, are being increasingly adopted in Ancient Studies and Egyptology, and may provide a useful solution.[7]

1.1 Small find or pottery sherd?

It is common practice on most excavations in Egypt (and also at Egyptian sites in Nubia) that dockets – ceramic sherds with written labels on them – are not kept within the ceramic corpus, but separated to be studied by a language expert.[8] Likewise, ceramic ostraca – sherds re-used as writing material – and jar labels are rarely studied by ceramicists but recorded separately, following a distinct workflow. This division, based on different expertise requirements, also became common practice in publications.[9] More recent publications have moved away from this division and reflect the more holistic approach which is now normally used in the study of material culture.[10] For example, Susanne Bickel and colleagues' publication on the material from KV 40 presents the complete set of jar labels, as well as the jars, as pottery vessels in one volume.[11] This is clearly an example of best practice, considering the individual expertise required for both dockets and jars, and there is hope that the recent increase in cooperation between different experts will result in similar publications.

3 Kemp/Stevens 2010a; Kemp/Stevens 2010b; Stevens 2012; Budka 2020.

4 See, e.g., Bader 2021.

5 See, e.g., Budka 2021a with all available evidence for one tomb, including all objects and the pottery.

6 See, e.g., the separate volumes on pottery for the AcrossBorders Project (Budka forthcoming, but note Budka 2017) and for the Amara West Project (Gasperini 2023).

7 See, e.g., Budka 2020 with an online appendix of all finds (`https://doi.org/10.1553/AcrossBorders2_Appendix_List-of-Finds`); for further open data of the AcrossBorders Project see Budka 2021b; Budka/Hinterhuber 2021; D'Ercole/Sterba/Budka 2021; Wohlschlager/Stadlmayr 2021. A number of research journals now offer digital supplementary materials, for best practice in Germany see iDAI.publications, for example, supplementary material for the journal Archäologischer Anzeiger.

8 This tradition can be traced back to the beginnings of Egyptian archaeology under Petrie; see, e.g., Petrie 1900. For a notable exception where a body sherd of a zir vessel with a hieratic docket was numbered as a ceramic vessel, studied, drawn and published by the ceramic specialist see Budka/Doyen 2012/2013: 198–199, figs. 29–30. Note, however, that dockets were extremely rare at this site, allowing us to work without an expert.

9 See, e.g., Tallet 1998 for a grouping of wine jar labels according to the information in the texts, without consideration of the jar types or fabrics.

10 See also Zöller-Engelhardt/Kilian 2021.

11 Bickel 2021.

2 Sherd tools in New Kingdom Egypt and Nubia

2.1 General aspects of sherd tools

Re-cut pot sherds were commonly used as tools, with multiple functions, at New Kingdom domestic sites, proving the existence of material-saving recycling processes in Pharaonic culture[12] (e.g., at Qantir,[13] Elephantine[14] and Amarna[15]). The reuse of ceramic sherds after reworking one or several edges is also attested to for Nubian cultures, for example for cosmetic palettes.[16] In general, the recycling of pottery sherds is a very common phenomenon at all sites, including cemeteries, across all periods since pottery was such a widely available material for making "convenient tools".[17]

The seminal study by Christine Raedler "Keramikschaber aus den Werkstätten der Ramses-Stadt" (MA thesis 1995 Mainz) published in 2007 can be regarded as an example of best practice for dealing with sherd tools.[18] It is an archaeological and typological study for which iconographic sources, as well as results from experimental archaeology were considered. Raedler could show close parallels between re-used sherd tools and tools made of other materials (silex, metal and bone).[19] The re-used ceramic sherds were chosen based on the colour, porosity, stability and hardness of the individual pieces which depend on the specific fabric.[20] Similar to the *chaîne opératoire* reconstructed by Kate Fulcher for painting materials, the task of producing sherd tools can involve a number of different places, people and actions.[21] The production process as well as the activities carried out with the newly created tool are well suited to consider tool kits and dynamics taskscapes in ancient landscapes and micro-contexts.[22] The technical choices are based on the cost (time and resources), availability and workability of the raw materials, in this case the fabric of the chosen sherd.[23] The latter also determines the tools necessary for reworking a sherd (e.g., smoothing the edges or piercing the pottery). There are also important questions regarding what time of year the sherd tools would have been produced. Although most of the tools were most likely produced *ad hoc*, pottery making was

12 Bourriau/Nicholson/Rose 2000: 143–144.
13 Raedler 2007; Prell 2011: 92.
14 Cf. Kopp 2005; see also Budka 2010.
15 Stevens 2012: 295–338.
16 See Williams 1993: 45 with note 49.
17 Bourriau/Nicholson/Rose 2000: 143.
18 Raedler 2007. See also Raedler 2015 for an English summary.
19 Raedler 2007: 11 and passim.
20 Raedler 2007: 16.
21 Fulcher 2022: 77, fig. 35. Cf. also D'Ercole 2024 for a chaîne opératoire approach to pottery production in Bronze Age Nubia.
22 For the concept of taskscape see Ingold 1993.
23 Fulcher 2022: 77, fig. 35.

probably mostly a seasonal activity.[24] As such the making of sherd tools may also have been primarily carried out on a seasonal basis, in particular for tools used in pottery workshops.[25] It is also very likely that a large stock of raw material was available once old vessels were replaced by new ones. However, since at several sites, especially Piramesse, imported – rather than locally produced – vessels were used for sherd tools, the schedule of making these tools may also have followed delivery cycles or simply the local demand.

2.2 Multifunctional tools

Raedler convincingly showed that sherd tools were convenient across different situations and useful in multiple contexts, from specialised pottery workshops to multi-functional workshops or horse stables.[26] This applies in particular to scrapers which are suitable tools for various materials. A large number of re-cut sherds were also used as digging tools[27] or spoons. From ancient Sudan, examples from the site of Hosh el-Guruf were most likely digging tools given the gold-mining context, a very specialised task.[28] The usage for more general digging activities including tomb looting is more commonly attested, in both Egypt and in Sudan.[29]

The multifunctional character of sherd tools means a classification based on different shapes is the most obvious to use.[30] Another criterion is size which can give indirect indications about the user of the tool (e.g., the size may be based on hand-size which could differ based on age or sex).

The functionality of sherd tools is also connected to the, in general, very complex use life of pottery vessels and different vessel functions.[31] Reuse of pottery is cross-culturally a common phenomenon and different usages and recycling need to be considered beyond sherd tools.[32] Ceramics are themselves long-lived and can provide raw material centuries after the production and original use. This makes them a convenient source for producing *ad hoc*-tools in various situations.[33] Despite the abundance and availability of pottery sherds as raw material, there seem to be site-specific and potentially task-specific production patterns of re-used sherds. The

24 See the seminal paper by Arkell 1939; cf. also Cedro/Żurawski 2019. Based on ethnography and modern parallels, pottery making in ancient Egypt and Sudan was most probably, at least, partly dependent on the timing of the harvest season and the agricultural calendar.

25 For the general use of ceramic scrapers in pottery production (to smooth wet surfaces of vessels) see Roux 2019: 196. For such a use at Egyptian sites see Raedler 2007: 45 with references.

26 Raedler 2007: 45–50. See also Raedler 2015.

27 Bourriau/Nicholson/Rose 2000: 143–144.

28 Williams 2024 could show that there was a deliberate choice for these digging tools in very strong meso- and neolithic sherds at Hosh el-Guruf; the much weaker Kerma or Napatan pottery sherds available at the site were not used.

29 Bourriau/Nicholson/Rose 2000: 144; Budka 2021a: 269.

30 Raedler 2007: 29, fig. 14.

31 See, e.g., the seminal work by Skibo 1992.

32 Cf. Peña 2007.

33 While processing large amounts of pottery at the site of Umm el-Qaab, I used large body sherds of convenient shape as shovels for the heaps of collected pottery – they are very effective digging tools.

following will argue for a need of more detailed studies from sites in Egypt and Nubia through the case study of Sai Island.

3 Case study: New Kingdom town of Sai Island

3.1 Documentation of re-used sherds from Sai Island, ERC AcrossBorders Project

The AcrossBorders excavation in the Egyptian town of Sai yielded substantial amounts of pottery, attesting not only to the use of the structures during the New Kingdom, but also to an abandonment phase and the later history of the site, especially in Meroitic, Post-Meroitic and Medieval times.[34] The sherds arrived from the field to the dig house in large baskets, arranged according to their archaeological context (site, square, stratigraphical unit). All of the pottery material from the site was then separated into diagnostic and undiagnostic sherds; rim and base sherds, handles and decorated/painted sherds were regarded as diagnostics. The material was separated into New Kingdom and Post-New Kingdom pottery. The undiagnostic sherds were documented in order to ascertain the different pottery fabrics, wares (surface treatments) and production techniques. The diagnostic sherds were analysed in more detail to establish a site-specific corpus of vessel types and for fine dating.[35]

On Sai, most of the ceramic small finds, predominately re-cut sherds, were not identified during the excavation process, but during the sorting of the pottery sherds. These objects were then separated from the pottery and given to the team member responsible for processing the small finds. Each tool would then be entered individually into a database and assigned a unique registration number. The pottery specialist, in this case myself, was asked to provide further details: fabric and ware,[36] vessel type of the sherd, colours of natural/slipped surfaces according to the Munsell soil colour chart and dating (based on ware, technology and shape of the original vessel). The fabric groups were identified from breaks in the pottery with the aid of a 1x10-magnification hand-lens; no further petrographic or chemical analyses of re-used sherds were conducted.

To facilitate the documentation, the registrar designed a specific form for re-used sherds (Fig. 1). The project's FileMaker database includes detailed descriptions, the information described above, photos and a note indicating whether a drawing of the piece was necessary.

34 See Budka 2020: 196–197.

35 This is a standard procedure in ceramic processing, see, e.g., Bader 2021.

36 For fabrics used in Egyptian archaeology see the "Vienna System" and Nordström/Bourriau 1993: 168–186; wares are considered as the fabric plus surface treatment, for example, Nile clay B2 uncoated or Marl clay A2 burnished and monochrome painted. For the wares in New Kingdom Sai see Budka 2020: 198, Tab. 15.

Sai 2016, Initials MG Page 19

ReUsed Sherds (JB Notes)

SAVIE

Reg #	Description	Ware/Pottery Type	Munsell Notes
2717	dish CHRISTIAN	Coarse RWall	RW 10 R 6/8 light red nat 5YR6/6 reddish yellow
2718	jar NK?	B2 UC? → "fires-rounded" core undone	nat 5YR 5/4 reddish brown
2725	jar Christ Port-NK	Coarse RW	RW 2.5YR 4/8 red UC/nat 5YR 5/8 yellowish red
2728	〃	〃	RW 2.5YR 4/6 red 〃 UC/nat: 5YR 5/6 yellowish red
2733	jar/storage vessel NK/18.D	C2UC	nat 7.5YR5/4 brown
2734	Dish w. flat base 18 D	B2UC	nat. 7.5YR 6/4 light brown
2755	jar red ware Port-NK/Chr.	Coarse RW	RW 10 R 4/8 red nat 5YR 5/4 reddish brown
2756	Dish CHRISTIAN	Red slip - coarse Red slipped	RS 10R 5/8 red nat 2.5YR 6/6 light red
2757	storage vessel Port-NK	coarse? UC? eroded	UC/nat: 7.5YR 6/6 reddish yellow
2762	Dish w. ring base 18KD.	C2UCRP RPin	RP 10R 4/6 red nat 7.5YR 6/6 reddish yellow
2763	jar/storage/bowl? Chr.	Red ware Coarse RW	RW 2.5YR 4/8 red nat 5YR 6/6 reddish yellow
2781	Dish/plate 18 D	C2UCRW	RW 2.5 YR 5/8 nat 7.5YR5/4 brown
2788	Dish w. ring base 18.D	B2RWall RPin	RW 2.5YR 4/8 red nat 7.5YR 5/6 strong brown
314	Plate 18D	B1 UC	nat

Fig. 1: An example of the form used by the AcrossBorders Project for the ceramic information for re-used sherds (design by M. Gundlach)

Overall, this workflow was not very time consuming and had the advantage that the dating and identification of the former vessel type was conducted, when possible. Furthermore, sometimes sherds that were merely eroded were identified and removed from the list of registered intentionally reworked objects before they were documented in detail.

3.2 Quantities and statistics

Of the 615 artefacts from the New Kingdom town of Sai classified as re-used pottery sherds by the AcrossBorders Project, most were probably used as scrapers. The total number of re-used sherds from both sectors excavated by the project, SAV1 East and SAV1 West, includes 233 pieces from the 18th Dynasty, one Ramesside sherd, three New Kingdom pieces, 195 Post-New Kingdom sherds, as well as 150 Medieval ones. 33 re-cut sherds are of an unclear date, due to weathering or size. Therefore, only 41 % of the re-used sherds from AcrossBorders excavations date to the New Kingdom. As such, the Post-New Kingdom use of the site is particularly well represented by the re-used sherds. However, with almost 250 objects, re-used pottery can still be regarded as quite a prominent factor in the 18th Dynasty object assemblage at Sai.[37]

3.2.1 Sector SAV1 East

374 re-used pottery sherds were documented from sector SAV1 East. 122 are of clear Post-New Kingdom date and 94 of 18th Dynasty date (Tab. 1). The remaining pieces are probably also of New Kingdom origin, although this is less certain. Among the datable sherds, scrapers, lids and tokens/gaming pieces are most common.

As described above, the documentation of the fabric and ware of the ceramic sherds used for the tools was a crucial part of the workflow. The statistical analysis of the choice of material (fabric) offers some interesting insights, especially when compared to the pottery. This means it is essential that either the pottery data on fabrics and statistics are already published, and/or the team member working on the re-used pottery has access to this information.[38]

For SAV1 East, most of the pieces were made from Nile clay sherds (see Fig. 2), in particular Nile clay B2 and C2 which are also the most common clays used for pottery vessels at the site. However, the sherd tools made from Marl clay sherds (imported from Egypt) accounts for a total of 10.6 %. This percentage is much higher than in the pottery corpus which is only 1.3–3.5 % and clearly indicates the preferred use of strong hard sherds. Therefore, the probability of one the few Marl clay vessels being re-used after it was broken is much higher than for other types of Nile clay vessels even if they were more common. Since Marl clay vessels could

37 See Budka 2020: 193–194. Note, as a comparison, that 30 years of excavations yielded 275 re-cut potsherds in Qantir, see Raedler 2007; Raedler 2015. However, within a single house in Elephantine, House 55, 435 re-used sherds were found (out of 2915 registered objects; unpublished data recorded during the AcrossBorders Project in cooperation with the Swiss Institute and Cornelius von Pilgrim).

38 In the case of Sai, the AcrossBorders pottery data are currently being prepared for publication: Budka forthcoming.

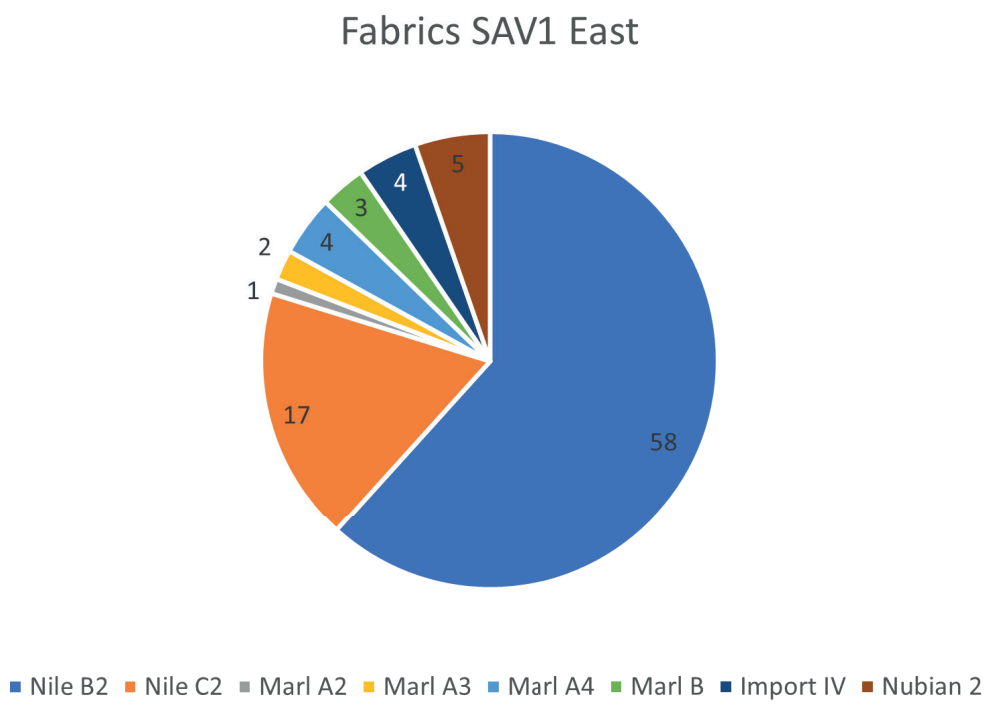

Fig. 2: Overview of the quantities of fabrics attested for re-used sherds from SAV1 East, Sai Island

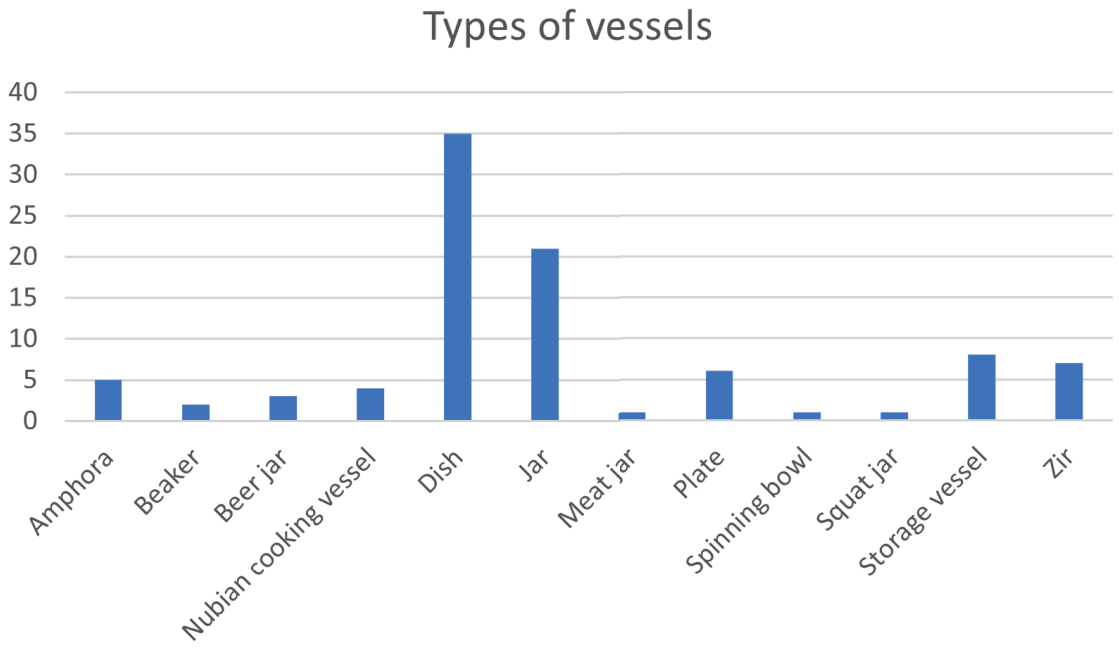

Fig. 3: Pottery types used for sherd tools from SAV1 East

also not be replaced immediately, such vessels probably held a specific value and there was a clear connection between value, material properties and availability.

Something similar can be suggested for the group of imported amphorae from the Levant, as at 4.2 % these fabrics are more common for the re-used pottery than the vessels (c. 1.7–2.5 %). Finally, the Nubian fabrics used for pottery tools account to 5.3 %, with an average of 3.2 % for Nubian wares in sector SAV1 East overall. This also must be seen as a deliberate choice. The predominance of Nile clays in the re-used sherd assemblage from SAV1 East is slightly different from the one in the pottery corpus. Although Nile clay vessels were the clear majority, sometimes accounting to 95 % and more of the corpus, there was a definite tendency to reuse fabrics of better quality regarding weight, hardness and strength (Marl clays and imported amphorae sherds).

Apart from the fabric, the vessel type is also of interest in the quantitative study of sherd tools.[39] At SAV1 East, twelve vessel types can be differentiated (Fig. 3). The most common vessels are dishes, next are jars, storage vessels and *zirs* (water jars). Open forms comprise 45 %, closed forms 46 % and transitional ones like cooking pots 9 %. Comparing these proportions to the pottery corpus is difficult, since the latter varies considerably according to context. However, in most contexts the predominant vessel type of sector SAV1 East are beer jars – a type very rarely used for re-cut sherds. Furthermore, an almost equal distribution between open and closed forms is strikingly different from the clear preference at Qantir for closed vessels like meat jars, storage jars and amphorae.[40]

Of particular interest is the fragment of a spinning bowl re-used as a lid (SAV1E 2629, Fig. 4). Spinning bowls are rare in the pottery corpus of sector SAV1 East, while they are attested in considerable numbers in sectors SAV1 North and SAV1 West. Therefore, it is likely that sherd tools were produced in one of these sectors which also yielded workshop-like buildings. There, activities like spinning and weaving are attested in the material culture, whereas SAV1 East was an administrative quarter with domestic activities mostly connected with food production (bread and beer), storage and some ritual practices. SAV1E 2629 raises, therefore, the important *caveat* to not directly compare the pottery corpus of one site with the corpus of sherd tools.

The majority of re-used sherds from SAV1 East were originally body sherds (Fig. 5). Only two rim sherds, one neck and 23 base sherds were documented.[41]

3.2.2 Sector SAV1 West

241 re-used pottery sherds were documented from SAV1 West and 143 of these could be dated to the 18th Dynasty (Tab. 2). The most common types are scrapers (40 pieces), followed by lids (26 pieces). There were also ten tokens, six weights and four net-weights.

39 Cf. Raedler 2007: 16–17.

40 Raedler 2007: 16.

41 For the preference of rim sherds at Qantir see Raedler 2007: 18–19, and below.

Fig. 4: Spinning bowl re-used as a lid (SAV1E 2629, ©AcrossBorders Project)

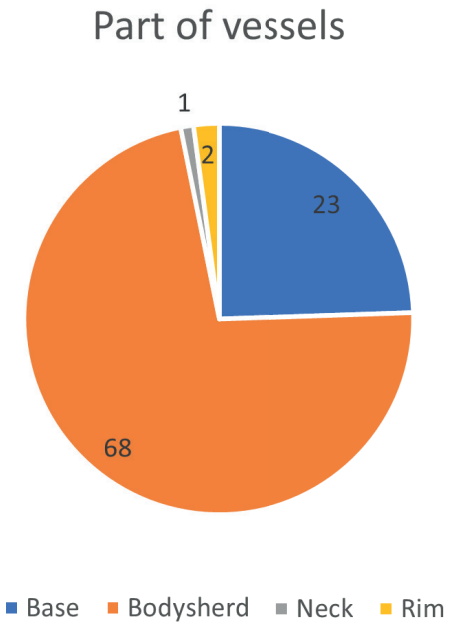

Fig. 5: Overview of part of vessels used for sherd tools from SAV1 East

The frequency of the fabrics (Fig. 6) is in general similar to the one from sector SAV1 East. The majority of the re-used sherds were made from Nile clay B2 and Nile clay C2 sherds, but the Marl clays account to a total of 13.3 %. This is significantly higher than within the pottery corpus (average of 1.3 %). The same holds true for the Levantine imports which comprise 7 % of the sherd tools. Nubian wares account to 6.3 % which is again slightly higher than the general appearance of Nubian sherds in the ceramics from the western sector (c. 2.5–4 %). To conclude, the composition of the fabric groups within the re-used sherds from sector SAV1 West is closely comparable to the one from SAV1 East and differs from the pottery corpus.[42]

The quantities according to pottery types from SAV1 West are very similar to the results from SAV1 East showing a preference for dishes and jars (Fig. 7). The proportions between open (42 %) and closed (48 %) vessels are also similar, with transitional vessels making up 10 % of the sherd tools. This contrasts with the pottery corpus from the western sector where, like at SAV1 East, the majority are beer jars.

Most of the sherds used for tools are body sherds (Fig. 8), but five rim sherds, one neck and 33 bases were also identified.

42 Like SAV1 East, this predominance of sherd tools made from Nile clay is markedly different to Qantir, where mostly Marl clays were used, see above, and Raedler 2007.

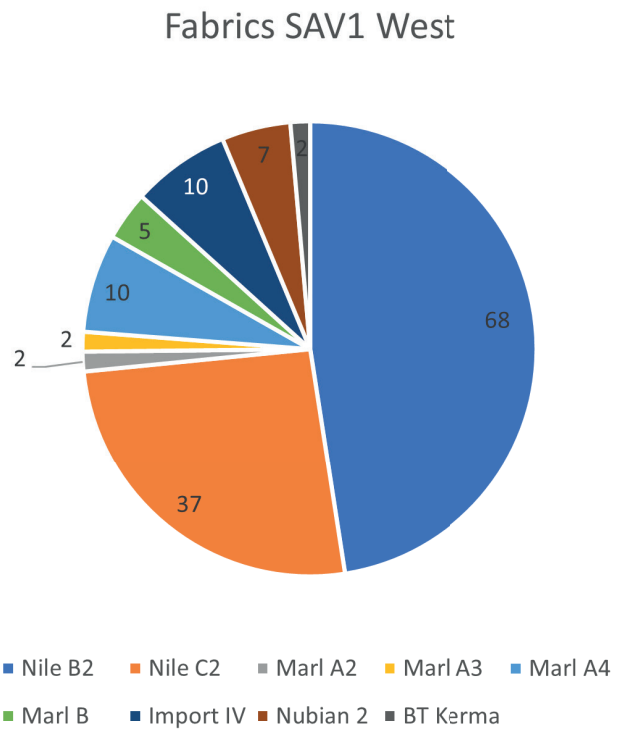

Fig. 6: Overview of quantities of fabrics attested for re-used sherds from SAV1 West, Sai Island

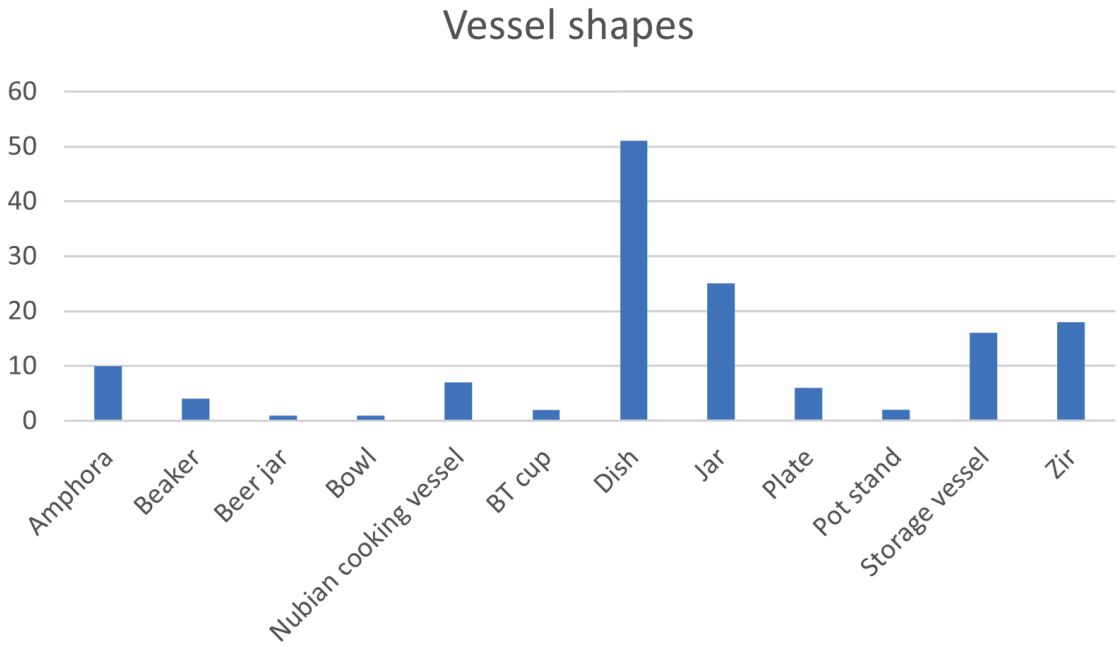

Fig. 7: Pottery types used for sherd tools from SAV1 West

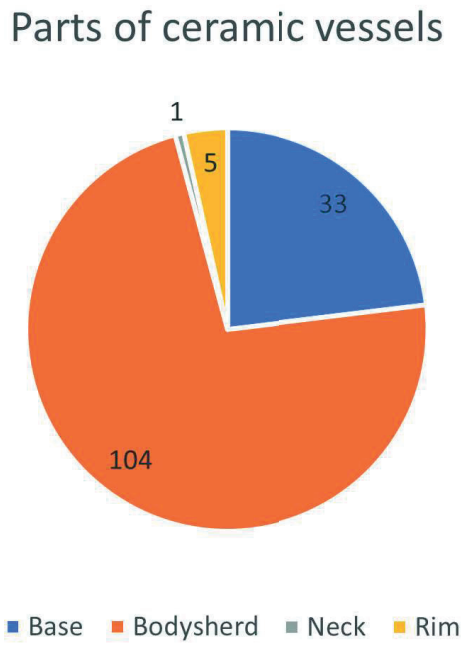

Fig. 8: Overview of part of vessels used for sherd tools from SAV1 West

3.3 Examples of sherd tools

Some of the sherd tools from the New Kingdom town of Sai have already been published.[43] Scrapers, including the unusual SAV1E 2964, the base sherd of a round-based Nile clay beaker, as well as token/gaming pieces (e.g. SAV1E 0989), and pierced sherds, possibly used as weights (e.g., SAV1E 2271), were included in the publication of material from SAV1 East. Another possible weight is SAV1E 1138, a re-cut sherd from an imported amphora (Fig. 9). The weight of the sherd is comparable to a Marl clay and clearly heavier than if Nile clay had been used.

While the weight of the original sherd is a fairly obvious choice for those re-used as weights, for scrapers there is an obvious preference for the harder fabric used in imported amphorae, such as SAV1E 1004 (Fig. 10). Likewise, SAV1E 2716 (Fig. 11) was made from the body sherd of a Marl zir vessel. Based on the larger wall diameter of the original vessel, it would have been a much stronger scraper than the thin-walled SAV1E 1004.

A particularly well-cut example for circular lids made of body sherds is SAV1W 1568, made from a Marl clay squat jar (Fig. 12).[44] Other examples include SAV1W 1599, a re-cut body sherd of a Nubian cooking pot, and SAV1W 1671 (Fig. 13), a circular sherd with a central perforation from a basketry impressed Nubian cooking pot, presumably used as a weight. Although, given the lightness of the material, this piece could have been a token rather than

43 Budka 2020: 233–236 and 249–253.
44 This piece was erroneously included in Budka 2020: 233, fig. 101 as coming from SAV1 East.

Fig. 9: A recut sherd from an imported amphora (SAV1E 1138, ©AcrossBorders Project)

Fig. 10: A scraper made from an imported amphora (SAV1E 1104, ©AcrossBorders Project)

Fig. 11: A scraper made from a Marl clay zir vessel (SAV1E 2716, ©AcrossBorders Project)

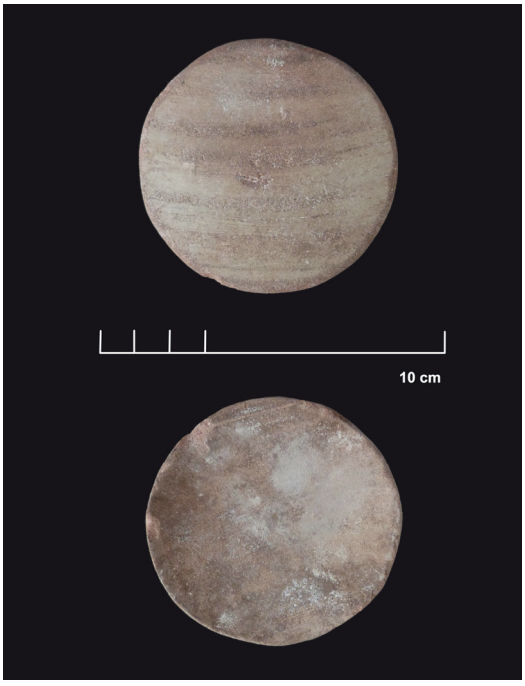

Fig. 12: A circular lid made from a Marl clay jar/ squat jar (SAV1W 1568, ©AcrossBorders Project)

a weight.[45] Another soft Nubian example for a sherd tool is the rim sherd of a Black-topped Kerma vessel, SAV1W 1533 (Fig. 14). This object fits nicely in the hand and it is possible to get a good grip, thanks to the rim and the rather soft material. The burnished surface suggests it was more likely used as a spoon rather than as a scraper. Of unclear use is the rectangular shaped Marl clay sherd SAV1W 1601 – a function as either a lid or a scraper seems possible.[46] Typical lids from Sai city are re-used ring bases of dishes like SAV1W 1501, a tradition well known from Egypt.[47] In addition to authentic tools like scrapers, further re-shaping of ceramics is notable across all sectors of the New Kingdom town of Sai for the production of lids.[48] Polishing instruments, maybe in relation to pottery production, are present with small re-cut sherds like SAV1W 0494.[49]

A small, but significant group are net-weights made of re-cut pottery sherds. Only five pieces (four from SAV1 West, one from SAV1 East) fall into type C of Cornelius von Pilgrim's typology of net-weights established based on the material from Elephantine.[50] These examples are, like SAV1W 0411 (Fig. 15), made from body sherds of large Marl clay zir vessels, which have a good hardness and are also much heavier than Nile clay wares. As already noted for the northern sector in Sai city, SAV1 North,[51] where similar small quantities were found, this scarceness of Type C net-weights contrasts to sites in Egypt like Elephantine where such weights are very common.[52] The preference on Sai for the so-called clay axe head type of net weight might indicate a centralised organisation for the distribution of these objects, rather than *ad hoc* production like Type C. A similar situation at Askut was interpreted by Stuart T. Smith as reflecting a "centralized system of food production."[53] On the other hand, those net-weights from suitable potsherds like SAV1W 0411 exhibit a clear knowledge of, and probably also experience in, producing these devices. It is likely that these weights were produced on site in Nubia although an import from Egypt cannot be ruled out.

3.4 The question of site-specific features

For Qantir, Raedler could convincingly show a deliberate choice for Marl clays as raw material, presumably because of their hardness (over 80 %). The amount of Upper Egyptian fabrics and a small number of Nile clays (c. 9.5 %) used differs considerably from the situation at

45 Note, however, a piece interpreted as net-weight made from a Nubian sherd found at Elephantine, von Pilgrim 1996: 276, fig. 120b.
46 See Budka 2020: 250, fig. 116.
47 Budka 2020: 250, fig. 117.
48 See Budka 2017: 164, pl. 45.
49 Budka 2020: pl. 106.
50 von Pilgrim 1996: 278, fig. 121.
51 Budka 2017: 163–164, fig. 90.
52 von Pilgrim 1996: 279, fig. 123.
53 Smith 2003: 101. According to the Nauri decree, fishing rights in Nubia were owned by temples (see Morkot 1995: 177); restricted access to fishing devices could correspond to this.

Fig. 13: A token or weight made from a Nubian cooking pot with basketry impressions (SAV1W 1671, ©AcrossBorders Project)

Fig. 14: A sherd tool made from the rim sherd of a Black-topped Kerma vessel (SAV1W 1533, ©AcrossBorders Project)

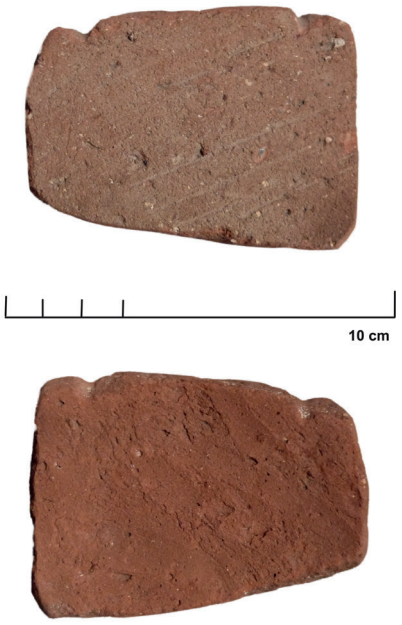

Fig. 15: A net-weight made from a Marl clay zir vessel (SAV1W 411, ©AcrossBorders Project)

Sai. Although evidence from New Kingdom Sai, and Nubia more generally during the New Kingdom, is likely to reflect the restricted access to Marl clays, it needs to be stressed that at Qantir the majority of the re-cut sherds were also from imported vessels. At Qantir, pottery manufacture is well attested and one of the Marl clays, Marl D, is likely to have been available in the region of Memphis. Despite the availability of local Marl clay vessels, there seems to have been a deliberate choice for "foreign" material in the re-used sherds. This is something which the inhabitants of both Sai and Qantir may have had in common, despite evidence of site-specific preferences. In both cases specific socio-cultural values of materials, which could not be easily replaced, likely played a role.

One intriguing example from the northern sector of the New Kingdom town of Sai is the body sherd of a large, blue-painted Marl clay storage vessel repurposed as a scraper (SAV1N N/C 679). As well as the hard raw material – imported Marl clay – there was likely an aesthetic appeal given its decoration, especially because blue-painted Marl clay vessels are very rare in New Kingdom Nubia.[54]

It is striking that at Qantir, out of 275 scrapers, 155 were made from rim sherds.[55] Rim sherds are clearly well suited for re-used sherds, if nothing else only three edges (instead of four for body sherds) need to be smoothed, making them quicker to produce. However, to the best of my knowledge, Qantir stands alone in its preferential use of rim sherds. At Elephantine, like Sai, the majority of sherd tools are made from body sherds. Therefore, it seems likely that the corpus from Qantir is the exception, and possibly connected to the local large-scale workshops and specific taskscapes.[56]

The presence of Nubian wares within the corpus of re-used sherds seems to be a particular feature in Sai compared to rest of Nubia. There are rare examples from Elephantine (where Nubian wares are a not insignificant part of the pottery corpus during the early New Kingdom), but none from Ramesside Qantir. The slightly higher frequency of Nubian wares in the re-used sherds from Sai, based on the overall pottery corpus from New Kingdom Sai, suggests a deliberate choice for which the reasons remain unclear. Since for Nubian cultures re-used sherds are mostly attested to in cemeteries as digging tools,[57] it might be a personal preference of the inhabitants of Sai, for whom both Egyptian-style and Nubian-style material culture, as well as hybrid objects would have been available.

54 See Budka in press.

55 Raedler 2007: 18–19.

56 See Raedler 2007; Raedler 2015 for the sherd tools as "indicators of largescale leather production and processing within the multifunctional workshops" at Qantir. An interesting example, but with a sample size which is too small to be conclusive, is site AtW 001 in Attab West in Sudan. In this 18th Dynasty domestic site, a total of 17 re-used sherds were found in one trench. There is a clear preference for base sherds of dishes, which again, likely, reflects certain site-specific activities and tasks.

57 See, e.g., material from the Kerma cemetery GiE 003 at Ginis, Budka 2022. A total of 44 re-used sherds were documented from five trenches comprising 58 burial pits, most of which are clearly shovels (made from both rim sherds and body sherds, including Egyptian Marl clays).

4 Challenges in interpretations

4.1 Documentation

There are several challenges to the use of the documentation outlined above. Especially communication between the team member in charge of registering finds and the pottery specialist is essential. Since it is rare for all specialists to be present at the same time on excavations, this requires site- and project-specific planning, including possible alternative work flows in case of material-rich findings.

Another challenge is being able to differentiate between weathered or eroded sherds and deliberately modified sherds which can be classified as objects. Both categories can provide valuable but very different information – for example, erosion can provide information on site formation, environmental and weathering processes,[58] while re-cutting can suggest different activities and material culture. This differentiation typically relies on the expertise of a pottery specialist. Likewise, 1:1 drawings of sherd tools require a certain degree of knowledge in drawing pottery.

4.2 Processing

The processing of re-used sherds requires: 1) expertise in ceramics, in particular of fabrics but also of pottery types and dating (which is especially crucial for multi-period sites) and 2) their assessment within the individual taskscape of the site, at a minimum their relation to other tools such as lithics or net-weights. The dating of re-used sherds based on the ceramic evidence can only give a *terminus ante quem non* – more precise dating relies on the stratigraphy or absolute dating methods.

Future processing of re-used sherds from Egypt and Sudan would fall into the categories of archaeometry (especially petrography and chemical analysis of fabrics which could be especially relevant to determine a local provenience of Nile clays etc.) and organic residue analysis (this could contribute to understanding the complexity of the object biography[59] and possibly different phases of use).[60]

The concept of taskscapes[61] seems crucial to address the possible multifunctional usage of sherd tools. Sherd tools can be used in various crafts and production processes of different materials (wood, leather, textiles, pottery etc.). In line with this, the restricted use of certain raw

58 Cf. Schiffer/Skibo 1989; Skibo 1992; Jennings 2015.

59 For the cultural biography of objects see Gosden/Marshall 1999 as well as Hoskins 1998; Kopytoff 1986.

60 Selected potsherd scrapers from Qantir were positively tested for mammal fatty acids, which supports the interpretation of their use within the leather industry at the site, see Raedler 2015.

61 Ingold 1993.

materials, as well as the preferred use of others could contribute to developing objectscapes[62] of re-used sherds in specific regions.[63] In conclusion, re-used sherds are an excellent example of why the analysis of material culture should ideally be conducted from multiple perspectives, including scientific analyses focusing on provenance studies and the consideration of raw materials as an integral part of material culture.

4.2.1 Contextualising re-used sherds from the New Kingdom town of Sai

As discussed above, it is crucial to understand the appearance of sherd tools in relation to the pottery corpus as well as the other finds, especially toolkits. In Sai city, undisturbed contexts and occupation layers were rather scarce. The least disturbed contexts were found in cellars and silos. Two examples, one each for the western and the eastern sector, demonstrate the potential of studying re-used sherds within their larger archaeological context.

Five re-used sherds were found in the fillings (SU 731 and SU 732) of a cellar in SAV1 West, Feature 115.[64] This assemblage comprises three unclear Nile clay pieces, probably tokens, one Marl clay scraper and one lid from a dish base. Amongst the find assemblage of the cellar, there are several macrolithics (pounders, whetstones and grindstone), one silex blade, twelve flakes, including agate ones, several beads of different materials, one amulet, one fragment of a faience vessel, sealings (including one of a king Thutmose), stoppers, one mud/clay lid as well as a fragment of an animal clay figurine and unidentified clay objects (spherical objects). Therefore, lid SAV1W 1478 made of a pottery sherd was found alongside a clay lid and mud stoppers. Unsurprisingly, the inventory of the cellar mostly relates to storage and sealing of containers. The complete set of tools found in Feature 115 is likely to reflect several domestic activities, as well as, presumably, some workshop-like activities such as the production of lithics.

Within sector SAV1 East, a large cellar, Feature 15, was excavated and yielded large amounts of complete pottery vessels, as well as pottery sherds. The entire context will be published elsewhere, but for the sherd tools the following is relevant: eleven re-used sherds from Nile clay vessels were found in this cellar, mostly scrapers, but also three tokens and one piece of unclear use. Within the group of scrapers, SAV1E 2653 is one of the rare tools made from a Nubian storage vessel. The associated finds are, in addition to a large set of pottery vessels, 283 registered objects. The majority are seal impressions, but stone tools (mostly pounders and grindstones) are also present, as are clay stoppers and some beads. Therefore, this context seems to reflect a preference for clay stoppers rather than ceramic lids to close vessels. The activities carried out with the pottery scrapers could be linked to the stone tools, but since the assemblage was found in a cellar, they may also be unrelated to each other.

62 Pitts/Versluys 2021.
63 For Egyptological applications of the objectscape approach see Lemos 2020; Lemos/Budka 2021.
64 See Budka 2020: 143.

All in all, a detailed contextual analysis of all tools found in the New Kingdom town of Sai, especially a spatial analysis and an assessment of associated objects, will provide new information about the local taskscape.[65]

4.3 Publication

In terms of publication, re-used sherds should ideally be presented together with the rest of the ceramic material. However, as mentioned above, sites addressed in Egyptian archaeology, both in Egypt and in Nubia, regularly have such large amounts of pottery that they require a separate volume.[66] However, if re-used sherds are published separately from the ceramic data, it is essential to provide, at the very least, information on the wares, fabrics, and the frequency of these in the corpus of sherd tools. Since the future in terms of publication of material from excavations clearly lies in hybrid formats, it might soon be possible to link re-used sherds and pottery corpora by means of digital data such as lists, databases and illustrations.

4.3.1 Blurred boundaries: the question of lids

Although I have argued above for a holistic publication approach of archaeological material and that ideally small finds and pottery are published together, there is one specific group of re-used sherds which are somehow in-between both categories. Lids and covers created from pottery sherds illustrate the blurry boundaries between categories of finds in archaeological documentation, especially between ceramic small finds and pottery. At New Kingdom Sai, lids are commonly made from ring bases of dishes, which is also well-attested to at Elephantine. However, lids can be made from different materials, most commonly stone, pottery, clay and wood. In the New Kingdom (and other periods), we encounter specific vessel types which can be regarded as lids, and as such as individual ceramic vessels.[67] Outside of the funerary sphere, vessels are rarely found with their lid in place. But if the function is clear to us, why should we separate the lids from the pottery vessels they originally covered, even if they were not found together? As a comparison, pot stands are commonly, and as a rule, published with the ceramic corpus, irrespective of whether they were found as an *in situ* assemblage with a vessel placed on top or not. However, for lids, a clear functional assessment as a cover is often impossible since the same vessel could also work as a dish.[68]

One possible argument for the differentiation would be to consider whether it made a difference to the ancient users if a lid was made from a re-used sherd or as an individual vessel. Here, questions of the abilities to consume/produce objects are again crucial and relevant to develop a taskscape and/or objectscape. Nevertheless, it is unlikely that it will be possible to consider

65 See, e.g., the analysis of painter's palettes from SAV1 East and SAV1 West, in Fulcher/Budka 2020.

66 See the AcrossBorders Project and Sai Island as an example – Budka 2020 includes only a selection of the material culture, especially of the pottery (see Budka forthcoming).

67 See, e.g. Rose 2007: 45–49; Gasperini 2023, passim.

68 See, however, Rose 2007: 45 for clear examples based on knobs or handles.

the choice behind the use of a specific lid in most cases (cf. above, 4.2.1). All in all, I would argue that irrespective of their material, lids and stoppers are integral parts of ceramic vessels as containers and should ideally be published together with these containers.

5 Outlook

Despite the long-established protocol in Egyptian archaeology to differentiate various sets of material culture and to treat these separately, the class of re-used sherds exemplifies, in a clear way, the need for a more holistic approach. Modern archaeology considers the soil of archaeological sites as an integral part of the material culture,[69] it is, therefore, timely to approach other materials with a similarly integrated view. As this chapter illustrates, the additional information that can be gained through the close cooperation of the pottery specialist and the team member working on sherd tools is worth dealing with the small set of, mostly logistical, challenges.

However, a holistic approach to archaeological sites and their data requires time, funding and a considerable number of people involved, especially if interdisciplinary studies are undertaken. Since we are still in urgent need for more microstudies in Egyptian archaeology, in particular of settlements, the potential output of such efforts should be a strong motivation. In order for re-used sherds to contribute to a better understanding of taskscapes in ancient Egypt, these objects need to be studied in a more integrated way.

Acknowledgement

First, I would like to thank the organisers of the Excavating the Extra-Ordinary 2 for their kind invitation and for a highly stimulating event in Mainz.

This study was written during the ERC DiverseNile Project. The project received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement No. 865463). The data from Sai Island discussed in this paper was recorded during the ERC AcrossBorders Project (grant agreement No. 313668). The work in Sudan was conducted with the kind permission of the National Corporation for Antiquities and Museums of Sudan (NCAM). My sincere thanks go to all Sudanese authorities for their support as well as to the directors of the French Mission to Sai for our cooperation agreement (2013–2017).

I am grateful to all excavation teams involved, especially the Sudanese workmen who were in the case of Sai the first to hold these re-used sherds in their hands, the first crucial step in the study of these objects. Furthermore, I am thankful to Patrizia Heindl, ERC DiverseNile

69 See, e.g., Salisbury 2016.

Project, who edited the photos used here as figures, and to Chloë Ward, ERC DiverseNile Project, who kindly improved my written English.

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Tab. 1: List of all New Kingdom re-used sherds from SAV1 East (for the abbreviations of the wares from Sai see Budka 2017: 153, fig. 83)

SAV1 East								
Number of object	Area/location	SU	Part of vessel	Type of vessel	Type of object	Ware	Munsell	Date of object
SAV1E 0346	SQ3	5	Bodysherd	Cooking vessel	Lid	Nubian ware, Nubian 2-3, wet smoothed	7.5YR5/3	18th Dynasty
SAV1E 1074	SQ3, 6–7.5m W-E/3.5–5m N-S	80	Base sherd	Dish with ring base	Lid	B2RWallRPin	2.5YR5/6; RW 10R5/6	early 18th Dynasty
SAV1E 2629	SQ4A, 0–3m W-E/0–2m N-S	205	Base (complete)	Spinning bowl with flat base and 2 handles in	Lid	Marl BUC	7.5YR5/4 to 10YR8/1	18th Dynasty
SAV1E 2619	SQ4A, 0.7–5m W-E/10.3–12m N-S	227	Bodysherd	Cooking vessel	Lid	Nubian ware, Nubian 2-3, wet smoothed	Outside surface: 7.5YR 4/2 brown; Inside: 7.5YR 3/2 dark brown; Section: 5Y2.5/1 black	18th Dynasty
SAV1E 2672	SQ4C	327	Bodysherd	Beer jar	Lid	B2UC	7.5YR5/4	18th Dynasty
SAV1E 2716	SQ4C	335	Bodysherd	Zir	Lid	Marl A4/2WW	5YR5/6; core 10YR5/2; WW 5YR7/4	early 18th Dynasty
SAV1E 2733	SQ4C	375	Bodysherd	Storage vessel	Lid	C2UC	7.5YR5/4	18th Dynasty
SAV1E 2762	SQ4C	384	Base (complete)	Dish/plate with ring base	Lid	B2UCRP	5YR6/4; RW 10R4/8	early 18th Dynasty
SAV1E 2781	SQ4C	384	Bodysherd	Dish/plate	Lid	C2UCRW	7.5YR5/4; RW 2.5YR5/8	18th Dynasty
SAV1E 2788	SQ4B	396	Base (complete)	Dish/plate with ring base	Lid	B2RWallRPin	5YR5/6; RW 10R5/6	early 18th Dynasty
SAV1E 0314	SQ4C	456	Bodysherd	Dish/plate	Lid	B2UC (some traces of red wash)	5YR6/6; RW 2.5YR5/6	18th Dynasty
SAV1E 2909	SQ4D	1423	Base sherd	Dish/plate	Lid	B2RWallRPin	5YR5/6; RW 10R5/6-4/6	early 18th Dynasty
SAV1E 2938	SQ4C	1481	Base (complete)	Dish with ring base	Lid	B2RWallRPin	5YR5/6; 2.5YR5/8	18th Dynasty

Tab. 1 (continued)

SAV1 East								
Number of object	Area/location	SU	Part of vessel	Type of vessel	Type of object	Ware	Munsell	Date of object
SAV1E 2954	SQ4C	1485	Bodysherd	Storage vessel	Lid	C2UC	5YR6/6	18th Dynasty
SAV1E 0089	SQ2, cleaning S of Feature 14	20-30cm below surface	Base (complete)	Dish with ring base	Lid	B2RWallRPin	2.5YR6/8; Red slip: 10R4/8	18th Dynasty
SAV1E 0084	SQ2, 0–6.5m to E	20-30cm below surface	Base sherd	Dish with ring base	Lid	B2RWallRPin	2.5YR6/8; Red slip: 10R4/8	early 18th Dynasty
SAV1E 0256	SQ 2B, 5–6.5m to E	NA	Base (complete)	Dish/plate with flat base	Lid	B2UC	7.5YR5/6	18th Dynasty
SAV1E 0172	SQ1+2, up to 1m W, surface cleaning	surface	Bodysherd	Cooking vessel	Lid	Nubian ware, Nubian 2, coarse	7.5YR6/4	18th Dynasty
SAV1E 2573	SQ4, 2.5–5.5m W-E, 9–10m N-S/SQ4A, 2.6–6.5m W-E, 0–2m N-S	9	Base sherd	Jar with flat base	Lid?	Marl BUC	2.5Y7/4	18th Dynasty
SAV1E 2946	SQ4C	1482	Base (complete)	Dish with flat base	Lid?	B2UCRP	5YR6/6; RP 2.5YR5/6	18th Dynasty
SAV1E 1385	SQ4, 0–4m W-E/6–10m N-S	205	Bodysherd	Dish	Lid? token?	B2UCRW	5YR5/3; RW 2.5YR5/8	18th Dynasty
SAV1E 2834	SQ2B, 2.5–4.5m to E	c. 20cm	Base sherd	Dish/plate with ring base	Palette	B2UC	5YR6/6	18th Dynasty
SAV1E 0672	SQ1B, 6–7.5m W-E/0–2.5m N-S	21	Bodysherd	Jar with linear painted decoration	Scraper	B2RWMO	2.5YR5/4; RW 2.5YR5/6; Black paint	mid-18th Dynasty
SAV1E 0777	SQ3, 9–10.5m W-E/2.6–5.5m N-S	34	Bodysherd	Jar	Scraper	B2UC	5YR4/4	18th Dynasty
SAV1E 1091	SQ4, 9.2–9.6m W-E/0–1.1m N-S	87	Bodysherd	Amphora	Scraper	Imported, IVWW	2.5YR5/6; WS 10YR7/3	18th Dynasty

Tab. 1 (continued)

SAV1 East								
Number of object	Area/location	SU	Part of vessel	Type of vessel	Type of object	Ware	Munsell	Date of object
SAV1E 1104	SQ3, 7.7–8.8m W-E/3.5–8m N-S	97	Bodysherd	Amphora	Scraper	Canaanite ware, IVUC	light brown	mid-18th Dynasty
SAV1E 1813	SQ4, 3.5–5m W-E/9–10m N-S	105	Bodysherd	Dish	Scraper	B2UC	5YR6/6	18th Dynasty
SAV1E 1465	SQ4A, 1.7–3.2m W-E/0–1.5m N-S	205	Base sherd	Dish with flat base	Scraper	B2UC	5YR6/6	18th Dynasty
SAV1E 1819	SQ4A, 4–5m W-E/1.4–2m N-S	205	Bodysherd	Jar	Scraper	B2RW	5YR5/6; RW 2.5YR5/6	18th Dynasty
SAV1E 1304	SQ4, 0–4m W-E, 5–10m N-S	205	Bodysherd	Jar	Scraper	B2UC	5YR6/6	New Kingdom
SAV1E 1466	SQ4A, 1.7–3.2m W-E/0–1.5m N-S	205	Bodysherd	Plate	Scraper	B2UC	5YR5/6	18th Dynasty
SAV1E 1820	SQ4A, 4–5m W-E/1.4–2m N-S	205	Shoulder- and neck	Amphora	Scraper	Canaanite ware, IVUC	light brown	18th Dynasty
SAV1E 2632	SQ4A, 0–1m W-E/0–2m N-S	217	Bodysherd	Jar	Scraper	C2UC	5YR6/6	mid-18th Dynasty
SAV1E 2278	SQ4A, 0.7–5m W-E/10.3–12m N-S	227	Bodysherd	Dish/plate	Scraper	B2UC	5YR6/6	18th Dynasty
SAV1E 2634	SQ4+4A, 0.5–3.5m W-E/7.5–10.3m N-S	227	Bodysherd	Zir	Scraper	Marl A4/2UC	2.5YR5/6; gray core	18th Dynasty
SAV1E 2624	SQ4+4A, 0.4–5m W-E/7.5–12m N-S	228	Bodysherd	Zir	Scraper	Marl A4/2WW	nat. 7.5YR5/3; WW 10YR8/2	18th Dynasty
SAV1E 2623	SQ4+4A, 0.4–5m W-E/7.5–12m N-S	228	Rim sherd	Beaker	Scraper	B2UC	5YR5/4	18th Dynasty

Tab. 1 (continued)

SAV1 East								
Number of object	Area/location	SU	Part of vessel	Type of vessel	Type of object	Ware	Munsell	Date of object
SAV1E 2267	SQ4A, 3.5–5.1 W-E/0–2 N-S	229	Bodysherd	Plate	Scraper	C2UC	7.5YR6/4	18th Dynasty
SAV1E 2257	SQ4A, 5.1–5.9m W-E/0–2m N-S	230	Base (complete)	Beaker with pointed base	Scraper	B2UC	7.5YR5/4 out; in 5YR5/6	early 18th Dynasty
SAV1E 0814	SQ4C	322	Bodysherd	Amphora	Scraper	Marl A3UC	10YR8/3	18th Dynasty
SAV1E 2696	SQ4C	330	Bodysherd	Storage vessel/ jar	Scraper	B2RW	5YR5/6; RW 2.5YR5/6	18th Dynasty
SAV1E 2695	SQ4C	330	Bodysherd	Zir	Scraper	C2UC	5YR6/6	18th Dynasty
SAV1E 0442	SQ4C	348	Bodysherd	Zir	Scraper	C2WW	5YR6/6; 10YR8/2	18th Dynasty
SAV1E 2734	SQ4C	375	Base sherd	Dish with flat base	Scraper	B2UC	5YR6/6	18th Dynasty
SAV1E 2816	SQ4C	408	Bodysherd	Storage vessel	Scraper	B2UC	5YR5/6	18th Dynasty?
SAV1E 2836	SQ4B1	418	Bodysherd	Storage vessel with rope impressions	Scraper	B2UC	2.5YR5/4	18th Dynasty
SAV1E 2843	SQ4B1	423	Bodysherd	Beer jar	Scraper	B2UC	5YR6/6	18th Dynasty
SAV1E 2652	SQ4, N baulk, Feature 15	1309	Bodysherd	Zir	Scraper	C2WW	5YR6/6; WW 10YR8/2	mid-18th Dynasty
SAV1E 2609	SQ2, Feature 15	1321	Bodysherd	Jar	Scraper	B2UC	5YR5/4	mid-18th Dynasty
SAV1E 2656	SQ2, Feature 15	1321	Bodysherd	Jar	Scraper	B2UC	5YR6/4	18th Dynasty
SAV1E 1309	SQ2, Feature 15	1321	Rim sherd	Dish (DP 1)	Scraper	B2UC	out 7.5YR5/1; in 10YR5/3	mid-18th Dynasty
SAV1E 2657	SQ2, Feature 15	1323	Bodysherd	Dish	Scraper	B2UC	5YR5/6	18th Dynasty
SAV1E 2653	SQ4, from filling of Feature 44 in Feature 15	1324	Bodysherd	Storage vessel	Scraper	Nubian ware, Nubian 2 coarse	5YR5/4-6/4	18th Dynasty
SAV1E 2279	SQ4D	1407	Bodysherd	Jar	Scraper	C2UC	7.5YR6/4	18th Dynasty

Tab. 1 (continued)

SAV1 East								
Number of object	Area/location	SU	Part of vessel	Type of vessel	Type of object	Ware	Munsell	Date of object
SAV1E 1420	SQ4D	1407	Bodysherd	Jar	Scraper	Marl BUC	greyish-green	18th Dynasty
SAV1E 2911	SQ4D	1421	Base sherd	Dish with flat base	Scraper	B2UC	5YR5/6	18th Dynasty
SAV1E 2915	SQ4D	1421	Bodysherd	Zir/Storage vessel	Scraper	C2WW	5YR6/6; 10YR8/2	18th Dynasty
SAV1E 2964	SQ4D	1424	Base (complete)	Jar with rounded base	Scraper	C2UC	5YR6/4	mid-18th Dynasty
SAV1E 2933	SQ4D	1428	Bodysherd	Jar	Scraper	B2UC	2.5YR5/6	18th Dynasty
SAV1E 2966	SQ4B	1444	Bodysherd	Dish	Scraper	B2RWall	5YR5/6; RW 2.5YR5/6	mid-18th Dynasty
SAV1E 0190	SQ2B, 1–3m to E debris	-20-40 cm below surface	Bodysherd	Plate	Scraper	B2UC	7.5YR5/6	18th Dynasty
SAV1E 0316	SQ2B, cleaning Feature 27 and S of Feature 27	before Pl. 7	Base sherd	Dish with ring base (completly preserved)	Scraper	B2RWallRPin	5YR6/6; RW 2.5YR5/8	18th Dynasty
SAV1E 0303	SQ2B, 0–6.5 m to E	below Pl. 6	Base sherd	Plate with flat base	Scraper	C2UC	7.5YR5/4	18th Dynasty
SAV1E 0290	SQ2B, cleaning 7.5–10 m to E	below Pl. 6	Bodysherd	Meat jar	Scraper	Marl A4UC	10YR7/3; in 5YR7/4	18th Dynasty
SAV1E 0302	SQ2B, 0–6.5 m to E	below Pl. 6	Bodysherd	Storage vessel	Scraper	C2RW	7.5YR6/4; RW 10R5/8	18th Dynasty
SAV1E 1874	SQ4, 5–5.9m W-E/4.2–5.8m N-S	207	Bodysherd	Dish	Scraper?	B2UCRW	5YR5/6; RW 2.5YR5/6	18th Dynasty
SAV1E 1931	SQ4+4A, 6–10m W-E/8.2–12m N-S	213	Bodysherd	Jar	Scraper?	B2UC	5YR5/6	18th Dynasty
SAV1E 2608	SQ2, Feature 15	1321	Bodysherd	Jar	Scraper?	B2UC	10YR6/3	18th Dynasty
SAV1E 2970	SQ4D	1444	Bodysherd	Dish	Scraper?	B2RWallRPin	5YR5/6; Red slip 2.5YR5/8	mid-18th Dynasty

Tab. 1 (continued)

SAV1 East								
Number of object	Area/location	SU	Part of vessel	Type of vessel	Type of object	Ware	Munsell	Date of object
SAV1E 0257	SQ2B, 0–2.5 m to E	~ 50-55 cm below the surface	Bodysherd	Dish	Scraper?	B2WRWallRPin	7.5YR4/6; Red slip 10R4/8	early 18th Dynasty
SAV1E 0143	SQ1A, 4.5–5m to E	~10-20 cm below surface	Base sherd	Dish with flat base	Scraper?	B2UC	7.5YR5/6	18th Dynasty
SAV1E 0140	SQ1A, 4.5–5m to E	~10-20 cm below surface	Bodysherd	Squat jar	Scraper?	Marl A2RP	nat. 2.5YR7/8; Red slip 10R5/8	18th Dynasty
SAV1E 0218	SQ2B, c. 5–7m to E	~40-45 cm below surface	Base sherd	Dish with flat base	Scraper?	B2UC	10YR5/4	18th Dynasty
SAV1E 0271	SQ2B, S-baulk 1–6 m to E	0-30 cm below surface	Bodysherd	Jar	Scraper?	Marl A3UC	10YR7/3	18th Dynasty
SAV1E 0045	SQ2	10-20cm below surface	Bodysherd	Dish with ring base	Scraper?	B2RWallRPin	2.5YR5/8; Red slip 10R5/8	18th Dynasty?
SAV1E 0006	SQ1, NW	10-20cm below surface	Bodysherd	Jar	Scraper?	B2UC	5YR6/8	18th Dynasty
SAV1E 0082	SQ2, 3.5m to E	20-30cm below surface	Bodysherd	Dish/plate	Scraper?	B2UC	2.5YR5/8	18th Dynasty
SAV1E 0083	SQ2, 3.5m to E	20-30cm below surface	Bodysherd	Plate	Scraper?	C2UC	7.5YR6/4	18th Dynasty
SAV1E 0009	SQ1	surface	Bodysherd	Plate	Scraper?	C2UC	10YR5/3	18th Dynasty
SAV1E 1112	SQ4, 7,.3-8m W-E/0-2.5m N-S	111	Base sherd	Beer jar	Scraper? unclear	B2UC	5YR5/4	18th Dynasty
SAV1E 2686	SQ4C	319	Bodysherd	Dish	Token/gaming piece	B2RWallRPin	5YR6/6; RW 2.5YR5/8	18th Dynasty
SAV1E 2658	SQ2, Feature 15	1321	Bodysherd	Dish	Token/gaming piece	B2UC	7.5YR4/3-5/3	mid-18th Dynasty
SAV1E 2422	SQ2, Feature 15	1321	Bodysherd	Jar	Token/gaming piece	B2RW	10YR5/3; RW 10R6/6	mid-18th Dynasty

Tab. 1 (continued)

SAV1 East								
Number of object	Area/location	SU	Part of vessel	Type of vessel	Type of object	Ware	Munsell	Date of object
SAV1E 2655	SQ2, Feature 15	1321	Bodysherd	Jar	Token/gaming piece	B2UC	5YR4/4	mid-18th Dynasty
SAV1E 0989	SQ4D	1403	Bodysherd	Jar	Token/gaming piece	B2UC	5YR6/6	18th Dynasty
SAV1E 0293	SQ2B, cleaning 7.5–10 m to E	below Pl. 6	Bodysherd	Dish	Token/gaming piece	B2UCRP	7.5YR6/4; RP 10R4/8	early 18th Dynasty
SAV1E 2626	SQ4, 7–9.2m W-E/6.8–8m N-S	212	Bodysherd	Jar	Unclear	C2UC	7.5YR6/4	18th Dynasty
SAV1E 2659	SQ2, Feature 15	1321	Bodysherd	Jar	Unclear	B2UC	2.5YR 5/6	mid-18th Dynasty
SAV1E 1940	SQ4+4A, 3.5–5.5 W-E/8.3–11.3m N-S	214	Bodysherd	Dish	Unfinished weight? (unfinished perforation)	B2RWallRPin	5YR5/6; RW 10R4/8	18th Dynasty
SAV1E 2271	SQ4A, 3.5–5.1 W-E/0-2 N-S	229	Base (complete)	Dish with ring base	Weight	B2RWallRPin	5YR4/4; RW 10R5/6	early 18th Dynasty
SAV1E 2687	SQ4C	319	Bodysherd	Dish	Weight	B2RWallRPin	5YR6/6; RW 2.5YR5/8	18th Dynasty
SAV1E 1138	SQ4+4A, 0–7.5m W-E/7.1–12m N-S	200	Bodysherd	Amphora	Weight/ax-shape	Canaanite ware, IVWW	7.5Y6/2; WW 5Y6/3	18th Dynasty
SAV1E 1028	SQ3, 4.8–7m W-E/4–8.3m N-S	66	Bodysherd	Cooking vessel	Weight? (perforated sherd)	Nubian ware, Nubian 2-3, coarse	10YR4/2	18th Dynasty
SAV1E 0207	SQ2A, 0–3m to S along E border	-30-35 cm below surface	Bodysherd	Storage vessel	Weight? (perforated sherd)	C2UC	7.5YR5/4	18th Dynasty

Tab. 2: List of all New Kingdom re-used sherds from SAV1 West

SAV1 West								
Number of Object	Area/location	SU	Part of vessel	Type of vessel	Type of object	Ware	Munsell	Date of object
SAV1W 0012	SQ2, 15 x 5m, surface	500	Bodysherd	Cooking vessel	Lid	Nubian ware, Nubian 2 basketry	5YR5/6	18th Dynasty
SAV1W 0112	SQ1, NW-corner, 1–5m W-E/3–5m N-S	502	Bodysherd	Storage vessel	Lid	C2UC	7.5YR6/4	18th Dynasty
SAV1W 0359	SQ1, 0–5m N-S/0–1m E-W	507	Bodysherd	Storage vessel	Lid	C2UC	7.5YR5/4	18th Dynasty
SAV1W 1718	SQ1	530	Base (complete)	Dish with a ring base	Lid	B2RWallRPin	5YR5/6; RW 10R5/8	18th Dynasty
SAV1W 0628	SQ1	537	Base (complete)	Dish with a ring base	Lid	B2RWallRPin	2.5YR5/6; RW 10R5/6	18th Dynasty
SAV1W 0350	SQ1, 3–5m E-W/0–5m N-S	538	Bodysherd	Storage vessel	Lid	B2RW	5YR5/6; RW 2.5YR5/6	18th Dynasty
SAV1W 0523	SQ1	556	Bodysherd	Cooking vessel	Lid	Nubian ware, Nubian 2 coarse	10YR4/4	18th Dynasty
SAV1W 0495	SQ1W	561	Bodysherd	Zir	Lid	Marl A4UC	5YR6/4	18th Dynasty
SAV1W 0561	SQ1	584	Base (complete)	Dish with a ring base	Lid	B2RWallRPin	2.5YR5/6; RW 10R5/6	18th Dynasty
SAV1W 1035	SQ1S	646	Bodysherd	Dish	Lid	B2RWallRPin	5YR5/6; RW 2.5YR5/6	18th Dynasty?
SAV1W 1130	SQ1S	646	Bodysherd	Storage vessel	Lid	Marl BUC	10YR8/2	18th Dynasty
SAV1W 1131	SQ1S	647	Bodysherd	Dish	Lid	B2RWallRPin	5YR5/6; RW 2.5YR5/6	18th Dynasty
SAV1W 1239	SQ1S	669	Bodysherd	Plate	Lid	C2UC	5YR6/6	18th Dynasty
SAV1W 1502	SQ1S	705	Bodysherd	Jar	Lid	C2UC	5YR6/6	18th Dynasty
SAV1W 1501	SQ1	708	Base (complete)	Dish with a ring base	Lid	B2RWallRPin	5YR5/6; RW 10R5/6	early 18th Dynasty
SAV1W 1478	SQ1 & E	731	Base (complete)	Dish with a ring base	Lid	B2RWallRPin	5YR5/6; RW 10R5/8	18th Dynasty
SAV1W 0019	SQ1SE	809	Base (complete)	Dish with flat base	Lid	B2RWallRPin	5YR6/6; RW 10R6/8	18th Dynasty
SAV1W 0320	SQ1SE	809	Base (complete)	Dish with a ring base	Lid	B2RWallRPin	5YR6/6; RW 10R5/6	18th Dynasty
SAV1W 0142	SQ1SE	811	Base sherd	Beaker/beer jar with flat base	Lid	B2UC	5YR5/6	early 18th Dynasty

Tab. 2 (continued)

SAV1 West								
Number of Object	Area/location	SU	Part of vessel	Type of vessel	Type of object	Ware	Munsell	Date of object
SAV1W 1549	SQ1SE	812	Base (complete)	Dish with a ring base	Lid	B2RWallRPin	5YR5/6; RW 10R5/8	early 18th Dynasty
SAV1W 1547	SQ1SE	815	Bodysherd	Plate	Lid	C2UC	5YR6/6	18th Dynasty
SAV1W 1567	SQ1SE	818	Bodysherd	Dish	Lid	B2RWallRPin	5YR5/6; RW 10R5/6	Thutmoside
SAV1W 1566	SQ1SE	828	Bodysherd	Jar/Storage vessel	Lid	C2UC	5YR5/6	18th Dynasty
SAV1W 1568	SQ1SE	832	Bodysherd	Jar/squat jar	Lid	Marl A2P	10YR8/2; 2.5YR6/6	Thutmoside
SAV1W 1588	SQ1SE	837	Base (complete)	Dish with a ring base	Lid	B2RWallRPin	5YR5/6; RW 10R5/6	18th Dynasty
SAV1W 1599	SQ1SE	839	Bodysherd	Cooking vessel	Lid	Nubian ware, Nubian 2 coarse	5YR5/4-6/4	18th Dynasty?
SAV1W 1611	SQ1SE	843	Bodysherd	Storage vessel	Lid	B2UC	5YR5/6	18th Dynasty
SAV1W 1596	SQ1SE	844	Bodysherd	Dish	Lid	B2RWallRPin	5YR5/6; RW 10R5/6	18th Dynasty
SAV1W 1601	SQ1SE	848	Bodysherd	Jar/Storage vessel	Lid	Marl BUC	5Y8/2	18th Dynasty
SAV1W 1602	SQ1SE	848	Bodysherd	Dish	Lid	B2UCRP	5YR5/6; RP 2.5YR5/8	18th Dynasty
SAV1W 1629	SQ1S	852	Bodysherd	Dish	Lid	B2UC	5YR6/6	18th Dynasty
SAV1W 1635	SQ1SE	854	Base (complete)	Dish with a ring base	Lid	B2RWallRPin	5YR5/6; RW 10R5/6	18th Dynasty
SAV1W 1705	SQ1S	880	Base sherd (almost complete)	Dish with a ring base	Lid	B2RWallRPin	5YR5/6; RW 10R5/6	early 18th Dynasty
SAV1W 1706	SQ1S	880	Bodysherd	Zir	Lid	C2UC	5YR5/6	18th Dynasty
SAV1W 1710	SQ1S/SQ1SE	884	Base (complete)	Dish with a ring base	Lid	B2RWallRPin	5YR5/6; RW 10R5/8	18th Dynasty
SAV1W 1711	SQ1S/SQ1SE	884	Base (complete)	Dish with a ring base	Lid	B2RWallRPin	5YR6/4; RW 10R5/6	early 18th Dynasty
SAV1W 1832	SQ1SE	920	Base (complete)	Dish with flat base	Lid	B2UC	5YR5/6	18th Dynasty
SAV1W 1784	SQ1SE	921	Bodysherd	Zir	Lid	Marl A4/2WW	5YR5/6; WW 10YR8/2	18th Dynasty
SAV1W 1785	SQ1SE	921	Bodysherd	Storage vessel	Lid	Marl BUC	10YR8/3	18th Dynasty
SAV1W 1788	SQ1SE	924	Base (complete)	Dish with a ring base	Lid	B2RWallRPin	5YR5/6; RW 10R5/8	early 18th Dynasty
SAV1W 1805	SQ1SE	937	Base (complete)	Dish with a ring base	Lid	B2RWallRPin	5YR5/6; RW 10R5/8	early 18th Dynasty

Tab. 2 (continued)

SAV1 West								
Number of Object	Area/location	SU	Part of vessel	Type of vessel	Type of object	Ware	Munsell	Date of object
SAV1W 0017	SQ2, 15 x 5m, surface	500	Base sherd	Dish with flat base	Lid (or scraper)	B2UC	5YR 5/4	18th Dynasty
SAV1W 1835	SQ1SE_E	916	Base (complete)	Dish with flat base	Lid (or scraper)	B2UC	5YR6/4	early 18th Dynasty
SAV1W 1829	SQ1S	964	Base (complete)	Dish with a ring base	Lid or token	B2RWallRPin	5YR6/6; RW 10R5/6	early 18th Dynasty
SAV1W 0023	SQ1, SW-corner	501	Bodysherd	Zir	Lid?	C2WW	7.5YR6/4, WW 10YR 7/4	18th Dynasty
SAV1W 0261	SQ1, 0–2m S-N/0–4m E-W	507	Bodysherd	Storage vessel	Lid?	C2UC	5YR5/6	18th Dynasty
SAV1W 0887	SQ1S	609	Base fragment	Dish with a ring base	Lid?	B2RWallRPin	5YR5/6; RW 2.5YR5/6	18th Dynasty
SAV1W 0765	SQ1S	636	Bodysherd	Amphora	Lid?	Imported canaanite ware, IVWW	2.5YR4/8; WW 2.5Y8/2	18th Dynasty
SAV1W 0411	SQ1	549	Bodysherd	Zir	Net weight	Marl A4/2WW	7.5YR5/4 to 2.5YR5/6; WW 10YR8/2	18th Dynasty
SAV1W 0496	SQ1	565	Bodysherd	Zir	Net weight	Marl A4/2WW	2.5YR5/6; WW 10YR8/2	18th Dynasty
SAV1W 0739	SQ1S	628	Bodysherd	Storage vessel	Net weight	C2UC	7.5YR5/4	18th Dynasty
SAV1W 1679	SQ1SE/SQ1S	862	Bodysherd	Zir	Net weight	C2WW	5YR6/4; WW 10YR8/2	mid-18th Dynasty
SAV1W 0586	SQ1	530	Bodysherd	Jar	Polishing instrument	B2UC	5YR6/6	18th Dynasty
SAV1W 0494	SQ1	563	Bodysherd	Jar	Polishing instrument	B2UC	5YR5/6	18th Dynasty?
SAV1W 1654	SQ1S	857	Base sherd	Beaker with trimmed/rounded base	Polishing instrument	C2UC	5YR6/6	early 18th Dynasty
SAV1W 0037	SQ1, SW-corner	501	Bodysherd	Cooking vessel	Scraper	Nubian ware, Nubian 2 coarse	7.5YR4/2	18th Dynasty

Tab. 2 (continued)

SAV1 West								
Number of Object	Area/location	SU	Part of vessel	Type of vessel	Type of object	Ware	Munsell	Date of object
SAV1W 0205	SQ1, SE-corner, 3–5m E-W/0–5m S-N	501	Rim sherd	Pot stand	Scraper	Marl BUC	7.5YR6/4	18th Dynasty
SAV1W 0233	SQ1, adj. to Feature 100, 3–5m E-W/0–5m N-S	501	Bodysherd	Dish	Scraper	C2RPall	5YR5/6; RP 10R4/6	18th Dynasty
SAV1W 0234	SQ1, adj. to Feature 100, 3–5m E-W/0–5m N-S	501	Bodysherd	Zir	Scraper	Marl A4/2WW	5YR4/3; WW 10YR8/2	18th Dynasty
SAV1W 0021	SQ1, from debris of SU 502	502	Bodysherd	Jar	Scraper	B2RW	5YR5/6; RW 2.5YR5/6	18th Dynasty
SAV1W 0593	SQ2, sandy area, 0–5m from W	504	Bodysherd	Plate	Scraper	C2UC	5YR6/6	18th Dynasty?
SAV1W 0270	SQ1, 0–1m E-W/0–2m S-W	507	Rim sherd	Dish (DP 3)	Scraper	B2RW Rim	5YR5/6; RW 2.5YR5/8	18th Dynasty
SAV1W 0271	SQ1, 0–1m E-W/0–2m S-W	507	Base sherd	Plate with flat base	Scraper	C2UC	10YR5/3	18th Dynasty
SAV1W 0384	SQ1, E-W 4–5m/S-N 0–5m	507	Bodysherd	Zir	Scraper	C2UC	10YR6/4	18th Dynasty
SAV1W 0552	SQ1, 4–5m E-W/0–5m S-N	507	Bodysherd	Plate	Scraper	C2UC	5YR6/4	18th Dynasty
SAV1W 0581	SQ1, E-half	507	Bodysherd	Amphora	Scraper	Imported ware, IVUC	2.5YR5/8-6/8	18th Dynasty
SAV1W 0410	SQ1	512	Bodysherd	Dish	Scraper	B2RWallRPin	5YR5/6; RW 10R5/6	18th Dynasty

Tab. 2 (continued)

SAV1 West								
Number of Object	Area/location	SU	Part of vessel	Type of vessel	Type of object	Ware	Munsell	Date of object
SAV1W 1533	SQ1	512	Rim sherd	Cup	Scraper	Classic Kerma BT Nubian 1-2	5YR6/6; RP 2.5YR5/8; Black	18th Dynasty
SAV1W 0291	SQ1, 0–3m E-W/0–5m N-S	537	Bodysherd	Jar	Scraper	B2RW	5YR4/6; RW 2.5YR5/6	18th Dynasty?
SAV1W 0349	SQ1, 3–5m E-W/0–5m N-S	538	Bodysherd	Zir	Scraper	Marl A4/2WW	5YR5/6; WW 10YR8/2	18th Dynasty
SAV1W 0354	SQ1, 3–5m E-W/0–5m N-S	538	Base sherd	Plate with flat base	Scraper	C2UC	5YR6/4	18th Dynasty
SAV1W 0497	SQ1	559	Bodysherd	Dish	Scraper	B2RWallRPin	5YR5/6, RW 2.5YR5/8	18th Dynasty
SAV1W 0580	SQ1	585	Bodysherd	Jar	Scraper	B2RW	5YR5/6; RW 10R6/6	18th Dynasty
SAV1W 0584	SQ1	587	Bodysherd	Jar	Scraper	B2UC	5YR6/6	18th Dynasty
SAV1W 1432	SQ1E	601	Bodysherd	Beaker	Scraper	C2WW	5YR6/6; WW 10YR8/2	18th Dynasty
SAV1W 1518	SQ1E	601	Base sherd	Dish with flat base	Scraper	B2UC	5YR6/6	18th Dynasty
SAV1W 0966	SQ1S	618	Bodysherd	Zir	Scraper	C2WW	5YR5/4; WW 10YR6/4	18th Dynasty
SAV1W 0736	SQ1S	622	Rim sherd	Dish (DP 3)	Scraper	B2RWallRPin	7.5YR5/4; RW 10R4/6	mid-18th Dynasty
SAV1W 0759	SQ1S	622	Fragment close to base	Beaker with rounded base	Scraper	C2UC	5YR6/6	18th Dynasty
SAV1W 0774	SQ1S	633	Bodysherd	Dish	Scraper	B2RWall	7.5YR5/4; WW 2.5YR5/6	18th Dynasty
SAV1W 0775	SQ1S	633	Bodysherd	Jar	Scraper	B2RW	5YR5/6; RW 2.5YR5/6	18th Dynasty
SAV1W 1507	SQ1S	639	Bodysherd	Zir	Scraper	C2UC	7.5YR5/4-6/4	18th Dynasty
SAV1W 1508	SQ1S	641	Bodysherd	Amphora	Scraper	Imorted ware, IVWP	5YR6/6; slip 2.5Y7/3	18th Dynasty
SAV1W 1134	SQ1S	642	Bodysherd	Zir	Scraper	Marl A4WW	5YR5/6; WW 2.5Y8/4	18th Dynasty
SAV1W 1032	SQ1S	643	Bodysherd	Dish	Scraper	B2RWallRPin	5YR5/6; RW 2.5YR5/6	18th Dynasty
SAV1W 1128	SQ1S	646	Bodysherd	Dish	Scraper	C2RWallRPin	5YR6/6; 2.5YR5/8	18th Dynasty

Tab. 2 (continued)

SAV1 West								
Number of Object	Area/location	SU	Part of vessel	Type of vessel	Type of object	Ware	Munsell	Date of object
SAV1W 1129	SQ1S	646	Base sherd	Dish with flat base	Scraper	B2UCRW	5YR5/6; RW 2.5YR5/6	18th Dynasty
SAV1W 1132	SQ1S	647	Bodysherd	Amphora	Scraper	Imported canaanite ware, IVWW	7.5YR5/4; WW 2.5Y7/3	18th Dynasty
SAV1W 1510	SQ1S	657	Bodysherd	Jar	Scraper	C2UC	5YR6/6	18th Dynasty
SAV1W 1198	SQ1S	658	Bodysherd	Amphora	Scraper	Imported canaanite ware, IVWW	5Y6/1; WW 5Y8/3	18th Dynasty
SAV1W 1199	SQ1S	662	Bodysherd	Amphora	Scraper	Imported canaanite ware, IVWW	5YR6/4; WW 2.5Y8/3	18th Dynasty
SAV1W 1304	SQ1, N-part, 3–4m to S	664	Bodysherd	Jar	Scraper	B2RW	7.5YR4/4; RW 2.5YR4/6	18th Dynasty
SAV1W 1305	SQ1, N-part, 3–4m to S	664	Bodysherd	Dish	Scraper	B2UC	5YR5/6	18th Dynasty
SAV1W 1306	SQ1, N-part, 3–4m to S	664	Bodysherd	Dish	Scraper	B2UC	5YR6/4	18th Dynasty
SAV1W 1512	SQ1S	668	Bodysherd	Jar	Scraper	Marl A2UC	10YR6/4	18th Dynasty
SAV1W 1514	SQ1S	668	Bodysherd	Cooking vessel	Scraper	Nubian ware, Nubian 2 basketry	7.5YR4/2	18th Dynasty
SAV1W 1307	SQ1S	674	Bodysherd	Zir	Scraper	Marl A4/2WW	5YR4/6-5/6; WW 10YR7/4	18th Dynasty
SAV1W 1515	SQ1S	674	Bodysherd	Jar	Scraper	Marl A3UC	2.5Y7/4	18th Dynasty
SAV1W 1516	SQ1	680	Bodysherd	Jar	Scraper	C2UC	5YR5/6	18th Dynasty
SAV1W 1394	SQ1S	698	Bodysherd	Amphora	Scraper	Imported canaanite ware, IVUC	5YR6/4	18th Dynasty
SAV1W 1312	SQ1S	701	Bodysherd	Jar	Scraper	B2RW	7.5YR5/4; RW 2.5YR5/6	18th Dynasty
SAV1W 1521	SQ1S	711	Bodysherd	Dish	Scraper	B2UC	7.5YR4/3	18th Dynasty
SAV1W 1434	SQ1 & E	717	Bodysherd	Amphora	Scraper	Imported canaanite ware, IVWW	10YR5/3; WW 5Y8/2	18th Dynasty

Tab. 2 (continued)

SAV1 West								
Number of Object	Area/location	SU	Part of vessel	Type of vessel	Type of object	Ware	Munsell	Date of object
SAV1W 1522	SQ1 & E	719	Base (complete)	Dish with a ring base	Scraper	B2RWallRPin	5YR5/6; RW 2.5YR5/8	18th Dynasty
SAV1W 1519	SQ1 & E	732	Bodysherd	Jar	Scraper	Marl A3UC	2.5Y7/4	18th Dynasty
SAV1W 1550	SQ1SE	818	Bodysherd	Amphora	Scraper	Imported canaanite ware, IVWW	2.5YR5/6; WW 5Y8/2	18th Dynasty
SAV1W 1551	SQ1SE	818	Bodysherd	Storage vessel	Scraper	C2UC	5YR5/6	18th Dynasty
SAV1W 1587	SQ1SE	837	Bodysherd	Jar/Storage vessel	Scraper	C2UC	5YR5/6	18th Dynasty
SAV1W 1600	SQ1SE	846	Bodysherd	Storage vessel	Scraper	C2RW	5YR5/6; RW 2.5YR5/8	18th Dynasty
SAV1W 1606	SQ1SE	847	Neck- and shoulder fragment	Zir	Scraper	C2WW	5YR6/6; WW 10YR8/2	18th Dynasty
SAV1W 1638	SQ1 S	852	Bodysherd	Storage vessel	Scraper	B2RW	5YR5/6; RW 2.5YR5/6	18th Dynasty
SAV1W 1639	SQ1 S	852	Bodysherd	Cup	Scraper	Classic Kerma BT Nubian 1-2	5YR5/6; RP 10R5/8	18th Dynasty
SAV1W 1669	SQ1SE	858	Bodysherd	Amphora	Scraper	Imported ware, IVUC	7.5YR5/2-7/2	18th Dynasty
SAV1W 1672	SQ1SE/SQ1S	865	Rim sherd	Bowl (BO 6 var.)	Scraper	B2RWallRPin	5YR5/6; RW 10R5/6	18th Dynasty
SAV1W 1740	SQ1S, S of Feature 143	903	Bodysherd	Zir	Scraper	Marl A4/2WW	5YR7/6; WW 10YR8/2	18th Dynasty
SAV1W 1750	SQ1SE-E & 1SE	912	Base sherd	Dish with flat base	Scraper	B2UC	5YR5/6	18th Dynasty
SAV1W 1836	SQ1SE, N of SU 941	916	Bodysherd	Storage vessel	Scraper	C2UC	5YR6/4	early 18th Dynasty
SAV1W 1810	SQ1SE	943	Bodysherd	Storage vessel	Scraper	Marl A4UC	5Y8/3	18th Dynasty
SAV1W 1008	SQ1S	638	Bodysherd	Pot stand	Scraper?	C2UC	5YR6/6	18th Dynasty
SAV1W 1837	SQ1S	970	Base sherd	Dish with flat base	Scraper?	B2UCRW	5YR5/6; RW 2.5YR5/8	18th Dynasty
SAV1W 0020	SQ1, from debris of SU 502	502	Bodysherd	Jar	Token/gaming piece	B2RW	5YR5/6; RW 2.5YR5/6	18th Dynasty

Tab. 2 (continued)

SAV1 West								
Number of Object	Area/location	SU	Part of vessel	Type of vessel	Type of object	Ware	Munsell	Date of object
SAV1W 0296	SQ1, 0–5m W-E/0–5 m N-S	533	Bodysherd	Storage vessel	Token/gaming piece	C2UC	5YR6/6	18th Dynasty
SAV1W 0323	SQ1	536	Bodysherd	Dish	Token/gaming piece	B2RWallRPin	5YR5/6; RW 10R4/6	18th Dynasty
SAV1W 1302	SQ1S	678	Bodysherd	Dish	Token/gaming piece	B2UCRP	5YR5/6; RW 2.5YR5/8	18th Dynasty?
SAV1W 1608	SQ1SE	850	Bodysherd	Beer jar	Token/gaming piece	B2UC	5YR5/6	18th Dynasty
SAV1W 1609	SQ1SE	850	Bodysherd	Zir	Token/gaming piece	C2UC	5YR6/6	18th Dynasty
SAV1W 1637	SQ1 S	852	Bodysherd	Storage vessel	Token/gaming piece	C2RW	5YR6/6; RW 10R5/6	18th Dynasty?
SAV1W 1671	SQ1SE/SQ1S	865	Bodysherd	Cooking vessel	Token/gaming piece	Nubian ware, Nubian 2 basketry	7.5YR5/4	18th Dynasty?
SAV1W 1811	SQ1SE & SQ1SE-E	947	Bodysherd	Storage vessel	Token/gaming piece	C2UC	5YR6/6	18th Dynasty
SAV1W 1820	SQ1S	963	Bodysherd	Dish	Token/gaming piece	B2UCRP	5YR5/6; RP 2.5YR5/6	18th Dynasty
SAV1W 1830	SQ1S	962	Bodysherd	Dish	Token/gaming piece (or unfinished weight?)	B2RWallRPin	5YR6/6; RW 10R5/6	18th Dynasty
SAV1W 1462	SQ1, sieved material	726	Bodysherd	Jar	Token/gaming piece or polishing tool	C2UC	7.5YR5/4	18th Dynasty

Tab. 2 (continued)

SAV1 West								
Number of Object	Area/location	SU	Part of vessel	Type of vessel	Type of object	Ware	Munsell	Date of object
SAV1W 0381	SQ1NW	501	Bodysherd	Cooking vessel	Token/gaming piece or weight	Nubian ware, Nubian 2 coarse	7.5YR4/2	18th Dynasty
SAV1W 0439	SQ1, 1.8m W-E/3.9m N-S	551	Bodysherd	Dish	Token/gaming piece or weight	B2RWallRPin	5YR5/6; RW 10R4/6	18th Dynasty
SAV1W 1525	SQ1, sieved material	731	Bodysherd	Jar	Token/gaming piece or weight	B2UC	5YR5/4	18th Dynasty
SAV1W 1445	SQ1, sieved material	731	Bodysherd	Dish	Token/gaming piece or weight	B2RWallRPin	5YR5/6; RW 2.5YR5/8	18th Dynasty
SAV1W 0437	SQ1	512	Bodysherd	Jar	Weight (central perforation)	B2RW	5YR5/6; RW 2.5YR5/6	18th Dynasty
SAV1W 1532	SQ1SE (surface cleaning)	800	Bodysherd	Zir	Weight (central perforation)	C2WW	5YR5/6; WW 10YR8/2	18th Dynasty
SAV1W 1642	SQ1S	852	Base sherd	Dish with ring base	Weight (central perforation)	B2RWallRPin	5YR5/4; RW 10R5/6	mid-18th Dynasty
SAV1W 1833	SQ1S	953	Base sherd	Jar with rounded base	Weight (central perforation)	Marl BUC	5Y8/2	18th Dynasty
SAV1W 1678	SQ1SE/SQ1S	862	Base (almost complete)	Dish with ring base	Weight (intended perforation)	B2Red splash in	5YR5/4; RW 2.5YR5/6	mid-18th Dynasty

Tab. 2 (continued)

SAV1 West								
Number of Object	Area/location	SU	Part of vessel	Type of vessel	Type of object	Ware	Munsell	Date of object
SAV1W 1675	SQ1SE/SQ1S	865	Bodysherd	Dish	Weight (intended perforation)	B2RWallRPin	7.5YR6/4; RW 10R5/6	18th Dynasty
SAV1W 0563	SQ1	585	Bodysherd	Jar	Weight? (perforated)	B2UC	5YR5/6	18th Dynasty

Beyond the Most Obviously Interesting

Aims and Methods in Documenting and Processing Scarabs

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Abstract
Publications of scarab finds from excavations in Egypt and beyond sometimes miss the level of detail required to address the research questions looming over modern scarab studies. The paper calls for more consideration.

1 Scarab studies and scarab documentation

Scarab-shaped seal amulets are small in size and complex in shape and details. They emerged as an omnipresent category of small finds in Egypt before spreading through much of the Mediterranean over time. Albeit ubiquitous, scarabs usually come in small numbers in almost every single excavation. Given that scarab studies are a marginal, not to say esoteric, subfield of Egyptian and Western Asian archaeology, the primary documentation and processing of scarab finds is often performed without considering the full potential research value of these objects.

Since the late 19th century, the interest in scarabs was mainly fuelled by the inscriptions on their undersides, as already expressed by William Matthew Flinders Petrie, who considered name scarabs as "the most obviously interesting class" of scarabs.[1] The 1970s and 1980s saw the rise of studies on decorative motifs on the undersides of uninscribed scarabs (so-called design scarabs), both as a means to dating[2] and as expressions of concepts important for scarab producers.[3] Other features, such as the rendering of a scarab's back, head, and legs on longitudinal sides were considered insofar as they could be used to position a scarab within a chronological framework, often thought of as a temporal succession of rather broad scarab types. Several classification systems, developed in line with this approach,[4] cover only small segments of the scarab timeline.

* Work supported by funding from the Fritz Thyssen Foundation. Many thanks are due to Ben Greet for sharing copies of his papers.
1 Petrie 1917: 1.
2 Tufnell 1975; Tufnell 1984.
3 Exemplarily: Keel 1977; Schroer 1989.
4 Overview: Keel 1995: 39-61.

Published in: A. Kilian, A. Pruß, M. Zöller-Engelhardt (eds), Excavating the Extra-Ordinary 2. Challenges and Merits of Working with Small Finds. Proceedings of the International Interdisciplinary Workshop at Johannes Gutenberg University Mainz, 25–26 November 2022, Heidelberg: Propylaeum, 2024, 125–132. DOI: https://doi.org/10.11588/propylaeum.1382.c19772

It can thus be said that, up until recently, scarab studies took interest mainly in the inscription or decoration on the underside and in pigeonholing other sculptural features to classes defined with the aim of dating scarabs. These interests could be served well by the then common documentation and publication practices. In earlier scarab publications, the principal attention was paid to the underside, which could be reproduced by line art drawing or even photographically, whereas other sculptural features would be at best codenamed rather than reproduced.[5] Some early scarab documentation techniques used by Egyptologists were only applicable to the scarab base: rubbings, made with paper and pencil, wet paper, or tin-foil and toothbrush,[6] and impressions in diverse materials ranging from sealing wax to polymer modelling clay, the latter technique still practiced at museums and excavation sites until recently.

With time, scarab sides and backs were also increasingly reproduced, but the line art drawings, aimed at classifying scarabs, still prevailed.[7] In 1976, Erik Hornung and Elisabeth Staehelin made a strong point for reproducing all three scarab sides in larger than life macro photographs rather than drawings in their catalogue of the Basel scarab collection, illustrated by exemplary photos taken by Artur Brack.[8] The success of this approach was such, that this and similarly executed roughly contemporary scarab catalogues from Geneva by Irene Vodoz[9] and from Hannover by Irmtraut Munro[10] are often cited as representative catalogues of Egyptian scarabs in comparative studies;[11] although almost all scarabs in these catalogues come from the antiquities market and are of unknown provenance, the quality of reproductions make these publications more useful than most existing (contemporary) publications of scarabs from excavations.

Almost half a century after Hornung and Staehelin's book appeared, it must be stated that the high standard they have set has not yet become universally adopted in publications of scarab finds from excavations in Egypt and elsewhere, although now there are even more reasons to document scarabs thoroughly.

2 New research questions in scarab studies

A careful examination of stylistic and morphological features, material and technology can reveal much more information on the production and use of scarabs than previous approaches allowed. In recent years there is a growing number of studies moving from the traditional

5 Examples of this approach range from Petrie 1917 and 1925 to Rowe 1936, Vercoutter 1945, and Martin 1971, each utilizing a different classification system for sculptural features. Some of these publications occasionally reproduce scarab backs and sides, but never systematically.

6 Advocated by Petrie 1889: 11.

7 Among the most recent examples of this approach are Tufnell 1984, Mlinar 2004, Ben-Tor 2007.

8 Hornung/Staehelin 1976: 7–8.

9 Vodoz 1978.

10 Beste 1978–1979.

11 For example: Hölbl 1986: 170 n. 40; Ben-Tor 2017: 208.

agenda of scarab studies to fine-grained stylistic analyses focusing on small groups of objects sharing sets of common traits (regionality and workshop studies),[12] studies on stylistic imitations of particularly valued kinds of scarabs and emulations of historical scarab styles,[13] and examinations of production processes,[14] reworked scarabs, and use-wear patterns. These new analyses often rely on minute details, previously omitted in descriptions and reproductions of scarabs, including shapes of clypeus[15] and tail, perforation,[16] incision techniques, various discolorations, striations, and other defects. Thus, for example, definitions of scarab groups that can be tentatively associated with production units, can rely on concave head-sides, asymmetrical heads or the number of serrations on the clypeus[17] – details that cannot be studied through linear drawings, small or unsharp photographs.

This turn to the materiality and fine details cannot be sustained without better documentation practices, both in the field and in the museum settings.

3 Bringing documentation closer to research needs

Current practices in dealing with artefacts from archaeological excavations often make scarabs and other small finds virtually not rediscoverable after their initial processing by the excavators. Hence, it is particularly important to provide quality publications of scarabs from excavations, for their reproductions in excavation reports and final publications are likely to remain their only publications accessible to scholars. It would be unjust to our colleagues if we provide here specific examples of less useable scarab reproductions in recent publications of archaeological material. In each case, different factors may be at work that prevent researchers from providing scarab reproductions of sufficient quality, be it limitations set by editors on the number (and colour properties) of illustrations submitted for the publication, or unfavourable circumstances during the documentation process in the field. Summarily it may be said that some malpractices still frequently occur in publications, interfering with the rapid evolving field of scarab studies and new research questions, sometimes even hampering the study of the published scarab material and eventually causing a massive loss of information. It is not that examples of best practices and detailed discussions of practical scarab documentation[18] are not accessible, but we are forced to reiterate several points.

12 Mlinar 2004; Boschloos 2014; Boonstra 2019; Boonstra 2020; Ilin-Tomich 2023.
13 Keel and Münger 2003; Boschloos 2016; Boschloos 2017: 164.
14 Ben-Marzouk et al. 2023; Solodenko-Vernovsky et al. 2023.
15 Ilin-Tomich 2023: 85.
16 Ilin-Tomich 2023: 143–146.
17 Examples taken from Ilin-Tomich 2023.
18 Keel 1995: 16–17. Most recently, Ben Greet has presented an elaborate description of a modern stamp seal photography method, Greet 2003: 286–288.

One obvious but still common shortcoming of some archaeological publications presenting scarabs is the lack of dimensions, whereas scarab size is one of the most widely used (even if not always correctly and meaningfully) criteria for their classification.[19]

Some publications offer only one or two views of the scarab: whereas the underside is always reproduced (except for blank scarabs), scarab backs or sides are still often omitted, as was common a hundred years ago, so that publications do not meet the minimum three-views-per-scarab standard (base, back and one of the longitudinal sides), set in the 1970s by Hornung and Staehelin's book.[20] In some cases, the two longitudinal sides of the same scarabs are demonstrably not identical, and some important features, such as the execution of the perforation, can be only discerned on the front and back sides of the scarab,[21] whence it is advisable to reproduce six views of each scarab, whenever possible.[22]

With the advent of the digital photography, there are no practical reasons to abstain from photographing scarabs; yet up to now some publications still only include drawings of scarabs (or reproduce some of the sides only as drawings). Such drawings are sometimes executed by archaeologists who are not scarab scholars and thus do not reproduce the diagnostic details that a scarab scholar expects to see on a scarab drawing. Yet even the best-informed scarab drawings remain subjective and can be misleading. One may compare the drawing of the only known scarab of king Sekheperenre (Second Intermediate Period, 14th dynasty) Ashmolean AN1935.100a in the book by Olga Tufnell and William Ward, who were leading scarab experts, with its photograph,[23] and see that the drawing misinterpreted cracks of the material on the back and in the corners of the head as features and overlooked actual features such as the horn and the lines running along the sides of the head, which indicate eyes.

Scarabs found in Egypt often retain at least remains of the original colour glazing, whereas those found in the Levant are mostly discoloured; hence, black and white photographs are not adequate for scarabs.

Even more importantly, scarabs are sculptures in miniature, and the finesse of scarab carvers excels the resolution of modern printing machines; hence, a great wealth of information about scarabs is lost when they are published at 1:1 scale or less. Scarab photographs should be larger than life, and best examples range from 2:1[24] to the splendid 3:1[25] scale.

The spread of digital point and shoot cameras and smartphones leaves a visible scar especially in preliminary archaeological reports that feature scarab finds. Scarabs, however, are not the easiest object to photographs and require at the least a tripod or a copy stand, adequate light and a camera able to produce close-up photographs (that is, in the general case, an interchange-

19 Keel 1995: 154–155.

20 Hornung/Staehelin 1976; for an advocacy of 3 views per scarab, see: Keel 1995: 16.

21 Ilin-Tomich 2023: 143–146. The flawed documentation of scarabs displaying two different sides was a problem addressed by Vanessa Boschloos in a talk given at the workshop held at the University of Zürich (9–10 February 2023) on 'Production, Distribution, and Groups in Stamp Seal Research: Old Problems, Innovative Solutions'.

22 So also Greet 2023: 286.

23 Tufnell 1984: pl. LXII (3465); Ilin-Tomich 2023: 145 fig. 95.

24 Keel 1995: 16–17.

25 As in Beste 1978–1979.

able lens camera fitted with a macro lens or another lens with a sufficiently small minimum focusing distance for the scarab to fill most of the shot). Beyond this basic equipment, more sophisticated techniques and devices can be successfully employed for documenting scarabs, depending on available resources. Focus stacking can drastically increase the depth of field of scarab photographs.[26] Compelling results can be attained with 3D[27] and 2.5D-imaging.[28]

4 Outlook

Scarabs are in most cases of subordinate importance for interpreting findings at a site, because scarab evidence is only telling when analysed in great numbers. The pitfalls of drawing conclusions from single scarab finds have been highlighted many times.[29] Hence, these are most often scarab scholars outside the excavation teams that require published scarab material for their analyses. This short publication encourages our colleagues in the archaeological community to question oneself: how efficient are published field reports and final publications in making the excavated scarab material accessible to scarab scholars? Are recent research questions in scarab studies taken into consideration when choosing how to process, document, and publish excavated scarabs?

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28 Boschloos/Hameeuw/Van Quickelberghe 2014.

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Puzzling Fragments

Intentional Fragmentation of Stone Vessels in Context of Early Dynastic Burial Practices (Egypt)

Nora Kuch

In memoriam of one of my supervisor Stan Hendrickx, whom I learned to know as a warm-hearted person. Not only his personal interest in the practice of fragmentation, but also his fundamental archaeological experience and kind support were a great inspiration to me.

Abstract

This paper focuses on the re-evaluation of stone vessel fragments from Early Dynastic tombs in the necropolis of Helwan, Operation 4. Repeatedly detected within undisturbed or well-preserved burials, some significant accumulations of stone vessel fragments can be argued as the result of ritual performances and therefore as intentional depositions. Thus, this case study challenges the traditional view of fragments as mere remnants of incidental taphonomic processes during the deterioration of the tombs. The research underlines the concept of burials as actively designed spaces, embodying culturally immanent ideas and serving as stages for human-thing interrelations. In this context, the fragmented vessels are not just static witnesses of funerary culture but active participants in ephemeral rituals. By integrating archaeological analysis with ritual studies, this paper argues that these artefacts provide insights into a practice of Early Egyptian funerary culture that has received little scholarly attention in the past.

Emphasizing some ritualistic aspects, the study draws on the idea that rituals are characterized by regulated, repetitive patterns which influence the placement of the grave inventory and are therefore traceable in archaeological records. In addition, a brief cultural-historical comparison is carried out with regard to the question of whether the destructive manipulation of objects, categorised today as small finds, was a common practice in the ancient Egyptian culture.

The paper concludes that the study of rituals in archaeology is not merely a theoretical addition but a methodological tool. By adopting a ritualistic lens, seemingly ordinary fragments are reinterpreted as extraordinary elements of ritual practices, thus offering a more nuanced understanding of ancient Egyptian cultural and funerary rituals.

1 Introduction

In his book 'Fragmentation in Archaeology', John Chapman points to a general issue in archaeological research by saying that most ancient artefacts are found broken, and that this breakage is commonly considered by archaeologists to be accidental.[1] This is all the more true for the

1 Chapman 2000: i.

Published in: A. Kilian, A. Pruß, M. Zöller-Engelhardt (eds), Excavating the Extra-Ordinary 2. Challenges and Merits of Working with Small Finds. Proceedings of the International Interdisciplinary Workshop at Johannes Gutenberg University Mainz, 25–26 November 2022, Heidelberg: Propylaeum, 2024, 133–157. DOI: https://doi.org/10.11588/propylaeum.1382.c19773

category of so-called small finds, whose sheer quantity ties up many resources in their analysis and reconstruction. There is no doubt that heterogeneous archaeological material requires experts with the necessary expertise to process it properly. The process is often repetitive and time-consuming, with attention focused solely on documentation. And even more often, these finds are perceived as so common and 'ordinary' that their potential for deeper historical insight is easily underestimated. However, previous conferences, such as "Excavating the Extra-Ordinary 1" and its successor, have demonstrated the need and the commitment to use interdisciplinary approaches in order to gain fresh perspectives on the material culture of the past.[2]

In this context, this paper deals with the re-evaluation of Early Dynastic stone vessels, or more precisely a specific group of fragmented vessels found in the tombs of the necropolis of Helwan, Operation 4 (Op. 4). These fragments occur repeatedly as remarkable accumulations in undisturbed or well-preserved burials. Consequently, and regarding their archaeological context, they cannot be interpreted as accidental, but as deliberate deposits.

Based on an understanding of burials as being actively designed and structured according to culturally immanent ideas, these deposits are not only to be seen as static 'witnesses' of a specific funerary culture, but rather as actants of reciprocal human-thing interrelations. The given funerary context makes it possible to combine the interpretation of the archaeological record with theoretical aspects of ritual studies. Within this interdisciplinary approach, rituals are considered as a multi-faceted cultural phenomenon and as mechanisms of social behaviour used for cultural-immanent communication. Rituals are therefore characterised by regulated, repetitive patterns that allow the attending group of participants to identify the specific meaning of the performed ritual.[3] As a result, and in the author's opinion, these invariant repetitions are reflected in the constitutive design of ritual space and thus, depending on the degree of preservation, are also preserved within archaeological features.

As necropolis and the individual tombs are considered ritual spaces per se, the deposits of deliberately fragmented vessels can be discussed as such remaining characteristics and therefore as part or even more the result of ephemeral rituals.

In the past of archaeological disciplines, fragments have been widely accepted as the result of taphonomic processes and consequently as a 'typical' and accidental state of preservation that needed to be corrected by physical or graphical restauration. But in regard to their respective contexts, these distinct vessel fragments are more than just parts of a larger, and former complete vessel to which they are traditionally reconstructed.

Although it is an essential part of archaeological work, a significant amount of information is lost by limiting our attention to the aspect of reconstruction. It is only within their find context that the fragments reveal an informative potential that allows conclusions to be drawn about human interactions in the sense of current cultural and ritual studies via material culture.

2 I wish to thank all the organisers, supporters and participants for this extraordinary conference, the fruitful exchange, and the opportunity to present my dissertation here. The dissertation was realised within the FWF-funded project "Helwan – A Necropolis of Ancient Memphis" under the supervision of E. C. Köhler, who I would also like to thank.

3 Michaels 2003; Krieger/Belliger 1998.

Fig. 1: Stone vessel fragments placed in an upright position in tomb N 559 at Naga ed-Deîr (Reisner 1932: pl. 7c)

Fig. 2: Stone vessel fragments placed in front of the deceased in tomb M 47 at Macramallah's Rectangle (Macramalla 1940: pl. XVI)

The aim of this case study on selected tombs from Helwan, Op. 4, is to combine archaeological observations with concepts from ritual studies. To find practical applications for theoretical considerations, an attempt will be made to bridge an observed divergence in research literature between theoretical and practical (archaeological) reports. The archaeological documentation of Helwan, Op. 4 provides evidence to analyse similarities and repetitions concerning the deposition of vessel fragments. These are, e.g., the specific position of the fragments or their stratigraphical position in the tomb pit, or a certain orientation in front of the deceased. These three possible placements of fragmented vessels are striking and can be observed repeatedly in 36 tombs in Helwan, and in eight other cemeteries of the Early Dynastic Period (Figs 1–2).[4]

A comparative cultural-historical overview, focusing on the ritual of 'breaking the red pots'[5], will show that there is evidence of deliberately broken objects in most periods of ancient Egyptian history. Destructive performances can thus be understood as a habit and part of social behaviour. So, this paper follows the bits and pieces of a history of fragmentation in perspective of Archaeology and Egyptology using ritual studies as a methodological tool, to discuss seemingly ordinary fragments as extraordinary parts of Early Dynastic funerary rituals.

4 Recently summarised in Kuch 2023 with focus on some examples from Helwan, Macramallah's Rectangle and Naga ed-Deîr.

5 Summarised by Hertel 2019.

2 Bits and Pieces on a History of Fragmentation

To illustrate the potential of small finds, especially sherds of stone vessels, a brief overview of the perception of fragments within archaeological research is given in the following. In the historical sciences, fragmentation is widely acknowledged as a challenging everyday problem, especially when it comes to the state of conservation and reconstruction.[6] Over recent years, an interdisciplinary field of research has opened in which Archaeology, Heritage Conservation, Art and Literary Studies deal with this alleged problem in very different ways.[7] In this interdisciplinary approach, Malcher et al. describe 'fragmentarity' in terms of three aspects: Fragments are considered as unusable (functional aspect), destroyed or incomplete (formal aspect), or unfinished (temporal aspect).

Fragments are reminiscent of the former original object they belonged to. Based on their inherent diagnostic features the fragments point to the object's former typology and primary function, which is, so to speak the initial purpose for which they had been manufactured. Following Malcher, 'fragmentarity' can therefore only be understood through the absence of completeness, but, at the same time, can only be identified if the original primary form is already known and is recognisable from the diagnostic features of the individual piece. As such, and spoken from an archaeological perspective, fragments are remnants of something that was once complete but has been damaged by external factors. Therefore, 'fragment' or 'fragmentary' refers to the external, incomplete form of things. Fragmentation suggests the absence of completeness and is usually perceived as a negative flaw.[8]

From an archaeological point of view, fragments, and especially diagnostic ones, point to initial conditions and allow the identification of typological developments in material culture. As such, fragments are to be understood as constituent parts, that refer to the former complete object and its materiality. Through their form-specific materiality, fragments allow conclusions to be drawn about the original object, its previous form and function, which are no longer available due to their fragmentary character. As a result, the object-specific or graphical reconstruction of objects has become a focus of archaeological work. But this merely permits the documentation of the objects' previous form, which is strongly connected to its former primary function.[9] Consequently, archaeological artefacts, as stone vessels, can at least theoretically be restored to their typological form, which can be determined from the diagnostic fragments. On this basis, the primary function of the vessel is usually assumed to be a container used for food service or storage. A possible reuse is only partially evident from physical alterations on fragments, and a secondary re-use can hardly be uncovered by a solely object-related reconstruction. As a consequence, archaeological reconstruction projects complete, intact objects, regardless of how they are actually preserved. Archaeological research is thereby (mis-)directed towards a supposed

6 Verbovsek 2013: 86–87.
7 Malcher et al. 2013: 10.
8 Malcher et al. 2013: 11.
9 Malcher et al. 2013: 13; Chapman 2000: 7–26; Schreiber 2013: 65.

physical integrity of material culture, which is vice versa reproduced through the reconstruction of the excavated fragmentary material. Still, technical or graphical reconstruction is an essential part of archaeological research regarding typology or chronology of material culture. However, it also tempts us to stop asking about the fragments' origins. Our archaeological field experience allows us to interpret fragmentation all too quickly as a by-product of taphonomy and contextual genesis – and thus as coincidence. But, to evaluate fragments resulting from deliberate actions, it is worth looking at the 'object biography' of the pieces.[10] The aim here is not to identify the individual steps of production, use, re-use, and disposal in a presumed 'life' of a vessel or its fragments. These stations are hardly archaeologically traceable and lead to a generalisation of the use-life (Gebrauchsleben) of Early Dynastic stone vessels.[11] Stone vessels are generally assumed to be intended for a use as containers, commonly ascribed the function of storage, provisioning or serving, and which is therefore regarded as the primary function and reason for production. Accidental fragmentation occurs towards the end of the object's 'life', in the time span between the objects' deposition and their archaeological rediscovery. In this sense, archaeological reconstruction jumps straight back from the discovery of fragments at the end of the vessels' biography to its starting point as a complete primary object.

In contrast, some undisturbed tombs found in Helwan, Op. 4, display some vessels that had been physically manipulated or completely fragmented clearly before their deposition. The intended primary function is now no longer available, and it is reasonable to assume a new object-biographical phase. Consequently, the act of fragmentation must be emphasised as a deliberate change within the vessels' biographies. Fragmentation is therefore the result of a deliberate act and not the end of the biography, but rather an essential part of it. The broken stone vessels do not necessarily become unusable or functionless but are given a further, new function and presumably also a different connotation.

2.1 The Egyptological Approach to Intentional Fragmentation

The observation of such deposits of deliberately fragmented stone vessels is not particularly new. To the authors' knowledge, the earliest mention of deliberate vessel fragmentation concerning ancient Egypt dates from 1897 by Jacques Jean Marie De Morgan.[12] In the context of his discoveries in the so-called 'Royal Tomb' or 'Tomb of Menes' at Naqada, De Morgan mentioned the discovery of scattered fragments as the result of an intentional distribution. In his proposed interpretation, De Morgan referred to the then already known phenomenon of fragmentary hieroglyphs, e.g. the dismemberment of the sign of the snake.[13] De Morgan also drew parallels to similar practices, such as the bending of weapons in the tombs of Bronze and Iron Age Europe, and interprets the fragmentation of the vessels as a deliberate act of required ritual

10 Samida 2010: 90.
11 Assmann 2007: 33; Sommer 2012: 20.
12 De Morgan 1897: 150.
13 Kahl 2000: 125–129.

killing to transfer the objects to the hereafter.[14] Although the comparative cultural approach seems very forward-looking for that time, the explanations are nevertheless open to criticism, because culture-specific practices from different eras are mixed together without question and are summarised into a single generalised ritual.[15]

Another example of examining the aspect of deliberate fragmentation can be found in Dow Covington's report on the so-called 'Covington's Tomb'. The tomb was excavated during the 'Mastaba Mount Excavations' in Giza in 1902–03. In one corridor, Covington noticed a particular distribution of fragments that looked as if they had been thrown there intentionally.[16]

Concerning excavations at Naga ed-Deîr by Arthur Mace and later by George Reisner, an intentional fragmentation prior to the closure of the tombs was discussed briefly in their publications. Especially Mace stressed the discrepancy of fragmented vessels in intact contexts in more detail and considered a ritual component, but also a destruction as protection against looting.[17]

In 1936, Rizkallah Macramalla described a find situation of intentional fragment deposition in tomb 4 of the M tombs near Saqqara. Particularly striking is that he mentioned the intact state of the burial. In contrast, the pieces of a broken vessel were found to the east and west of the feet of the burial, and Macramallah concluded that they had been deliberately broken before the tomb was sealed. Relating to the aforementioned excavators, Macramallah also believed the vessels were being made unusable as protection against grave robbery.[18]

More references could be cited, but with the publication by Kurth Sethe on deliberately destroyed pottery vessels inscribed with execration texts,[19] the discussion about meaningful fragmentation shifts to a more philological approach. Together with the ritual of 'breaking the red pots', the act of fragmentation was then associated with and generalised to the ritual killing of enemies, and archaeological evidence was often interpreted in this way till today.

Finally, more recent archaeological observations add new impetus to the debate. Besides the actual analysis of the tombs at Helwan by Christiana Köhler, some further insights are discussed, e.g. by Stan Hendrickx, who recently re-evaluated an intentional fragmentation of pottery vessels found in tomb 77 at Elkab.[20] Furthermore, Pablo Barba was able to trace intentional breakage of pottery back to 4th millennium BCE. And concerning stone vessels, Lisa Mawdsley presented several intentionally destroyed examples from the necropolis at Tarkhan stressing a fragmentation prior to a seemingly orchestrated deposition.[21] But in order to highlight the destructive performance in the context of funerary culture, the focus will be on the Helwan necropolis, Operation 4.

14 De Morgan 1897: 150.
15 This is also true for the later work by Leslie V. Grinsell in 1961 and 1973, often quoted in Egyptological research.
16 Covington 1905: 217.
17 Reisner 1932: 235; Mace 1909: 36.
18 Macramallah 1940: 11, 23 with footnote 2 and pl. V; this tomb contained the burial of a man on his left side with his head orientated to the north.
19 Sethe 1926.
20 Hendrickx 2020: 174–175.
21 Barba 2021: 17–20; Mawdsley 2020: 165–87.

3 The necropolis of Helwan, Operation 4 as ritual space

The Helwan necropolis is situated 21 km south of Cairo on the east bank of the Nile. Despite some earlier investigations, it was not until 1942–54 that extensive excavations were carried out by Saki Zaad, resulting in the discovery of 10,000 tombs. So far, Helwan is the largest known necropolis of the Early Dynastic Period. Adjacent to Memphis, the former centre of ancient Egypt at that time, the material culture of the tombs allows a glimpse into a broad cross-section of the social demography of the inhabitants of ancient Memphis and their private funerary culture.

Since 1997, an undisturbed part of the site, referred to as Operation 4 (Op. 4), has been investigated under the direction of Christiana Köhler. The total of 218 discovered tombs date from the late 1st to early 4th Dynasty (Date Groups IIIC-IV), with a high point of occupation during the 2nd and 3rd Dynasties.[22] The area of Operation 4 has not been the subject to archaeological investigation in the past, making it a suitable starting point for investigation according to modern archaeological research methods. This area is well defined, and its documentation provides detailed access to the small finds discovered in the Early Dynastic tombs.

In terms of ritual studies, there is no doubt that tombs and necropolises are culturally immanent and ritually defined spaces. And the same is true of the actions performed in these contexts. Space, and especially burial space, is therefore no longer regarded as a parameter to which people and things act independently and without reference. Spatial structures or 'spatial determinations' actively result from social dynamics of human interactions and are thus an expression of typical historical socialisation.[23] Therefore, burials can be understood as a direct result of dynamic processes and as expressions of social practices. Cultural immanent beliefs are manifested in the architecture and equipment of tombs as well as in the treatment of the deceased and became a constitutive reality. Through the transmission of these practices and especially their repetitions, they became tradition and finally a part of cultural memory. Tombs and burial rituals thereby have both a preserving and a formative function.

However, the idea of a ritualised distribution of grave goods is not new and was already postulated e.g. by Petrie. In more recent research, statistical analyses have also been conducted on this subject, e.g. by Alice Stevenson for El-Gerzeh or Barbora Janulíková. With a focus on the M tombs from Macramallah's Rectangle, Turah and also Helwan, Janulíková used statistical analyses of cemetery data comparing specific funerary parameters in order to analyse the complexity of Early Dynastic society.[24] But statistics often display fluctuations that are interpreted as supposed deviations and which are usually explained by the problem of sheer quantity or, on

22 Compare Köhler 2005; Köhler 2014; Köhler 2017; in detail see Köhler 2008: 113–114.

23 Löw/Sturm 2005: 34.

24 Stevenson 2009: 130 with reference to Petrie 1939: 35; Janulíková 2018, cf. 167 and fig. 5.14; Janulíková 2018, 274 with fig. 8.2.

the contrary, the lack of available data. However, it is rarely considered that human behaviour does not necessarily follow such exact patterns.

In this respect, Janulíková's work is essential, as she defined an 'ideal burial' and deviations are not understood as statistical flaws, but as deliberate variations: the tomb and the burial equipment are based on a principal scheme, which could be modified depending on the resources available. As an absolute minimum, the deceased must be protected in a tomb structure, additionally by a mat or coffin, and provided with some parts of an offering meal. Ritually necessary vessels for oil can be a lower priority addition, and personal belongings have the lowest priority (comp. Fig. 5). Variations from such a basic configuration and their prioritisation can be made depending on the available resources and on the social possibilities of the acting group or community. Consequently, such variations are reflected in the archaeological contexts and are not statistical inaccuracies but rather the outcome of human behaviour.

But even in these investigations little distinction is made between intact and fragmented objects. Instead, it is suggested that all objects found are part of the supplies and equipment for the deceased. Based on the evidence from Helwan, the author suggests that the depots of fragmented vessels may not have been part of standardised funerary equipment. Perhaps they are not meant for the dead to use in the afterlife, but rather as an aspect of communal rituals that relate more to the living. In this sense, burial sites are institutionalised spaces of a community. As communal spaces, they frame concepts of death or memory, but they also reflect interpersonal hierarchies and relations, and some aspects of culture- or group-specific habitualised manifestations are to a certain degree preserved in the burials and remain in the archaeological features.

3.1 Depositions of Stone Vessels Fragments in Helwan, Op. 4

To provide evidence for the aforementioned claim, let us finally take a closer look at the archaeological records in Helwan, Op. 4.[25] Especially in undisturbed or well-preserved contexts, the position of some stone vessel fragments does not appear erratic. It is necessary to identify characteristics that can explain such distributions and thus distinguish them from accidental taphonomic context genesis. For this, the following considerations can be made:

1. object-inherent evidence: distinct cut marks on the fragments indicate deliberate destruction by tools.
2. contextual indications: as briefly mentioned above, fragments of some stone vessels are found in a position that cannot be explained as the result of taphonomic disturbances. Especially in undisturbed contexts, these are fragments that are stuck in the ground in an upright position, or piled on top of each other, or placed next to each other. Also, there are matching fragments that lie at a considerable distance to each other or at different

25 Köhler 2014: 18.

stratigraphical levels. The position of the fragments can therefore be seen as a deliberate placement that can only be realised if the vessels have already been fragmented before.

The best examples to highlight the described indicators of intentional fragmentation or deliberate deposition of fragmented vessels occur in the simple pit tomb 4/190 and the subterranean chamber tomb 4/94, that will be briefly illustrated in the following:

The intact simple pit tomb 4/190 (date group Naqada IIIC/D)[26] contained the burial of a mature adult woman and two deposits of deliberately fragmented stone vessels. At a higher level above the coffin the siltstone bowl S09-23 was found,[27] divided into two halves. The reconstruction of the bowl reveals a prominent cut mark in the centre of the base, a sign of deliberate fragmentation by a tool. But even more interesting is the position of the two halves, east and west of the coffin: in an undisturbed tomb, with no evidence of taphonomic interferences, this specific distance between the fragments can only be explained by a deliberate placement. Similarly, the cylindrical calcite vessel S09-22 was found at the bottom of the pit. The fragments were placed one after the other and parallel to the eastern coffin wall. This was only possible if the jar was deliberately destroyed prior to the rearrangement of the fragments. Further, the stratigraphic documentation of the fragments allows a reconstruction of their position in relation to the coffin: the specific distance and the deposition of fragments on different stratigraphic levels was only possible during the process of backfilling of the burial pit (Fig. 3).

Tomb 4/94 (date group Naqada III D3) is a subterranean chamber tomb characterised by a massive substructure and a steep descent leading to an underground burial chamber.[28] The burial chamber was enclosed by a mud-brick wall and protected by a massive stone portcullis. However, the upper third of the portcullis was damaged by grave robbers and the fragments were randomly scattered within the descent. As a result, the underlying archaeological features were protected and could be documented in situ. A total of seven stone vessels were found here, scattered in multiple and very small fragments.[29] Interestingly, several fragments of the same vessel were detected in the entrance as well as in the undisturbed context under the portcullis. Apparently, the sherds were deposited after the deceased had been placed in the main chamber, but before the chamber was sealed and the portcullis was lowered, indicating their deposition as a ritual performance marking the closure of the tomb.

Furthermore, the mainly calcite fragments could be fully reconstructed into jars and bowls, and some of them are of above average size: bowl S05-155 has a maximum diameter of 68 cm, a height of approximately 14 cm and a total weight of 11 kg. The cylindrical jar S05-157 has a height of 62.5 cm and the jar S05-158 measures 50.5 cm with a total weight of 21 kg.

Similarly, the mentioned indicators of intentional destruction or at least an intentional deposition of prior fragmented vessels could be identified in 36 of the 218 tombs at Helwan, Op. 4. Due to their state of preservation, an evaluation of the archaeological context was only

26 Tomb 4/190 at Helwan, Op. 4 has already been discussed in more detail in Kuch 2021: 397–398, fig. 1a–b, and Kuch 2023.
27 Köhler 2016: 30, fig. 5.
28 Köhler 2017: 36–37, 363–380.
29 Köhler 2017: pl. 56–57.

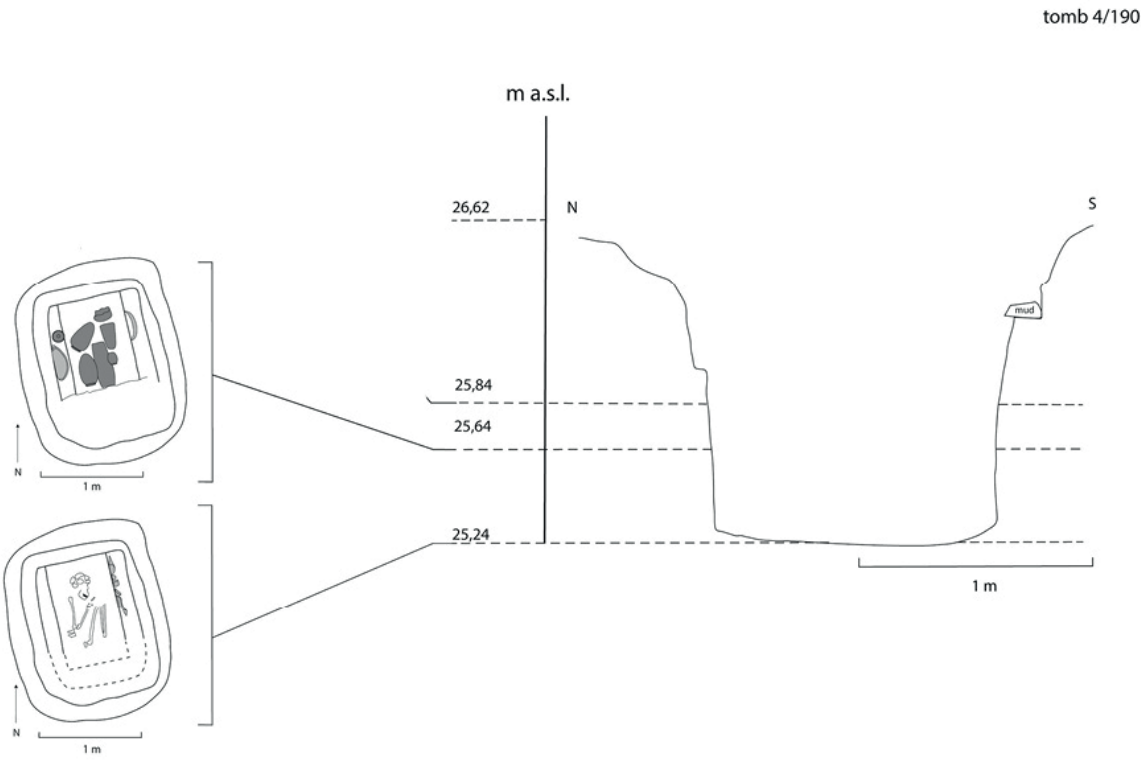

Fig. 3: Sketch of tomb 4/190 to visualise the different stratigraphical levels of the fragment deposits indicating a sequence of their placement during the backfilling of the pit. Graph © Helwan Project, adapted by N. Kuch

possible in 29 of them. Interestingly, the fragments found in the deposits of these 29 tombs could be reconstructed to a great extent resulting in 101 complete vessels.[30]

In search of more information, possible connections were investigated by analysing the fragmented vessels, the tomb construction and its inventory, as well as the age and biological sex of the deceased resulting in the following observations:

Out of the 29 contexts, 19 deposits are located in simple oval or rectangular pit tombs, and eight of these burials were discovered intact and considered as primary contexts, that offer the best evidence.[31] Another 7 pit tombs are considered to be good features, while 4 are problematic because of looting and destruction.[32] 10 deposits of vessel fragments occur in subterranean chamber tombs but are much more difficult to evaluate due to repeated looting and disturbances of the archaeological features.[33]

In the 29 tombs, 34 individuals were uncovered, and 25 of these could be anthropologically determined: 16 are biologically male (47 %), and 9 female (26 %), ranging in their age between

30 Kuch 2023.

31 These are the tombs: 4/14, 4/51a, 4/87,4/102, 4/120, 4/151, 4/177, 4/190.

32 Slightly altered examples, but with still good contexts are tombs 4/8, 4/55, 4/114, 4/136, 4/29, 4/134, 4/140. Showing more disturbances, but with some preserved parts, the tombs 4/73, 4/85, 4/87, 4/117 are considered as problematic contexts.

33 Tombs 4/94 and 4/116 revealed significant evidence in the well-preserved entrance area. Tombs 4/123, 4/153, 4/206 and tombs 4/46, 4/69, 4/90, 4/96, 4/139 are problematic.

infant (0–3 years) to mature adult (>46 years), with a peak on 13 middle-adult (36–46 years) individuals (38%).[34] Most of the deceased had been buried lying on their left side with the head to the north and facing east, but there are also variations possible.

So far, the examined aspects do hardly present any similarities that would allow to decide to whom and why such a specific aspect of burial practice is given. However, there are two distinctive elements that were repeatedly observed: in subterranean chamber tombs, the fragments are deposited at the lower end of the descent and directly in front to the burial chamber. In contrast, in simple pit tombs that do not have such a distinct entrance, the stone vessel fragments are located mainly in the narrow peripheral areas between the coffin and the walls of the burial pits. Matching fragments can also be placed at different stratigraphical levels, and sometimes a fragment is deposited in an additional depot of pottery vessels. As a result, these are specific, repetitive features of possible ritual performances that have been preserved within archaeological features, and which will be discussed as aspects of ritual performances in the following.

4 Fragments of a Ritual

Assuming that the deposition of deliberately destroyed stone vessels represents a ritual act, or the result of such a practice, their aforementioned characteristics need to be analysed.

Rituals are regarded as symbolic actions that can be found in almost all fields of cultural life and are closely linked to social interaction and identity. Essentially, rituals serve to convey specific ideas and are therefore a tool for communication in a wide variety of contexts. Thus, ritual can be defined as a specific type of social behaviour that can be learned, understood and inherited. As such, ritual behaviour is part of a socialisation process within a culture- or group-specific habitus. In this sense, rituals have a twofold function, as they communicate meaning and reflect social aspects through performance. Simultaneously, these aspects are received, shared and passed on in a meaningful way through the acceptance and participation of a community.[35] After Alex Michaelis and Jan Platvoet, rituals are consequently regulated actions that fulfil certain criteria, which, depending on the context and dynamics, can be prioritised differently and are therefore polythetic. Such criteria or characteristics are key symbols, performance, localisation, and formality.[36] They are used to structure ritual actions in order to distinguish them from other actions. Further, these actions are specific and characteristic,

34 Overview given in Marshall 2021; in detail see also Köhler 2014; Köhler 2017; Köhler 2021. However, it should be noted that these data derived from 29 of the 218 tombs that were located in the artificially selected excavation area. In contrast to the 10,000 only marginally investigated tombs at Helwan this can hardly be considered statistically significant. Nonetheless, it is apparent that the practice was not exclusively restricted to men. Cf. Kuch 2023.

35 Krieger/Belliger 1998: 7; Michaels 2003: 3–5.

36 Michaels 2003: 4f.; Platvoet 1998: 187.

and are therefore recognisable and perceivable as typical for a specific ritual.[37] This means that rituals are sequences of actions that are standardised and mandatory to a certain extent, while other aspects can be varied as long as the basic features of the ritual are still recognisable.[38] This will be discussed and demonstrated on the basis of the mentioned aspects of rituals: key symbols, performances, localisation and formality.

4.1 Stone vessels as key symbols in context of transformation and performances

Regarding their shape and material, in other words, their materiality, the specific fragmented vessels are no different from other vessels found within the mentioned tombs.

Most of the vessels are simple bowls (72 pcs.; 71 %), cylindrical (20 pcs.; 19,8 %) or ovoid vessels (9 pcs.; 8,91 %). Chosen materials are calcite (72 pcs.), limestone (20 pcs.) or siltstone (7 pcs.) and gneiss (2 pcs.).[39] As these are the most common materials and forms concerning stone vessels during the Early Dynastic Period, it can be assumed that the chosen vessels only have undergone a change in meaning or connotation through their use in ritual contexts. And the new function as ritual objects thus becomes part of their object biography as well as the act of fragmentation.

The object biography starts with the manufacture of an item and is produced according to an intended purpose which can be considered its main or primary function.[40] The Early Dynastic stone vessels are generally assumed to have a purpose as containers used for storing or serving in the funerary context, and which is therefore the primary function and reason for their production. However, certain vessels are given a complete fragmentation, whereby this primary function is no longer available, and things can be used in other ways according to the user's intention. Such a transformation or reinterpretation of these specific vessels is achieved through a specific treatment of the object, which is preceded by a change in the ascribed meaning. So, because of the performative act of fragmentation, these vessels are initially recognisable as characteristic key symbols within the burial contexts. Accordingly, key symbols experience an appropriation of meaning that can be expressed via an operational dimension.[41] The meaning of the vessels is therefore not inherent to the object, but changes according to how they are used and in what context. The vessels thus become carriers of meanings that are projected onto the object. In other words: It is only through human attribution that things become active

37 This means that specified objects, texts or gestures are to be used for a particular ritual. These clarify which ritual is intended and may not be changed in the interests of general recognition: imagine the potential confusion of dyeing eggs for Christmas.

38 Humphrey/Laidlaw 1998: 148.

39 Kuch 2023: 139.

40 Schreiber 2013: 65–66.

41 Meier/Zotter 2013: 137, 139.

carriers and mediators of meaning, and the stone vessels are transformed into active actors of communication.[42]

Nevertheless, only some vessels revealed destruction through the deliberate use of tools. The destructive act itself is considered a dramaturgical moment, but that is only implied by recognisable cut marks, and of course by the fragments and splinters. However, the broken pieces only indirectly refer to the performative act of destruction. And the fragments as such only have limited informative potential. Only in an archaeological context do the fragments reveal more information and it can be decided whether the fragmentation was accidental or deliberate. The performative act of destruction, however, is ephemeral and not archaeologically recognisable. So, we must focus on another aspect of performance, that is preserved in the archaeological features: the position of the vessel fragments and their spacial relation to the deceased.

In the notion of performance as a conscious and multimedial presentation of key symbols, the process of deposition becomes an essential moment of the ritual act. This is particularly the case, as archaeological evidence has shown, when the fragments were located in specific places within the tombs and even at different levels in the tomb's stratigraphy.

As mentioned above, the subterranean chamber tombs provide evidence that fragmented vessels were deposited in the entrance area and in the context of the closure of the tomb. Pit tombs, in contrast, lack such a prominent entrance area. Still, the performative aspect of the deposition within the pits can be emphasised by the documented stratigraphy. The deposits of fragmented vessels mentioned in tomb 4/190 were situated at the bottom of the pit and in an upper layer above the coffin (comp. Fig. 3). This stratigraphical difference can only be achieved if the deposits were placed during the backfilling of the pit. A similar situation can also be observed in some other pit tombs and allows for the reconstruction of a complex of performative action: at first, the deceased was buried in the centre of the pit, often in a coffin and sometimes accompanied by some grave goods. Regarding their proximity to the deceased, these grave goods are usually considered personal belongings. Further, the intentionally fragmented vessels were orchestrated along the sides of the coffin. In some cases, matching pieces are placed at higher levels of the tomb during the backfilling and therefore the closure of the tomb. The act of fragmentation and the deposition afterwards can therefore be emphasised as a dynamic process through which meaning or meaningful content is represented and can thus be regarded as constitutive action.[43]

Performances are often non-verbal or expressed through the use of facial expressions, gestures, clothing, or music etc. And such key symbols must be symbolically connoted so that the participants in the ritual can still recognise and understand their meaning.[44] Even if these expressions and meanings are ephemeral by nature and long gone, the deposits visible in the archaeological features can still be seen as direct results of these ritual actions.

42 Philipp Stockhammer argues for the term 'effectancy' to emphasise that things do not literally 'act', but rather have an effect on people based on the ascribed connotation. Cf. Stockhammer 2016: 336; Keßeler 2016: 344–345.

43 Krieger/Belliger 1998: 9–10

44 Harth/Michaels 2004: 10, 17; Tambiah 1998: 230. Concerning Early Dynastic burial practice, such aspects are hardly traceable or preserved within the archaeological sources.

4.2 Localisation and formality of fragment depositions

The examination of the fragments within their find context allows further conclusions to be drawn about two other important characteristics of ritual practices: localisation and formality. According to both Michaels and Platvoet, localisation corresponds to a specific place and time of a ritual. This means not only a certain point in time for the performance of the entire act, but also certain moments within the ritual process that highlight and frame specific actions.[45]

Concerning the fragmented vessels, their object biographies provide a relative chronological localisation within the context of the burial. As mentioned above, the specific deposits contained all the fragments and even the smallest chips, so that the vessels could be almost completely reassembled, indicating that their destruction took place directly at the tomb. The stratigraphy of their deposition show that the broken vessels were placed during the closure of the tomb. Consequently, the act of fragmentation and the performative deposition constitute a sequence of funerary practices that take place between the interment of the body and closure of the tomb.

Within this framework, it is the formalised arrangement of the fragments that emerges as a repetitive element in the tombs. Formality, as a ritualised characteristic, refers to the standardised, repetitive, and thus recognisable and meaningful sequences of ritual behaviour.

The ritual acts are communicated non-verbally or through codified verbalisations. Adhering to a form is necessary so that the participants can recognise a certain aspect of the ritual and respond accordingly. In other words, there is a need for determined key symbols and regulated processes which, as essential features of ritual behaviour, are not allowed to be changed. And it is eventually these same formal fixations that are reflected in the archaeological features.

As the deposits of vessel fragments only concentrate in the entrance of subterranean chamber tombs, these formalities can be followed best in the intact or well-preserved pit tombs. Where possible, deposits of vessel fragments are separated from other grave goods. And the fragments were mainly to be found in the side areas between the coffin and the walls of the burial pit. Moreover, there seems to be a connection between the placement of the fragments and the orientation of the deceased, as the deposition was often organised in front of them. If the burial was oriented towards the east, the fragments were also found lying along the eastern side of the tomb. If the orientation of the burial differed, e.g. the head was oriented towards the south and the face towards the east or west, then the fragments were also adapted to the respective orientation (Fig. 4).

Although fragments of a vessel may have been placed at varying levels, the side in front of the deceased was selected for the initial deposition. Subsequently, further deposits were made on the other sides of the pit, and at different levels. However, it should be noted that such depositions were also found on all sides around the coffins. The choice of their placement is therefore less formalised, and variations are possible. Nonetheless, the observed tendency to position the fragments in front of the deceased is striking, even if the meaning of this may be lost.

45 Michaels 2003: 4, Platvoet 1998: 175–182.

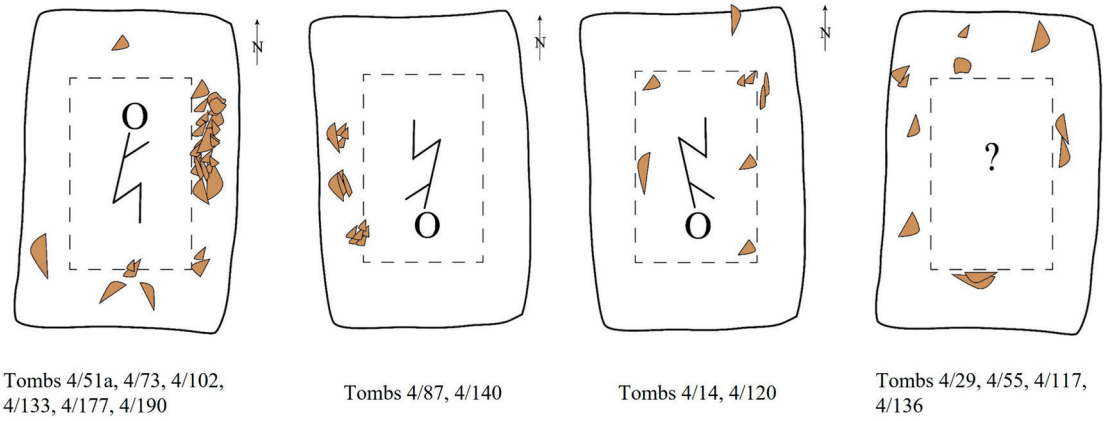

Fig. 4: Scheme illustrating the distribution of deliberately placed vessel fragments in relation to the orientation of the deceased, Helwan, Op. 4 (by N. Kuch)

Based on these observations, it is possible to discern a spatial structure and organisation of the space within the burial pit: in the interpretation of burial goods, a generalised differentiation is typically made between personal belongings and general tools and supplies. Adornments such as bracelets, necklaces, or toiletries, for example, are located close to the deceased and are therefore considered as personal belongings. In contrast, equipment and storage jars that are meant as supplies in the hereafter, are located in side areas of the burial pit or in additional storage chambers. The fragment deposits are located in the immediate vicinity of the coffin, in the side areas of the pit tombs or in the entrance area of the subterranean tombs. So, it seems plausible that the spatial arrangement of the grave goods indicates a separation based on their function, and that the fragmented vessels do not seem to belong to either of these two categories. Probably, they might be neither part of the personal belongings placed close to the body, nor of the supplies and equipment to ensure continued existence in the afterlife. As a result, and in the author's opinion, the burial space is not only to be organised in two but rather three areas: An inner area, as a sphere of direct mortuary treatment and equipment. In reference to Janulíková this is also the minimum of an ideal burial. In a second, outer sphere, there can be additional equipment and supplies as well as conducting final ritual acts at the tomb. Also, these may take place after a certain time or be repeated regularly and relate to maintenance of the funerary practice by the family or community.[46] This reveals a ritual structure where fragment deposits occupy an intermediate position, not only through their location in the side areas but also between these two spheres. The deposits are regarded as visual markers and create a third, more ephemeral sphere between the two mentioned, and in which fragmentation and deposition play an essential role as part of culturally immanent practices for the living.

46 Comparable aspects during the Old Kingdom are discussed by Fitzenreiter 2006: espc. 75–106.

4.3 Preliminary conclusions on a ritual of fragmentation

Based on the observed patterns, which were considered characteristic aspects of ritual performances, it was possible to identify further comparative depositions of vessel fragments in Early Dynastic cemeteries in Northern and Southern Egypt. Looking for these characteristics, they can even be recognised in photographs of older archaeological publications from the 20th century. And even if the stratigraphic information is lacking, it is possible to detect noticeable accumulations of fragments in direct vicinity to the deceased and mainly at the ground of pit tombs.

In total, over 100 tombs could be identified in 9 cemeteries including Helwan, Op. 4 (36 tombs), Macramallah's Rectangle (34 tombs) and Naga ed-Deîr (27 tombs, areas N 500, N 600, N 3500, N 3000). In the author's opinion, there are also occasional examples to be found in Elkab and Abydos, or in the Delta, e.g. in Abu Roash and Turah, or Tell el-Farkha and Tell el-Murra.[47]

Regarding the aforementioned observations, there are significant similarities, which will be summarised in regard to the observations made in Helwan. Depending on the published information, the deposits of vessel fragments were analysed in question of a possible relationship to the burial type, the age and biological sex of the deceased, as well as relation to other grave goods.

As a first summary, these deposits occur in burials of men, women, and children of different ages. There are also differences in the construction of the tomb and the composition of the grave goods. So far, no common feature has been identified to indicate for whom such a ritual deposit was or was not made.

A comparison of the grave inventory, especially of undisturbed tombs, shows that fragment deposits can also occur in tombs with few or no grave goods. This suggests a certain prioritisation of such deposits. Especially when it comes to the absence of grave goods of a certain priority according to Janulíková, the fragments are even given a higher significance compared to the postulated ideal burial equipment. Furthermore, a certain correlation between the increase in the size of the tomb and the quantity of grave goods is apparent. This can be an increase number of depositions for one burial, and even in an increase in the quantity or size of the fragmented vessels.

However, the number of well-documented burials is too small to draw any reliable conclusions, and it has become clear that there are significantly more tombs without such deposits in all the cemeteries analysed. Nonetheless, the previously made observations imply that fragment deposits might hold more significance compared to other grave goods: and if such deposits are present, they could constitute a part of a grave inventory with higher priority (Fig. 5).

47 Summarised in Kuch 2023; for Elkab compare tombs 5, 39, 64, cf. Hendrickx 1994. The plan of the Abydenian Tomb M 18 by Petrie reveals some incidence about the position of a broken vessel, cf. Petrie 1902: 16–18, pl. xliv, xlviii. For Abur Roash compare tombs 926, 365, M21 in Klasens 1958 and Klasens 1960. In Turah, possible evidence can be found in the tombs 12p3, 19m5, 18k3, 15h15, see description and plates in Junker 1912. Possible deposits derive in tombs 63 and 126 of Tell el-Farkha, cf. Czarnowicz 2018: 99–106, pl. XV.1; Dębowska-Ludwin 2018: 23. For the confirmation of comparable deposits in tombs 2 and 7 in Tell el-Murra, my special thanks go to Grzegorz Bąk-Pryc and Mariuz Jucha, cf. Jucha et al. 2014: 143–145 with figs. 2, 3, 5; Jucha et al. 2015: 204–205, fig. 9.

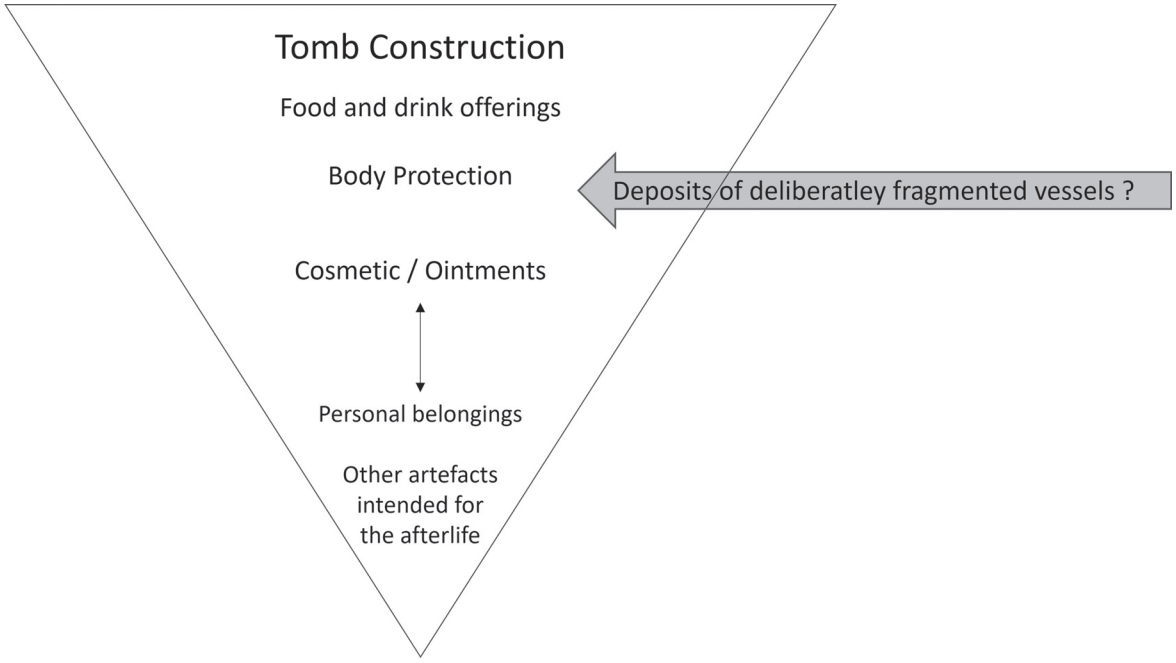

Fig. 5: Possible prioritisation of a ritualised fragmented and deposited stone vessels based on the observations made in Helwan, Op. 4 compared to an ideal burial equipment by Janulíková 2018: 274, fig. 8.2 (adapted by N. Kuch)

These variations, and in particular the fact that not every tomb possessed fragment deposits, indicate that such depositions cannot be an formalised integral part of a required funerary ritual. The reasons for such depositions are more likely to be found outside the funerary context and may be linked to other social or communal factors. Nevertheless, when depositions of fragments do occur, they follow certain formalities, which are expressed in the spatial organisation of the grave goods and can be recorded in well-preserved and adequately documented archaeological finds.

5 A broader perspective on intentional fragmentation as a cultural habit

In the context of the above study, the question arises whether the deposition of deliberately fragmented stone vessels is a unique Early Dynastic phenomenon. In other words, are there similar instances of destruction observed in other categories of so called small finds, so we can consider the practice of deliberate destruction as embedded in ancient Egyptian culture?

In this respect, predynastic fishtail knives and ripple-flaked knives represent the oldest group of such objects dating to Naqada I-II, and decreasing in number until the End of Naqada III. For the fishtail knives, only vague and general comments on intentional fragmentation can be

found, e.g. fishtail knife E11250, probably from Abydos, display a distinct hole.[48] However, the aspect of a possible deliberate manipulation or destruction remains behind the detailed discussion about a possible ritual use of the knives.[49] More explicitly, Stevenson discussed the deliberate fragmentation and orchestrated deposition of the fragments of some ripple-flaked knives found at el-Gerzeh.[50] There is also an illustration of a ripple-flaked knife in Petrie's publication on el-Gerzeh, which shows a distinct cut mark.[51] Of particular note, though, is tomb 25 (Naqada IIC-IID1), which was found intact by Petrie. Referring to Petrie's documentation, Stevenson noted a fragmented ripple-flaked knife next to a granite vessel, and both were found in halves. Confirmation of this information requires further evidence, however, the discovery of a deliberately broken stone vessel next to a potentially treated knife is noteworthy.[52] Similar incidences are mentioned for Naga ed-Deîr, e.g. tomb 7454,[53] or Abusir el-Meleq. For the latter, the excavators reported that all the splinters from the knives were found and suspected that the pieces were deliberately broken and ritually killed.[54]

Concerning the time of the Old Kingdom, several incidences of destructive manipulations are discussed in Egyptology. One of them is the object group of the so-called 'reserve heads' found in shaft tombs of the 4th and 5th Dynasties. The destructive elements are broken noses and ears, as well as fine incisions on the neck or forehead. Intentional fragmentation or manipulation is thus given limited attention or ignored entirely, revealing once again the importance of a noteworthy awareness of intentional destructive behaviour. However, when the destruction is noted, it is interpreted as being intentional and discussed in the context of a variety of ritual practices, including ritual killing.[55]

Also, for this period, Lucie Jirásková described noticeable damage on several canopic jars found at Abusir South that were considered to be cut marks. Furthermore, some effort was put into their repair, by filling a mortar-like substance into the holes and their surface was subsequently smoothed.[56]

Furthermore, intentional fragmentation is the subject of Gianluca Miniaci's study of the group of faience figurines from the Middle Kingdom. Likewise, for the group of execration figurines of this time.[57] The evidence from the Mirgissa Deposit[58] and the aforementioned execration texts published by Sethe also belong to this context. For the New Kingdom, deliberate fragmentation is discussed in relation to certain objects placed in temple deposits. In 2014,

48 Hikade 2011: 220, fig. 78, Nr. OIM E11250.
49 Stevenson 2011: 72; Ciałowicz 1985: 162–163. Interestingly, the inventory lists of Pap. Abusir contain references to the repair of such fishtail knives (psš-kf). However, fragmentation can only be implied here, and it is unclear whether the pieces broke accidentally and through long-term use. See Graves-Brown 2011: 209.
50 Stevenson 2009: 113.
51 Petrie 1912: pl. VII, no. 12.
52 Stevenson 2009: 113.
53 Dunham 1965: 278–279, figs. 124a–b, fig. 125c.
54 Scharff 1926: 46, pl. 29.
55 A summary and further bibliography can be found in Mendoza 2017.
56 Jirásková 2015.
57 Miniaci 2017; Kühne-Wespi 2023.
58 Vila 1963: 142–147, figs. 6–8.

such a depot was found in the Ptah Temple area at Karnak, and its detailed archaeological documentation was used to create a 3D model that allows to trace a ritual deposition process of the previously fragmented objects.[59]

There are numerous other examples of intentionally fragmented objects in most periods of ancient Egyptian culture. Although it is important not to interpret these as a linear evolution of an universal ritual practice, but rather to evaluate these individual cases in their respective setting. Nonetheless, the aspect of destructive manipulation and ritual transformation of objects in certain situations seems to be a common practice in ancient Egypt.

5.1 The breaking of the red pots: an epilogue?

The most essential destructive ritual known from ancient Egypt, and which can also be traced over a long period of time, is the so called 'ritual of breaking the red pots' (sḏ dšr.wt). Even if no direct connection should be made to the deliberate destruction of Early Dynastic stone vessels, some interesting similarities concerning ritual formalisation can be identified.

Attested in archaeological contexts as well as inscriptions and pictorial sources, this performative act was first mentioned by Aylward Blackman in 1924 and is extensively discussed in Egyptology since then.[60] One of the best-known examples of this ritualised performance of breaking red polished pottery vessels is displayed on reliefs in the tomb of Horemhab in Saqqara dating to the New Kingdom. In the scenery of a funeral procession and in front of a pavilion-like structure, the reliefs depict broken pots lying on the ground. However, the ritual of breaking the red pots already appears in much older sources of Old Kingdom burial rites. The oldest written reference can be found as a ritual instruction to Pyramid Text 244, and Blackman established a link between the act of breaking and the funerary offering rites. He also suggested that the fragmentation was carried out during the closure of the tomb.[61] This somehow resonates with the previous observation regarding the formal localisation of vessel fragments deposited in Early Dynastic burial. But further evidence can be found within the late Old Kingdom offering lists.

Defined as 'Type C' by Winfried Barta, these standardised offering lists are part of the funerary decoration programme. They accompany the so-called 'offering scene', which depicts the deceased in front of a richly laid table of offerings to secure the dead's provision in the afterlife. Additionally, these lists contain a wide range of objects, foods and beverages, and clothing. As such, they constitute a transposition or replacement of the physical grave goods and transfer their representation to the decoration of the tomb. Furthermore, these categories can be extended by ritual instructions, for example burning of incense, libations, the ritual of erasing the footprints, and the breaking of the red pots. The offering lists thus illustrate a

59 Charloux et al. 2017.
60 Recently by Hertel 2019 with further literature.
61 Blackman 1924: 50–51.

formal structure and organisation of grave goods as well as ritual performances, similar to the one found in the ritual spaces of Early Dynastic burials.

In the author's opinion, there seems to be a continuation of ritual formalisations, but with an adaptation, as they are now translated into writing and continued in the medium of funerary decoration as a complement or even a substitute for ritual practices.[62] Nevertheless, there is a time hiatus and especially due to the lack of data from the transition of the Early Dynastic Period to the Old Kingdom, it remains unclear, if the destructive ritual came to an end or was changed, and further research needs to be done here.

The fundamental principles of destructive practice cannot be reconstructed from the historical sources available so far, but economic reasons could be a possible explanation for an end or a modification of this specific ritual action. Towards the end of the Early Dynastic Period, a gradual decrease in the stone vessel production is noticeable. The number of stone vessels found in the archaeological context declined, and the variety of forms and the materials used is hardly achieved again in the following epochs. This decrease is believed to be due to economic changes, and such external factors can also have potential pressure on ritual acts.

In fact, the destructive ritual requires large quantities of material and useful mass products, as stone vessels, that were withdrawn from the economic cycle. It is possible that this extensive consumption of resources was no longer economically sustainable. The required quantity or quality of key symbols, for example, is no longer affordable. Thus, mundane factors can also have an explicit impact on the formalised ritual traditions and may bring them to end or massive change. It is therefore conceivable that the ritual destruction of stone vessels also came to an end at the transition to the Old Kingdom. Alternatively, it is possible that the ritual was adapted to the economic changes and continued with pottery vessels. But these are other fragments of social history that would be interesting to follow another time.

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62 Comparison for the Old Kingdom cf. Fitzenreiter 2006.

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“Stone vases are not satisfactory”

On the Importance of Stone Vessels in the Pre- and Early History of Egypt. Examples of Vessel Materials from the Royal Tomb of Den in Abydos

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Abstract

Stone vessels have so far often been understood as a phenomenon of prestige within Egyptology. However, the study of this material provides a much more comprehensive and exciting insight into the functioning of the various economic networks. As an example of the 1st dynasty, the following section looks at the collection discovered in the royal tomb of Den in Abydos. The processing of the material was intended from the outset as a practical example, which will make it possible to document other stone vessel groups in a similar form in the future and thus make them comparable. In addition, the study of production, sources of raw materials and stone vessels as an important medium for writing in the Early Period plays an important role.

1 Introduction

Similar to pottery, stone tableware represents a special and important category of objects for the archaeology of pre- and protodynastic Egypt. Unlike clay vessels, however, stone vessels are classified in Egyptology and Near Eastern Archaeology as so-called “small finds”[1], not least because of the sometimes unusual and unique raw materials. Rarely, and mostly in elite-tombs, stone vessels with inscription were recorded, and therefore belong to yet another special category in the stone vessel material. On the other hand, stone vessels represent a category of finds, which is also not so often found in cemeteries and settlements, especially not in larger quantities. However, this fact is considerably changing when moving to high-elite contexts such as royal tombs. As will be exemplified in this overview, in the royal necropolis, stone vessels are quite numerous and are considered among the prestige goods of pre- and early dynastic

1 Martin 1993. Some archaeologists list these kinds of objects also in the category of “other objects”: cf. Köhler 2014: 71, even-though stating “artefacts which are not classified as pottery, so-called Small Finds, were …”.

Published in: A. Kilian, A. Pruß, M. Zöller-Engelhardt (eds), Excavating the Extra-Ordinary 2. Challenges and Merits of Working with Small Finds. Proceedings of the International Interdisciplinary Workshop at Johannes Gutenberg University Mainz, 25–26 November 2022, Heidelberg: Propylaeum, 2024, 159–179. DOI: https://doi.org/10.11588/propylaeum.1382.c19774

Egypt as an "obsession of the elites"[2]. They combine several aspects: special raw materials, some of which have to be procured at considerable expense, special manufacturing know-how, their durability, which predestines them to be the first choice for permanent grave goods, and last but not least, a special symbolism of colour and material.[3] They are often interpreted as indications of the emergence of the state structure, the formation of a status-orientated elite, and the emergence of specialised crafts.[4] However, the basis and starting point for these hypotheses remains extremely poor to this day and it is therefore surprising that stone vessels have played a rather subordinate role in Egyptological research literature to date. The focus of research has primarily been typological starting with Jacques de Morgan. However, even these typochronological approaches have hardly been ascribed any great significance, as an important quote from the British archaeologist Guy Brunton illustrates very well: "Stone vases are not satisfactory : they are not sufficiently common ; they were used and re-used in daily life, and very often buried only when worn out."[5] In the course of the German Archaeological Institute's excavations in the tomb of King Den (1st Dynasty) in the necropolis of Abydos, several thousand fragments of stone vessels were documented, which led to a detailed examination and study of the material. Therefore, the following article will highlight and outline some important results and aspects.

2 The stone vessels in the tomb of King Den in Abydos

The royal necropolis at Abydos is situated at a wadi edge and contains elite and royal tombs dating from the late 5th Millennium BCE until the end of the 2nd Dynasty. The tomb of king Den, fifth king of the 1st Dynasty, is situated in the very centre of this necropolis (Figs 1–2). The history of this particular tomb is very complex, resulting from various stages of ancient and modern robbery, secondary burning, and multiple excavations beginning in the late 19th century.[6] Despite the destruction by Coptic agency and robbery, objects and tomb inventory have been relocated due to the depositions of the Osiriscult-rituals in Antiquity[7] and different archaeological interventions starting with Émile Amélineau[8] and William Flinders Petrie[9].

2 Seidlmayer 2009: 318.
3 Kuhn 2018: 135–139.
4 Hendrickx 2011.
5 Brunton 1927: 6.
6 Müller 2021: 48–54; Müller 2006: 37–38; Müller 1998: 147–149.
7 Müller 2021: 48–54; Müller 2006; Effland/Effland 2013.
8 Amélineau 1899.
9 Petrie 1900; Petrie 1901; further excavations have been undertaken in the area by E. Naville – cf. Naville et al. 1914: 35 with pl. VIII. Another excavation appears to have been carried out by W. B. Emery, although no documentation of this is known to date: cf. Dreyer 1990: 72.

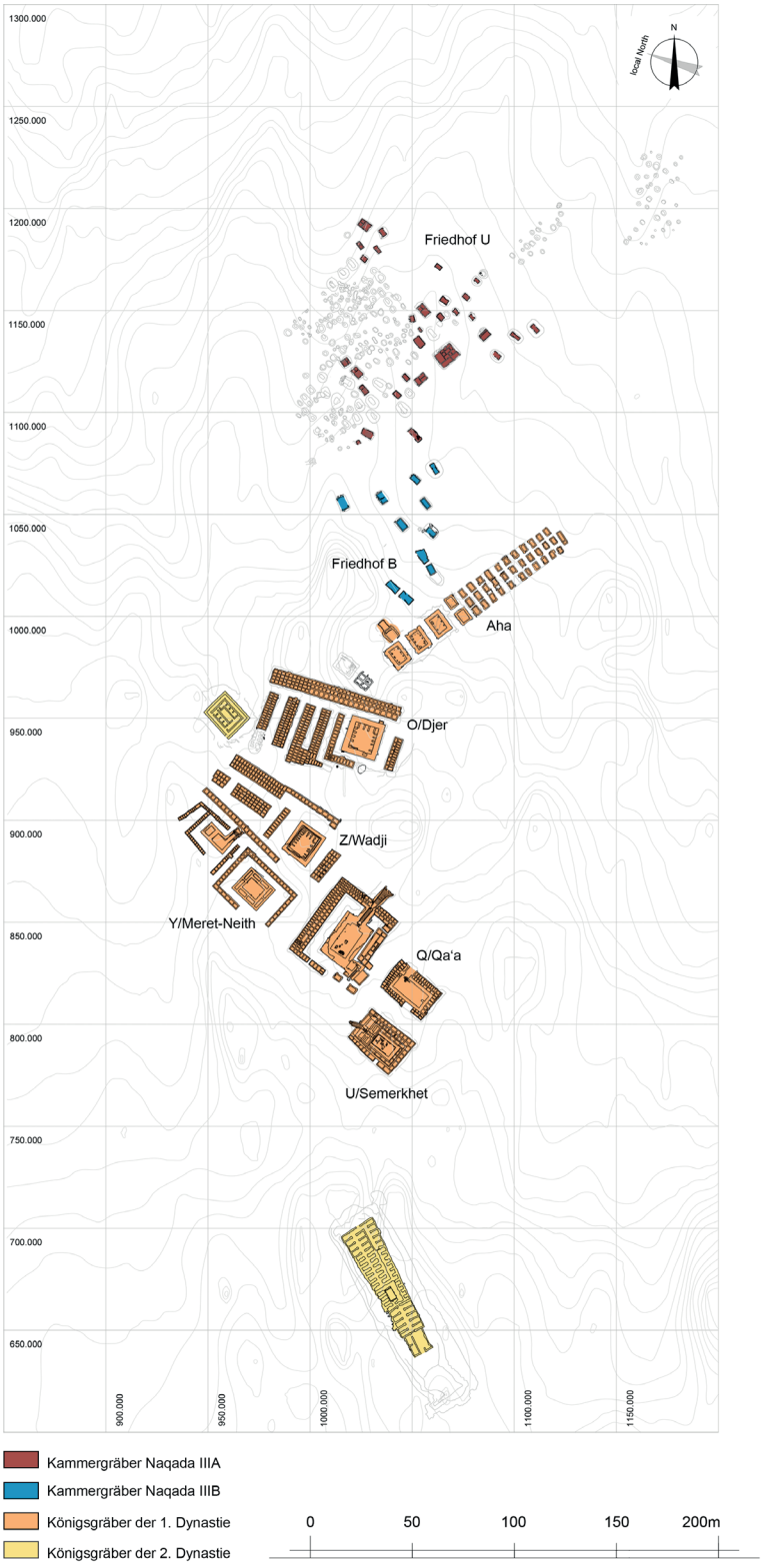

Fig. 1: Plan of the necropolis of Umm el-Qa’ab, Abydos; © DAIK, M. Sählhoff, with kind permission

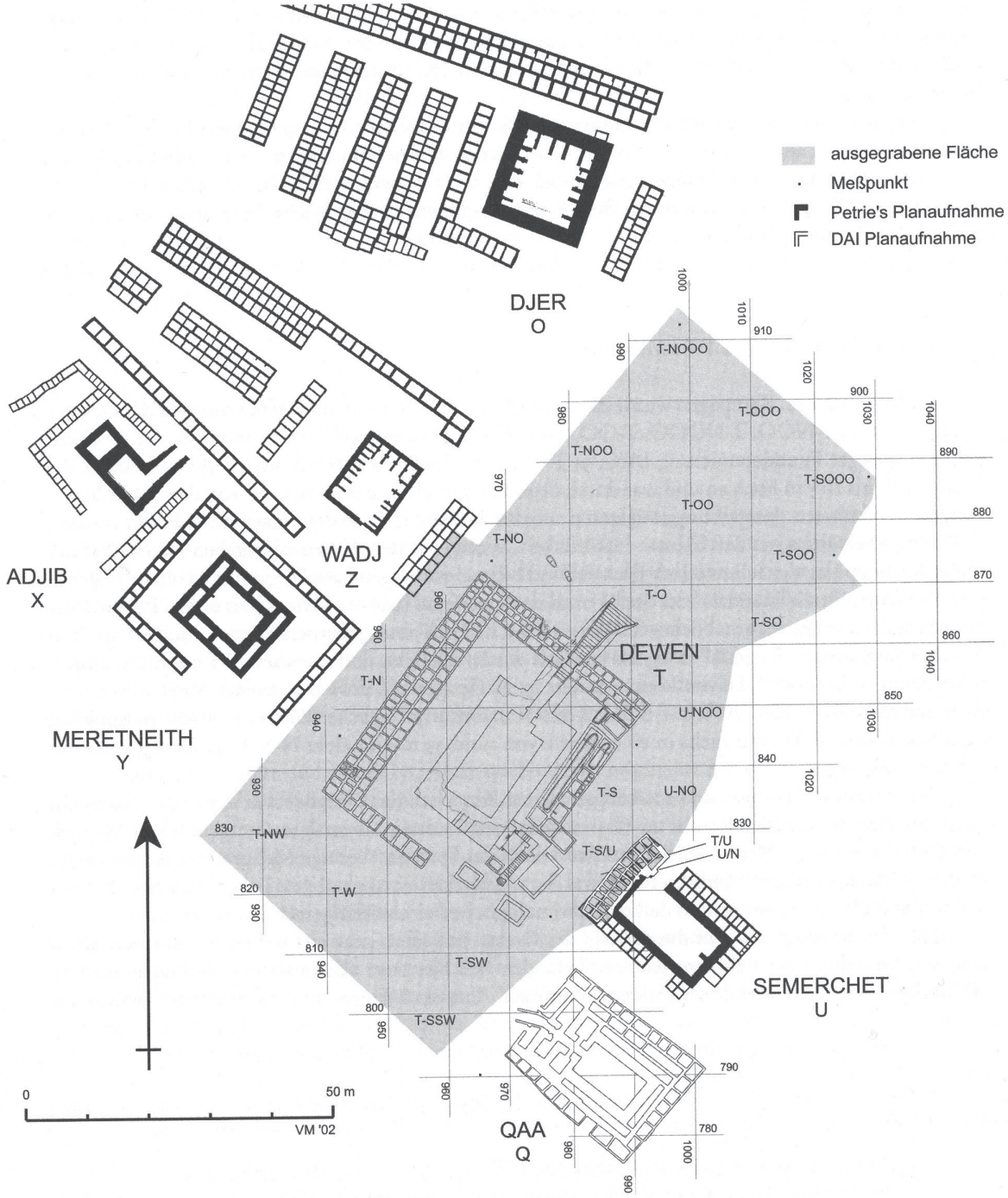

Fig. 2: Plan of the surrounding area of king Den and the spoil-heaps;
inlay: V. Müller, 2002, after G. Dreyer et al. 2003: fig. 8; with kind permission

During the re-excavation of the German Archaeological Institute, the tomb of Den as well as most of the surrounding area including the spoil-heaps from previous excavations have been examined by the late Günter Dreyer and Vera Müller.[10] This time-consuming investigation has provided us with a lot of new material and information.

About 20,700 fragments of stone vessels were discovered in the described excavation area.[11] In most cases, they were highly fragmented, and hardly any of the objects could be recovered intact or *in situ*. They were found in the king's chamber (Fig. 2, T-KK), in the magazines and in large amounts in the adjacent spoil-heaps. In addition, much of the material shows severe burning and prolonged exposure to heat has caused demineralization and even melting. This mass of finds naturally posed a particular challenge for documentation and processing. Above all, the difficulty that almost none of the pieces were found *in situ* made it important that the origin or context of the find was also recorded on the fragments themselves. This was done by using lightfast markers, and so each fragment was labeled in a lengthy, time-consuming process – a work which was undertaken by the excavator Vera Müller. To process the stone vessels, the next step was to separate the available material into raw materials and then roughly pre-sort them into vessel shapes (Fig. 3). Despite intensive attempts, it was difficult to join the pieces, as burnt and unburnt fragments are sometimes matching, making it a labour-intensive task. Nevertheless, it was possible to reconstruct a certain amount of vessel profiles at the site, as well as with the help of material scattered worldwide in different museums and private collections such as Brussels, London, Berlin, Cairo, and so forth.[12]

2.1 "Typology at all costs..."

In addition to the reconstruction of the vessel forms, it was also an intriguing task to deal with the documentation and typology. Starting with Jacques de Morgan[13] and William Matthew Flinders Petrie, typological work on the stone vessels was provided in the early days of Egyptology (Fig. 4.) The categories and types published were usually a mix of the raw materials, vessel forms, and the attributed – but mostly speculative – function.[14] The lack of clear and

10 For more details see the preliminary excavations reports: Dreyer 1990: 72–79; Dreyer 1993: 57–60; Dreyer 1998: 141–147; Dreyer et al. 2003: 88–89; Müller 2003: 89–102; Müller 2006: 73–92.

11 Kuhn 2017; Kuhn forthcoming.

12 This is likewise attested for the stone vessels from the tomb of Qa'a: cf. Engel 2017: 352. Already Engel and others have pointed out that many of the possibly joining fragments are housed today at different museums. Although Petrie reported leaving some of the fragments near his excavation house – which to a certain amount could be verified by the American team – it seems likely that a vast part of this material is now housed in the museum in Brussels, the Petrie Museum and to a smaller amount in other collections world-wide.

13 De Morgan 1896. Even if De Morgan never explicitly speaks of a typology, his classification of the stone vessels, which he presents in several illustrations, is at least a first step in dealing with the different forms and variations.

14 This is especially true for the typological work of De Morgan 1896; Petrie 1901; Petrie 1937; Bonnet 1928; Reisner 1931; Emery 1938 sq.; Klasens 1958 sq.; El-Khouli 1978. The approach via the raw material originated, for example, from Alfred Lucas (1930) and, more recently, Barbara G. Aston (1994). Recently, some more authors have followed the approach of presenting the available material via the raw material rather than the vessel form, e.g. Engel 2017.

Fig. 3: Sorting and processing stone vessels in Abydos, © DAI-K, R. Kuhn

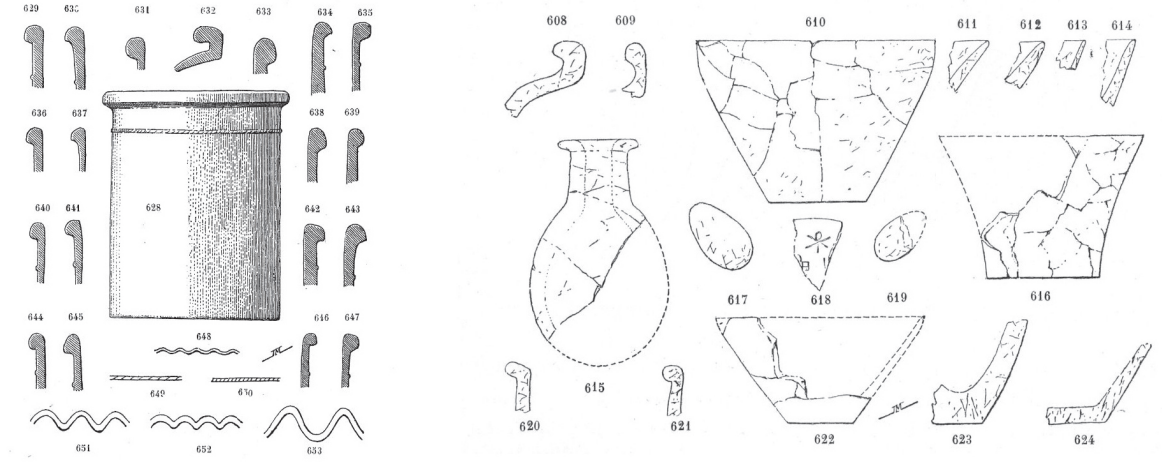

Fig. 4: First attempts towards a typology for stone vessels can be found in the publication by de Morgan 1896: fig. 629–653 (cylindrical beaker made of calcite alabaster); and fig. 608–628 (vessels made of quartz). These vessels were found in the so-called Royal Tomb at Naqada

objective categories, as well as a distinct definition, is problematic and, in the end, not useful for fieldwork. Therefore, most of the stone vessel aficionados are trying to establish their own typology, which of course does not help very much for an inter-side comparison, etc. This is particularly evident in the classification of vessel shapes such as plates, bowls, dishes, and bowls, which can ultimately differ greatly depending on the author. A handbook for this kind of material is still a desideratum in Egyptology.[15]

Thus, when reprocessing the Abydos material, a more objective methodology was selected, which is ultimately based on ceramic processing using the vessel index (v_i) and has been established in Egyptology by Rostislav Holthoer and Hans-Åke Nordström.[16] They worked with the help of metrical characteristics that can be clearly assigned to the individual forms. In stone vessel processing, this method was first tested in 1988 in the context of publishing a private collection, but has hardly been used to date.[17] In addition to Rudolf Wellauer, Peter Günther and Petra Vlcková[18] there are above all Stan Hendrickx and Stijn Bielen who have also documented stone vessels, using and adapting the vessel index system,[19] and have recorded as well as documented material from the old excavations at Abydos in this way.[20] The result is not only the implementation of an objective and good working system, but also the possibility of comparison with other, already recorded and numerically large convolutes.

Diagnostic material such as rims and bases could be differentiated into restricted (R) and unrestricted (U) vessels and their subclasses (Fig. 5).[21] In a second step, the nondiagnostic material has been connected with these vessel classes as well.

A quantity of minimum individuals for the very vessel forms could be finally calculated by employing the Estimated Vessel Equivalent-system.[22] As a result, at least more than 2,300 different stone vessels were identified in the area of King Den's tomb. A very high percentage of about 43 % can be attributed to cylindrical beakers without (938) and with plastic rope-band application (126 + 209), mainly produced of calcite-alabaster. A high quantity of unrestricted vessel forms, such as cups, bowls, and plates – likewise produced of calcite-alabaster and greywacke – are also present in the material.[23] Although the characteristic "Leitforms" of the 1st dynasty dominate, such as cylindrical beakers, a high variation of about 33 different vessel forms is found in the tomb of Den, some of which are only present in very small quantities: these include, for example, vessels decorated in high relief, imitations of wine jars, miniature and dummy vessels, and so forth (Fig. 6).

15 First attempts were made by Petrie 1937 and Aston in 1994, which should not be minimized at this point, but nevertheless both publications show many gaps and difficulties.
16 Holthoer/Nordström 1977.
17 Günther/Wellauer 1988.
18 Vlcková 2006.
19 Hendrickx 1990; Hendrickx 1994; Bielen 1997; Hendrickx/Bielen/De Paepe 2001.
20 Bielen 1997; Hendrickx/van Winkel 1993; Hendrickx/Bielen/De Paepe 2001; Bielen 2004.
21 Detailed and with a clear breakdown of the individual metric parameters: cf. Hendrickx 1994: 39–41, 52–54.
22 Orton/Tyers/Vince 1993: 168–181.
23 An in depth-presentation of the whole material by the author is in preparation: cf. Kuhn forthcoming.

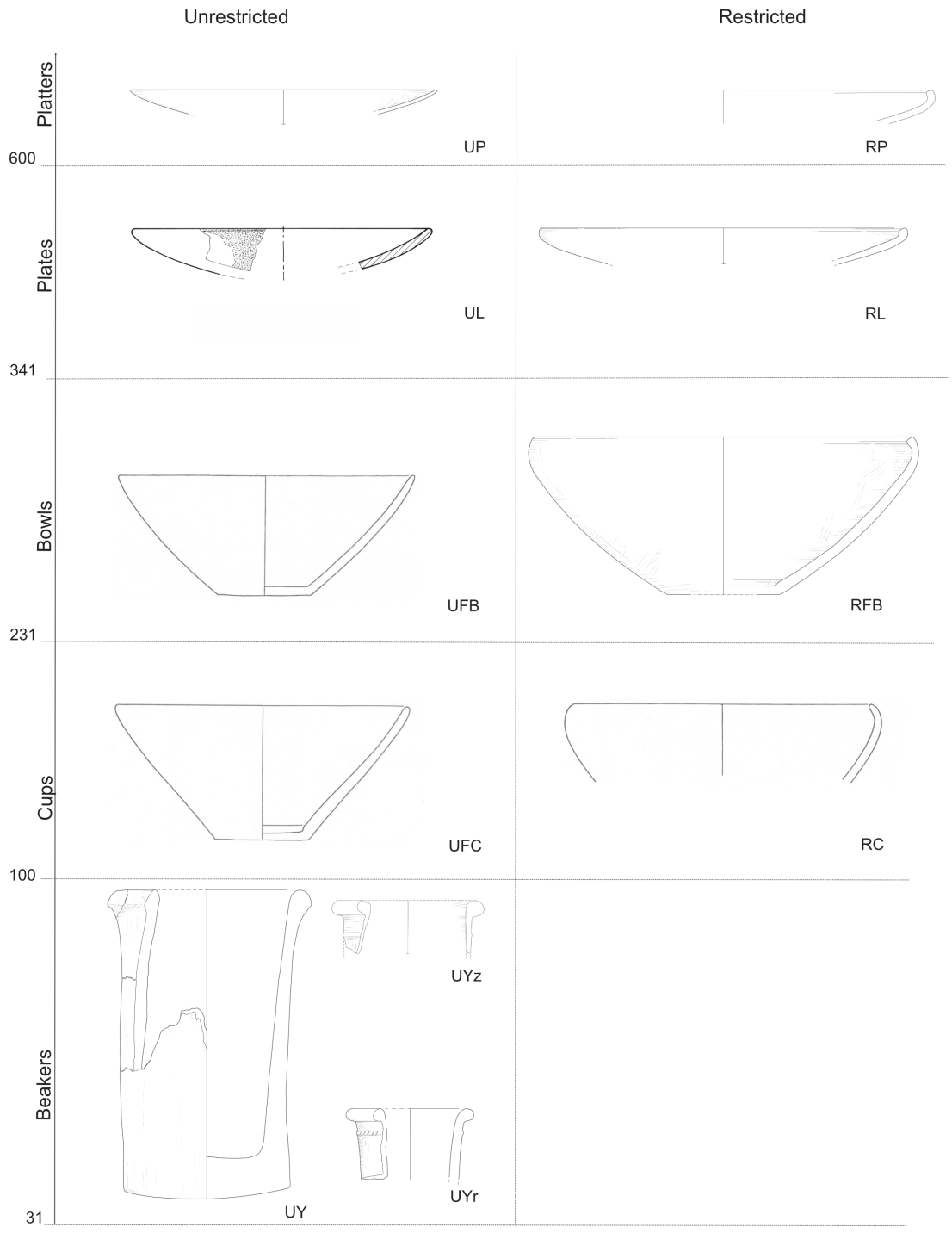

Fig. 5: Dividing the stone vessels by vessel index
(UP = Unrestricted Platters; RP = Restricted Platters; UL = Unrestricted Plates; RL = Restricted Plates; UFB = Unrestricted Flat-based Bowls; RFB = Restricted Flat-Based Bowls; UFC = Unrestricted flat-based cups; RC = Restricted cups; UY = Unrestricted Cylindrical jar; UYz = Unrestricted Cylindrical jar with plastical band; UYr = Unrestricted Cylindrical jar with incised plastical band (incision pointing to the right)

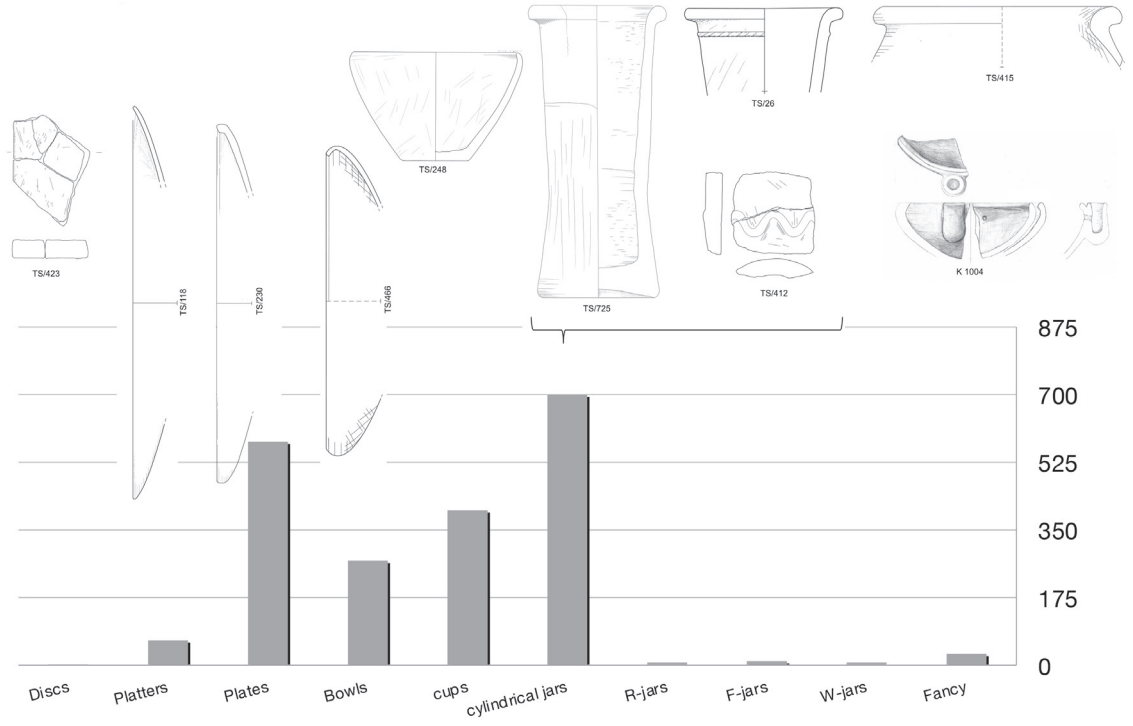

Fig. 6: Overview of the different stone vessel classes in the tomb of king Den at Abydos

2.2 On trading networks and the question of raw materials

Concerning raw materials, it is interesting to note that even though calcite-alabaster and greywacke dominate, a substantial variety of 17 different stones and minerals have been used to produce these vessels. In addition to others, dolomite, limestone, granite, obsidian and rock-crystal are attested. Due to the raw material, further questions arise regarding the type and method of processing (for example problems of hardness and structure), as well as possible transport routes and even networks (raw material sources). The so far known geological sources of these materials in the Nile Valley[24] and the surrounding areas (e.g. Ethiopia for obsidian[25]) point already to the existence of extensive networks, probably centrally organised and led by the king and his elite. One problem remains, however, as for many rocks there are no longer any clear traces of extraction from pre-dynastic and early dynastic times, which is due not least to the

24 Klemm/Klemm 2008; Aston/Harrell/Shaw 2000: esp. 5–20; Aston 1994.
25 Bavay/De Putter/Adams et al. 2000: 5–20; Giménez/Sánchez/Solano 2015: 349–359.

long mining traditions of these deposits up to the present day. The individual origin of rocks can therefore not (yet) always be determined with certainty.

The networks would probably start with the survey for appropriate raw materials, continuing with the selection of suitable blocks to the rough portioning at the site[26], and finally further transport to the appropriate specialized workshops. Due to the mostly still poor written evidence from the time, many of these steps remain uncertain, but indeed, they imply a clear and detailed organisation. This applies not only to the production of vessels in the workshops. The sheer mass of the objects as well as the perfection of the processing, up to the shiny polished surfaces reflects how excellently the craftsmen could handle the raw material. Many of the individual steps of the *chaîne opératoire* may at least be inferred from experimental archaeological investigations.[27] The similarity of the finished products in the individual vessel classes as well as the existence of size-based sets within these, also show that these objects were probably produced in groups as a step towards mass production by central and specialised workshops as well as technical know-how.[28]

Compared to other convolutes published so far from Pre- and Early Dynastic tombs, the quantity of vessels found in Den's tomb is enormous and just surpassed by Djoser in the early 3rd Dynasty – although the latter has never been studied or documented *in toto* yet.[29] So far, however, only a fraction of the comparable stone vessel material is available with good documentation and publication. The tomb of Qa'a, last king of the 1st Dynasty, published by Eva-Maria Engel, should therefore be mentioned as particularly important. Engel recorded about 3,726 fragments of stone vessels, which can be attributed after her calculation to about 386 different vessels made of 14 different stones/minerals.[30] It is worth comparing these numbers also with other contemporary cemeteries, e.g. the elite necropolis of Saqqara – here in particular the tombs of the viziers Hemaka (S 3035)[31] and Ankh-Ka (S 3036)[32] – as well as other Memphite cemeteries. In the tomb of Hemaka (S 3035), Walter B. Emery documented about 328 stone vessels made of 11 different raw materials (cf. Tab. 1 below), all of which have been discovered in the burial chamber.[33] In the Memphite region there are other cemeteries and elite-tombs contemporaneous with the regency of King Den: Macramallah,[34] Abusir,[35]

26 This is indicated, for example, by the semi-finished products such as slate palettes made of graywacke as well as a small amount of semi-finished stone vessels found in the Wadi Hammamat: cf. Harrell/Bloxam/Kelany 2014: 11–30.

27 Hester/Heizer 1981 were working foremost on ethnographic observations, as well as El-Khouli 1978; experimental-archaeological approaches are presented by Stocks 2003; Kuhn/Lehmann in press; Kuhn forthcoming. A very detailed documentation on stone vessel material contemporary to that of the royal tomb of Dewen has been published by Takenouchi 2021, who is particularly taking into account the traces resulting from the production of the vessels.

28 Costin 1991; this problem is exemplified in more detail: Kuhn in press; Kuhn/Lehmann in press.

29 The excavators Pierre Lacau und Jean-Phillipe Lauer have, however, published the stone vessels with inscriptions: Lacau/Lauer 1959; Lacau/Lauer 1965. An overview of the remaining vessels and vessel types in king Djoser's tomb is only available in the form of preliminary reports such as Quibell 1936: 76–80.

30 Engel 2017: 352–409.

31 Emery 1938.

32 Emery 1949.

33 Emery 1938: 55–61; Kuhn forthcoming.

34 Macramallah 1940.

35 Bonnet 1928; Blaschta 2011.

Abu-Rawash,[36] and Helwan[37]. A first rough comparison of the tomb inventories with the royal tombs in Abydos shows that a significantly lower quantity of stone vessels per grave is recorded. Although there is evidence of more than 100 stone vessels per grave in the elite burials of the Emery-cemetery, there are often only 2 to about 20 stone vessels[38] per grave in the so-called middle-class cemeteries of the Memphite region. Furthermore, it is obvious that, especially in less rich equipped and smaller tombs, there is a tendency of less variety concerning the raw material. While calcite-alabaster and limestone, and more rarely graywacke, predominate, other rocks and minerals are extremely rare. The tendency here may be that the variance in the raw material used, as well as the quantity of stone vessels, can be interpreted as an indicator of status of the deceased in the 1st Dynasty (Tab. 1).

Tab. 1: Overview of the quantity of fragments of the stone and mineral materials used for the production of stone vessels (data: Emery 1938 [Hemaka]; Engel 2017 [Qa'a]; Emery 1949 [Ankh-Ka]; Emery 1959: 119–120 [S 3121])

	Dewen	Hemaka	S 3121	Ankh-Ka	Qa'a
Calcite-Alabaster	12089	167	15	20	2129
Greywacke	5860	133	8	19	1068
Alabaster	35	0	0	0	76
Limestone	329	8	0	3	184
Dolomite	1401	2	1	2	165
Rock Crystall	199	4	0	4	48
Serpentine	58	0	0	0	23
Basalt	38	0	0	3	2
Granite	17	0	0	0	1
Andesit-Porphyr	173	5	0	3	2
Diorite	210	23	0	7	9
Anorthosit-Gneis	46	0	0	0	3
Obsidian	10	0	0	0	3
Breccia	101	2	0	0	0
Metabolit	1	0	0	0	0
Tuff	34	15	0	12	0
Conglomerate	169	0	0	0	0
unknown	298	1	0	0	0

36 Montet 1938; Montet 1946; Klasens 1958; Klasens 1960.

37 Köhler 2014; Köhler 2017.

38 Some of the tombs stand out with a remarkable quantity of stone vessels like the tomb 4/94 with 54 dummy vessels made of limestone and some other stone vessels as well (cf. Köhler 2017: 377–379). These tombs are, however, already mostly belonging to a younger phase of early Egyptian history – late 2nd Dynasty, or even the transitional phase to the 3rd Dynasty. Interesting are also graves like 4/114 and 4/91 in Helwan, which stand out by the variety of 8 respectively 9 different raw materials: cf. Köhler 2021: 73; 159–174 (tomb 4/114); Köhler 2017: 333–347 (tomb 4/91). These mentioned tombs do also belong to the older phase of the cemetery and are dated by the excavator into their phases IIID1 (4/91) and IIID2 (4/114), which corresponds roughly with the Hendrickx chronology Naqada IIID1 and IIID2, so the early 2nd Dynasty.

2.3 Reddite ergo quae sunt Den …

In addition to this "quantity problem" it has of course to be asked, if these 20,700 fragments found in the area of king Den's tomb truly belong to the original tomb inventory of that king. The tomb itself is located in the very centre of the 1st Dynasty royal necropolis and is therefore surrounded by the tombs of Queen Meret-Neith, king Adj-ib and Djet in the north-western section, and the tombs of Semer-khet and Qa'a in the eastern and south-eastern area (Figs 1–2).

As the material connected with the tomb of Den has been found scattered in a wide range in all directions, it was imperative to document all the finds and to map them by context and vessel class to obtain an overview of their distribution. About 5 % of the rim fragments of plates, for example, (almost 1,000 fragments) has been found in the filling of the king's chamber (T-KK), while a lot of more material derives from the spoil-heaps surrounding the tomb. Although none of the vessels has been found *in situ,* vessel impressions in the magazines like in S16 could be recorded. It cannot, however, be assured if these impressions derive from the deposition of pottery or stone vessels as a very comparable variation of forms and dimensions is to be found for both materials. However, there is also evidence for the deposition of stone vessels such as cylindrical beakers in wooden boxes,[39] which has also been attested for miniature vessels at sites such as Minshat Abu Omar[40] for the 1st Dynasty and the Qubbet el-Hawa cemetery[41] for the Middle Kingdom.

Re-excavating the southern and eastern spoil-heaps showed, that a lot of inscribed objects with the name of king Den have been found, so that it is quite clear that these spoil-heaps are connected to the former excavations of the tomb of this particular king. This holds also true for the area in the east of the king's chamber, which can be easily explained with the staircase giving access to the burial chamber. More problematic is the interpretation of the convolute deriving from the northern and western spoil-heaps. Typologically, the vessel fragments date to the 1st Dynasty, but more than 1/3 of the material shows secondary burning. Additionally, some of the fragments join with others deriving from the king's chamber or the eastern part, so that one can again argue for a connection with the original burial of Den. However, a mixture of vessels from other royal tombs nearby has to be taken into account as well.

An interesting area is also the so-called 'Annex' and the two southern chambers S 1 and S 2, where 156 fragments of cylindrical beakers and other open forms, mainly cups and bowls, have been recorded. Taking up Dreyer's proposal, which considers that this feature was used as the main offering space,[42] the vessels might very well have played a role during special offering rituals while closing the burial chamber.

39 Jones/Killen 2008: 290–292.
40 Kroeper 1985; Kroeper/Krzyzaniak 1992: 90.
41 García González 2022: 164–165.
42 Dreyer 2010.

2.4 Function beats form …

A characteristic feature of older typologies was the mixture of references connecting form and function. For example, wine jugs and cosmetic vessels were openly denoted as such without any corresponding chemical investigations or evidence confirming that they truly contained such contents. The function was often borrowed, mostly from depictions of vessels in reliefs and sealings, some of which also name vessel contents.[43] However, it remains crucial to note that the vessels – including the stone vessels – first and foremost represent containers that could be used to store a wide variety of things. Although there is no doubt that there are similarities between the depictions and the vessels, the actual function of each vessel remains simply hypothetical without appropriate investigation. Therefore, it was also interesting to note that in 2 % (331 fragments) of the stone vessels in Den's tomb, evidence of the former vessel contents could be visibly detected macroscopically. The vessel fragments could not be sampled on the excavation itself at the time of their documentation. However, chemical tests are currently being carried out on the vessel material in the Berlin collection. In purely macroscopic terms, the remains of the contents are reminiscent of burnt oils, ointments, and fats, which has already been demonstrated in the museum sampling as well.[44] Besides oily substances, which are also known from the written records, other contents should be considered. For example, we could find traces of a backlog of a copper chisel in a calcite-bowl. The latter reminds us of the general possibility of the multifunctional use of these vessels. Compared to other convolutes of this time, most of the vessels in Den's tomb could also have been deposited empty or as kind of *pars pro toto*. Interestingly, for most of the cylindrical beakers with rope decoration (Fig. 7), almost no trace of any content at all could be ascertained. In connection with the imitation of the rope band deriving from the sealing, this might be explained by the fact that these vessels are already sealed and filled *qua* decoration.

The distribution of the stone vessel fragments from Den's tomb shows a high probability of actual deposition in the main burial chamber of the king. Interestingly, this hypothesis fits quite well with Eva-Maria Engel's observations for the royal tomb of Qa'a[45] as well as the observations made in tombs of the high-elite at Saqqara. The stone vessels – like other cosmetic equipment such as slate palettes – belong to a special class of objects, usually buried next to the body of the deceased. This might be due to the characteristics of the material, especially its durability connected with a certain colour symbolism.[46]

43 The Egyptologist Heinrich Balcz presented some important ideas on this problem in a series of articles in the Mitteilungen des Deutschen Archäologischen Institutes Abteilung Kairo: cf. Balcz 1932–1934.

44 Kuhn forthcoming.

45 Engel 2017: 353.

46 Baines 2007; Kuhn 2018.

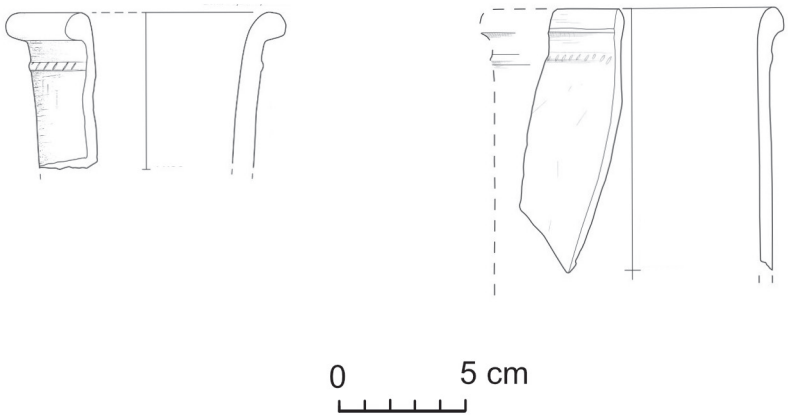

Fig. 7: Rim fragments of cylindrical beakers: a. TS/0735, made of calcite-alabaster, drawing: R. Kuhn; b. TS/0646, made of greywacke, drawing: R. Kuhn

2.5 Hence, inscriptions beat everything …

From the very beginning, Egyptologists did not care too much about materials and forms but rather, of course, about the inscriptions on these vessels. During the re-excavations by the German Archaeological Institute, 43 new inscriptions could be found which now complete the so far known published material.[47] Taking into consideration the whole material known so far from the tomb of Den which is scattered today across different museums, private collections and known from the older excavation reports, it is nevertheless striking that just very few stone vessels were inscribed and deposited in the royal tomb. Incised inscriptions – the largest amount –, ink inscriptions as well as very few vessel fragments with inscriptions in high-relief could be recorded. More marks on vessels that cannot be definitively ascertained as script have been detected, and may have played a role similar to the so-called pot-marks on pottery.[48] The information provided by the convolute concerns mostly names of persons, gods, feasts, and institutions. The name of a product also appears twice, which could be interpreted as the name of the actual content: *št*[49].

Chronologically, and regarding the deposition, by far the most interesting convolute concerns the stone vessel fragments with royal names. In addition to the tomb owner Den himself, the name of almost every ruler of the 1st Dynasty – including the name of Queen Meret-Neith –

47 A first overview with some examples: Kuhn 2017: 75–79; Kuhn forthcoming.

48 As the literature has not yet recorded other examples for this phenomenon it remains to be seen what purpose and distribution can be connected with them. For the recent discussion of the interpretation of pot-marks on pottery cf. Bréand 2005: 17–30; Mawdsley 2009: 197–219; Engel 2015: 55–70.

49 The reading of the word is not assured yet. It may be hypothesized that it is a short version for *šsd* (*balanites aegyptiaca*) and therefore a well-known product for the time period of the 1st Dynasty. One of the examples was already found by W. M. F. Petrie 1901: pl. XXV.16 in the tomb of king Den. For the plant and its use in medical recipes cf. Germer 2008: 35–37; 207–208.

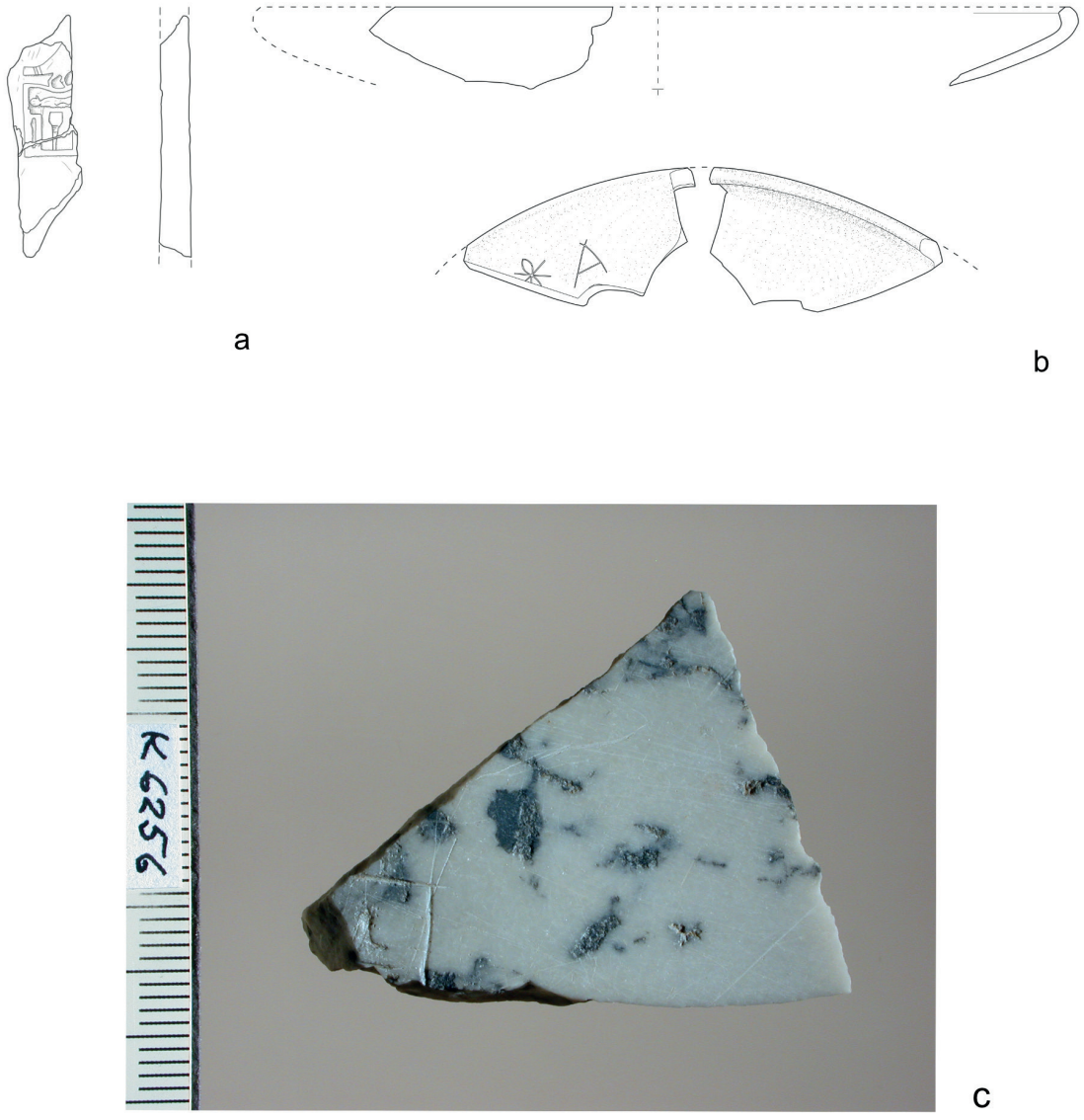

Fig. 8: Stone vessel fragments naming royal kings of the 1st Dynasty: a. Nar(-mer), Ab K 5093, Calcite-Alabaster; drawing: R. Kuhn; © DAIK; b. Queen (?) Merit-Neith, Ab K 5090a, graywacke, drawing: R. Kuhn, © DAIK; c. Qa’a (?), Ab K 6256, dolomite, photograph: F. Barthel, © DAIK

has been found within Den’s material. These fragments could very well be inherited heirlooms (like the one of Nar(-mer)[50]; Fig. 8) or derived from the surrounding tombs as well, as it is for sure the case for the fragment naming Qa’a, which on top of that has been found in the western spoil-heaps.

50 Kuhn 2017: 78–79.

Besides the naming of a second Sed-festival for the reign of Den[51], which is now likewise attested by a seal impression found by Müller, institutions such as *pr-ḥḏ* – the treasury –, and one example with the evidence for a royal domain have been documented. The latter provides further information on the question of storage and distribution of these prestigious goods.[52]

3 Conclusion

Whether the stone vessels were also used as a luxury tableware in everyday life, especially by the elite – some show traces of repair – , cannot be conclusively affirmed yet, due to the lack of evidence from the settlements. However, the known material from the tombs indicates that these were very likely luxury items, which served as durable tableware for the afterlife, as storage containers for other luxury goods such as oils and, in addition, they may also have been related to the funeral and burial rituals that were performed when the tombs were closed and visited.

Therefore, examining stone vessels is interesting in different aspects such as the raw material, the technical problems of the manufacturing processes as well as the distribution and final deposition and use of these items. All of these aspects help us to understand the economical networks and crafts in Pre- and Early Dynastic Egypt much better. Stone vessels are by no means boring as lamented by Guy Brunton – it remains an exciting topic, which is far from being conclusively clarified.

Acknowledgements

This work could not have been completed without the support and help of Vera Müller and the late Günter Dreyer; for both, I am particularly grateful. Further research on the material of other collections such as the one in Brussels and Berlin was made possible by the kind support of the late Stan Hendrickx, the late Dirk Huyge, Luc Delvaux and Friederike Seyfried. The main part of this research was compiled as part of my PhD Dissertation, presented at the University of Bonn in 2017. Therefore, I would also like to thank my supervisors for their kind support and guidance: Ludwig Morenz and Friederike Seyfried. Pia Lehmann, the conservator for stone of the Berlin Museum, has brought many details concerning the question of the vessel production to my attention – I have to thank her for her support and for her insight concerning new ideas and hypotheses. I am deeply indebted to Ana Díaz Blanco for improving the English – all remaining errors are of course the ones of the author.

51 Dreyer 1990.

52 For the concept cf. Breuer 1990; Costin 1991; these ideas will be explained in more detail in Kuhn in press.

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An Introduction to the Realities of Metalworking on the Elephantine Island in the late Middle Kingdom

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Abstract

The paper offers a preliminary report on the corpus of metalworking material of the Middle Bronze Age / Middle Kingdom from Elephantine Island, located within Aswan in Egypt. Several excavation seasons of the Realities of Life project, led by Johanna Sigl (German Archaeological Institute Cairo), focused on a small part of the Middle Kingdom settlement on the island. The main deposits are datable from the Dynasties 11 to 13, and meticulous excavations allow us to focus on the minute details of the ancient day-to-day reality. Among the uncovered finds were several hundreds of rather small green copper 'blobs', coming from metalworking. The production must have happened elsewhere in the settlement, as no metallurgical installations were identified in the trenches. The true nature of the corpus was uncovered with the use of portable XRF spectrometer Niton XL3. Almost 500 unique spectra were produced, and with the help of archaeometallurgical analysis, we are able to demonstrate that the remains, although insignificant in size, cover the complete *chaîne opératoire* of the copper production, from the ores, through the crucible fragments, prills and slags, i. e. metallurgical waste, to the finished artefacts. The specific alloys represented are predominantly arsenical coppers, with gradually increasing number of early tin bronzes. The paper provides a brief description of methodology, selected initial results, and illustrations of the specific find categories, coming from the largest uncovered structure, House 169 of Dynasty 13.

1 Introduction

Egyptian archaeology is often attuned to the size of things: if something is big, it must be important. That is why Old Kingdom Giza is often considered the most significant site of this period: it is home to the largest pyramids.[1] However, if we would focus on the maximal concentration of the Old Kingdom royal pyramids and contemporary tombs of the high officials, the Old Kingdom central funerary landscape would have clearly been Saqqara.[2]

1 Lehner/Hawass 2017; Manuelian 2017.

2 Including the Abusir area, which was not separated in antiquity: Mariette 1889; Spencer 1974; Roth 1993; Verner 2017; Verner 2021.

Published in: A. Kilian, A. Pruß, M. Zöller-Engelhardt (eds), Excavating the Extra-Ordinary 2. Challenges and Merits of Working with Small Finds. Proceedings of the International Interdisciplinary Workshop at Johannes Gutenberg University Mainz, 25–26 November 2022, Heidelberg: Propylaeum, 2024, 181–202. DOI: https://doi.org/10.11588/propylaeum.1382.c19775

That superficial observation on the deceptiveness of size is also valid for copper metallurgy. Thus, the most relevant findings must surely come from the large, uncovered metalworking installations, such as those found at Old Kingdom Seh Nasb (Sinai Peninsula), Middle Kingdom Ayn Soukhna (near the Red Sea coast of the Eastern Desert), and New Kingdom Qantir/Pi-Ramesse (Nile Delta). They are supposed to provide the main pieces of evidence for the workings and processes of the ancient Egyptian copper metallurgy, as on these sites the highest number of preserved metalworking furnaces was uncovered, as well as other similar installations, and material culture related to copper metallurgy.[3] Yet even here, the most precious products and semi-products are gone, neither ingots nor big metal objects were preserved, at best only fragmentarily. But metallurgical and metalworking remains can be even less conspicuous, if coming from a busy settlement lacking vast spaces, specifically the town on Elephantine Island.

We would like to argue in this paper that regarding the metalworking remains, size is not important. Extraordinary small finds from the settlement debris can contribute to the wider debate as much as, or even more than, big installations, in our case on the metalworking processes in a thriving Middle Kingdom town. The meticulous excavation techniques of the Realities of Life project allow us to ask questions that would have been impossible to pose without its granular, detailed data. The find processing continues, but we enclose the available preliminary results in this paper and synthesize the already available information. Further, more detailed publications are being prepared.

2 The Realities of Life project

Several excavation seasons of the Realities of Life project, directed by Johanna Sigl with the lead archaeologist Peter Kopp (German Archaeological Institute Cairo), focused on a small, selected part of the Middle Kingdom settlement on the Elephantine Island.[4] Archaeological fieldwork from autumn 2013 to the end of 2018 focussed on two squares of 10 × 10 m in the northwestern part of the town. The northern square was excavated down to the archaeological layers of the Old Kingdom and the stratigraphic features prior to mid-Dynasty 12 were reached in the southern trench (Fig. 1). This settlement segment was built above the level of the late Old Kingdom cemetery of the townspeople, adjacent to the Dynasty 3 granite pyramid. These lower layers were not in the focus of the project and thus were left intact.

The researched area was marginally disturbed by French explorations in the early 1900s, but the southern of the two trenches preserved undisturbed ancient deposits. The main layering is

3 Tallet/Castel/Fluzin 2011; Abd El-Raziq/Castel/Tallet 2011; Verly et al. 2021; Pusch 1990; Rademakers/Rehren/Pernicka 2017.

4 Published articles on the project include Kopp 2022; Sigl 2022; Sigl/Kopp 2020; Sigl/Kopp 2022; Warden 2022. Research of the metalworking remains was reported by Martin Odler and Jiří Kmošek in Sählhof et al. 2020: 29–30 and Sählhof et al. 2022: 31–33, and one more, thus far unpublished report. Parts of these preliminary texts are also used herein.

Fig. 1: Aerial photograph of the part of Elephantine Island with the Realities of Life excavation squares highlighted in blue, south-east of the Dynasty-3 granite pyramid, after Sigl 2022: Fig. 1, © German Archaeological Institute Cairo

datable to Dynasties 11 to 13, based on the analysis of excavated pottery and stratigraphy. Scant remains of the earliest houses are dated to the Dynasty 11, and successive phases with new, different houses were from the Dynasty 12. Three further houses built adjacent to each other are datable from the late Dynasty 12 to Dynasty 13. Their ground plans were well preserved, and the buildings were numbered 169, 166, and 73. Above them were remains of two further houses from the Second Intermediate Period. Overall, one of the largest uncovered settlement structures of all the so far excavated late Middle Kingdom houses on Elephantine Island was House 169 with an area of ca. 150 m^2 (Fig. 2). Several published papers already dealt with the evidence found in this particular structure: an impressive range of the disciplines and techniques applied on the material was e.g. recently listed here by Sigl and Kopp.[5] This includes ample, albeit likely secondarily deposited evidence on copper metallurgy. Use and existence of House 169 is estimated to have lasted about a century within the Dynasty 13.

The overarching aim of the Realities of Life project was to understand the daily lives of the settlement inhabitants. Within the material culture, three major research foci were defined:

> "a) the production and storage of food and drink; b) the acquisition and manufacture of other goods or tools, some of which can be used to trade (it has to be noted that raw materials and products of category (a) such as fish and beer may have been used for the same purpose), and c) the building, development, and use of the living and working environment to accommodate all activities of daily life including e.g. sleeping and socializing as well as the impacts of these actions on this environment through, for example, noise or heat."[6]

The second focus directly involves metallurgy. The craft of metallurgy would indirectly influence, often negatively, the quality of the environment and the living conditions in its vicinity. In less attentive excavations, the minute evidence of the copper metallurgy that we were able to study would have been lost or deemed insignificant by the excavators. Research and publication of such material will enhance the identification of similar remains elsewhere, where they might be even less conspicuous than in the Realities of Life project's trenches.

3 Metalworking remains

Among the uncovered finds were several hundreds of rather small, mostly greenish copper 'blobs' related to metalworking. Only with archaeometallurgical analysis, we are able to demonstrate that the remains, although insignificant in size, cover the complete *chaîne opératoire* of the copper production. The total weight of the corpus is 850.5 grams. For comparison, we have

5 Sigl/Kopp 2022: 58–59.
6 Sigl/Kopp 2022: 58.

Fig. 2: Ground plans of the Houses 73, 166 and 169 from the mid Dynasty 13 (above) and late Dynasty 13 (below). After Sigl 2022: 92, Fig. 2, © German Archaeological Institute Cairo

identified altogether 22 crucible fragments, while at the Middle Kingdom copper metalworking centre Ayn Soukhna, the total number of fragments is estimated to be 8,000 to 10,000. Although it has to be noted that the scale of excavations at Ayn Soukhna is larger and the purpose of the sites is different: Ayn Soukhna was near the beginning of the *chaîne opératoire*, while Elephantine was at its end.[7]

The production must have happened elsewhere in the settlement, as no metallurgical installations were identified in both trenches. During the Middle Kingdom, from Dynasty 11 until Dynasty 13, the location and disposition of the houses changed radically. Thus, also the metalworking remains do not have to come from a single metalworking installation. Any small feature that could produce heat of more than 1,100 °C and accommodate a crucible would suffice for secondary metallurgical operations. Evidence from House 169 on the production of bread moulds, as well as heavily vitrified phytoliths, demonstrate temperatures of at least 800–850 °C have certainly been reached.[8]

In general, people do not like to carry their waste too far,[9] and this assumption might also be valid here. Therefore, the metallurgical installations related to the discussed finds could have been nearby the Houses 169, 166 and 73 in the Middle Kingdom. The closest assumed distance to the water was to the northwestern river channel within about a hundred metres.[10] Water would have been important not only for the life of the town's inhabitants, but also specifically for copper metallurgy.[11] Due to the limited space on an island, waste disposal from the regular life activities and crafts could have had different rules than elsewhere in the Nile Valley, and the larger fraction of some of the waste could have been dumped into the river. Although the excavations were not followed to the bedrock, we can be sure that the recovery of the archaeological evidence from excavated layers is likely complete, in that each fragment was preserved and recorded. The completeness of the metallurgical material in the refuse layers is corroborated by our consecutive analysis following the work already done by Martina Renzi (University College London).

4 Work in 2019 with preselected samples

As mentioned, a small part of the material was originally studied by Renzi and analysed by portable X-ray fluorescence spectrometer. She carried out 150 analyses on 85 fragments.[12] On this basis, the first batch of twelve samples was selected and transported by the Ministry of Tourism and Antiquities to the archaeometric laboratory of the Institut français d'archéologie orientale

7 Marouard 2020.
8 Sigl/Kopp 2022: 65–66.
9 Warden 2022: 73.
10 Sigl 2022: 90.
11 As at the Middle Kingdom Ayn Soukhna: Verly et al. 2021: 3.
12 Renzi in Seidlmayer et al. 2016: 18–20. These datasets were not available to us.

du Caire (Le pôle archéométrie de l'IFAO du Caire) and assigned with the IFAO lab numbers from 12532 to 12538. The selection involved the largest pieces of metalworking remains from the whole excavated corpus.

In November 2019 (12th to 21st), among other planned work, these 12 archaeometallurgical samples were processed, enabling initial survey of the corpus. The samples were first documented by photographs and drawings by Martin Odler. Metallographic cross sections were then prepared from the samples by Jiří Kmošek and subsequently measured with the portable X-ray fluorescence spectrometer Bruker Tracer III-SD (property of the University of Pardubice), as well as analysed by the metallographic microscope present at the IFAO laboratory.

Six samples were identified as vitrified fragments of ceramic crucibles. In each of the crucible fragments metallic copper alloy prills were still present, mostly indicating processing of the alloy of arsenical copper and tin bronze, high in arsenic. One vitrified ceramic fragment from Dynasty 11 was newly classified as a fragment of a tuyère (ceramic end of a plant tube, through which the air is blown into the furnace), used in processing of arsenical copper alloy, also rich in antimony. The remaining analysed material consisted of fragments of different types of slags, having mostly amorphous characteristics with the presence of arsenical copper prills. Thus, contrary to the assessment of Renzi, the material contains also slag fragments.[13] Two remaining samples were identified as iron minerals, hematite or goethite with admixtures of silica and manganese. These iron minerals can be used as fluxing agents in copper smelting, melting, or alloying operations.[14] Another emendation of the original report by Renzi is the initial information given on the corroded state of the material. This is indeed the case by the outward appearance of all the fragments, but with the metallographic cross sections, tiny remains of the uncorroded material can be studied within many samples, giving precise information on the Middle Kingdom metallurgy on the island.

5 Methodology for the settlement remains of metalworking

The true nature of the whole corpus, stored in the excavation magazines of the joint German and Swiss archaeological mission on Elephantine Island, was uncovered with the use of portable XRF spectrometer Niton XL3, property of the German Archaeological Institute Cairo. The machine, which was kindly provided by the Institute, permitted sorting of the material not only by the macroscopic observation of its character and typology, but also by its chemical composition. Almost 500 unique spectra were produced with the pXRF, consecutively numbered from 81 to 567. Obtained XRF spectra were subsequently evaluated using integrated standards

13 Renzi in Seidlmayer et al. 2016: 18–20.

14 Ogden 2000. Iron ore is present in the Aswan area, therefore these fragments could have been locally sourced (Johanna Sigl, pers. comm.).

and the concentrations of the major and minor elements present (Cu, Fe, As, Sn, Sb, Pb, Zn, Ni, Bi, Ag, Au, Co, Mn, Ti) were quantified (Tab. 3). These identifications with the metallurgical description are connected with the archaeological numbering of contexts and find groups. Unexpectedly, material from all stages of the metal production was identified: from the ores, through the crucible fragments, prills and slags, i. e. metallurgical waste, to the finished artefacts. The specific alloys represented are predominantly arsenical coppers and there is also a significant amount of early tin bronzes. In combination with the archaeological contexts, a diachronic and synchronic synthesis can be produced. Studied 'blobs' are from well-stratified contexts, allowing a 'time lapse' approach to metallurgy on the Elephantine Island and exceptionally fine chronological divisions.

While analysing the chemical composition, attention was paid to the archaeological context of the corpus: the finds from the floors and 'better' archaeological contexts, such as fireplaces, were prioritized, even though they might be less well preserved than the fragments from the filling of archaeological features. The distinction between finds from these two major deposit types was also made while processing the ceramics of the Realities of Life project by Leslie Anne Warden.[15] As Warden writes, finds from the floors and living surfaces might represent "*de facto* or primary refuse relating to the use of a space".[16] On the other hand, fills or secondary deposits of the artefacts could inform on "different formation processes and thus conflate many activities and people".[17] As an example, in the case of House 169, a much higher percentage of the fine wares was retrieved from the floor assemblages.[18]

In further analysis of the metalworking material, firstly it will be necessary to consider the fragments from the floors and fireplaces as separate categories, and secondly, the material from the feature fillings. Small disturbances and movements of fragments are more likely to occur in the latter case than in the former with fragments trampled into the floors or burnt, unintentionally, within fireplaces.

6 Work in 2022 and 2023

In the days from 19th February to 3rd March 2022, Martin Odler continued the work on Elephantine. The main focus of the 14-day work was photographic documentation of all analysed specimens from 2021 and additional documentation of the selected pieces that were not analysed. A typology of the small metalworking remains within ancient Egyptian and Nubian contexts is, frankly, non-existent. Thus, the fragments measured by the pXRF spectrometry needed to be photographed, their maximal dimensions and weight had to be noted, as well as

15 Warden 2022.
16 Warden 2022: 72.
17 Warden 2022: 72.
18 Warden 2022: 80–81.

a detailed description of their macroscopically apparent characteristics. In addition, two golden finds were documented, a bead from a mortar pit, and a fragment of a golden pendant from the court R08 in House 169. Isolated finds of gold illustrate another metal that was available to the inhabitants of the Middle Kingdom town.

Each fragment was photographed with a Canon EF 180mm f/3.5 L Macro USM lens mounted on a full-frame camera Canon Eos 6D Mark II. Each piece was photographed from several sides, capturing its overall form, shape, and colours. The documentation will ultimately serve for the typological characterization of similar metalworking material from Bronze Age Egyptian and Nubian sites. Based on the evaluation of pXRF spectra, a subset of 48 samples was selected for a detailed study at the IFAO laboratory. The sample transport was approved and carried out by the Ministry of Tourism and Antiquities, eventually reaching the IFAO laboratory in early March 2022.

In the days from 21st to 24th May 2023, both authors continued the study of the samples from Elephantine Island transported to Cairo. These 48 samples were numbered at the IFAO laboratory with consecutive local lab numbers from 13289 to 13336. In May 2023, metallographic cross sections were prepared from almost all samples by the standard procedure, with the exception of ore fragments (Fig. 3). The procedure is based on mounting the samples in epoxy resin, grounding on silicon carbide (SiC) metallographic plates, polishing with 2 and 0.7 μm diamond pastes and etching of prepared metallographic cross-sections of metallic phases by a $FeCl_3$ solution. The sample study was performed using an optical metallographic microscope in bright field observation mode available at the IFAO laboratory. Digital images of the samples' microstructures were taken by the digital camera Nikon D3S and processed by the Camera Control Pro 2.26.0 M software (Fig. 4).

The samples studied in 2019 were then transported to the Desert Research Center, part of the Ministry of Agriculture and Land Reclamation, on 24th May 2023, with the substantial help from the IFAO lab staff, Prof. Sameh Hussein from the Cairo University, and kindly approved by the Ministry of Tourism and Antiquities. There a selection of eight samples was analysed with the Scanning Electron Microscopy and Energy Dispersive Spectroscopy (Fig. 5) which gives much higher resolution for the study and enables to analyse the particular phases of the metallographic samples. The work on the results of these analyses and their eventual publication is still ongoing.

7 A selection of the find categories

The main find categories of the metalworking processes were defined as minerals, crucibles, prills and slags, and finished artefacts. We have selected five examples of such finds, all from House 169, to illustrate the main categories (Tab. 1).[19] Altogether, 551 specific contexts were

19 Kopp 2022; Sigl 2022; Sigl/Kopp 2020; Sigl/Kopp 2022; Warden 2022.

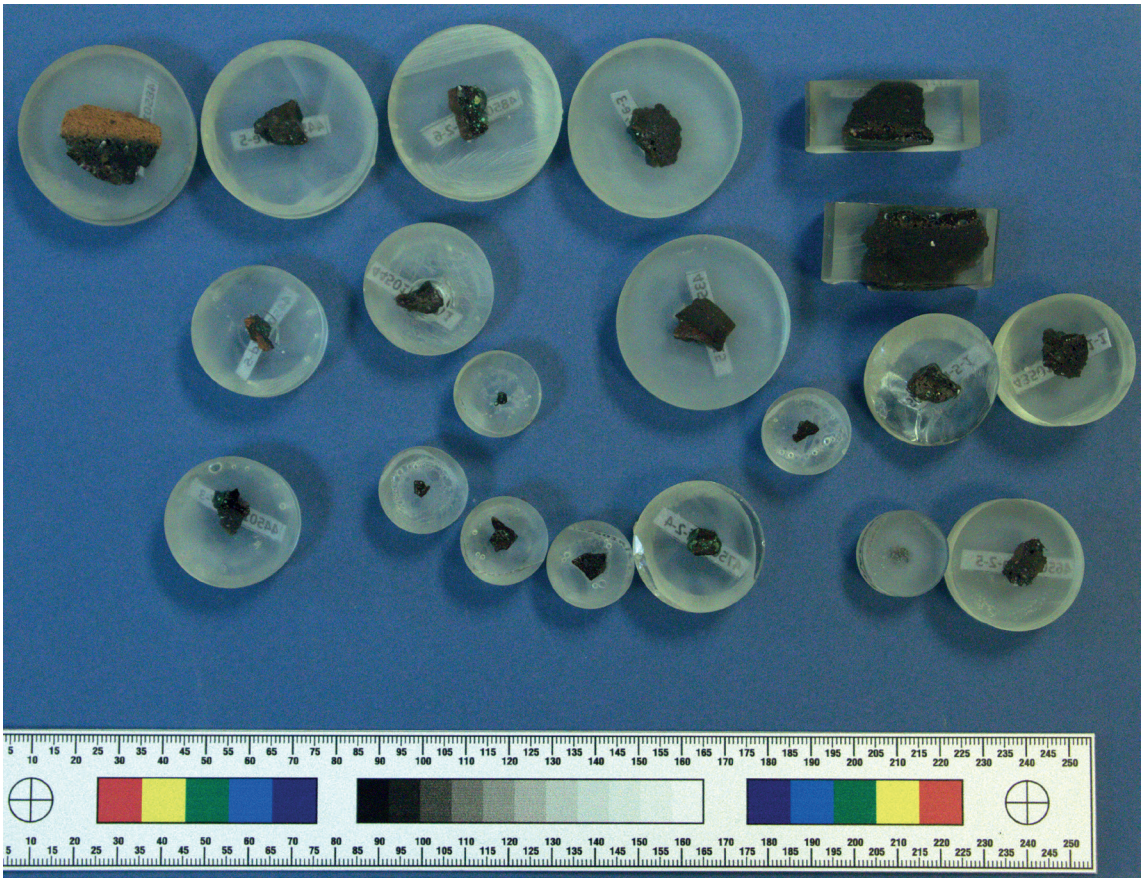

Fig. 3: A selection of samples of the metalworking remains mounted in resin blocks, photo: Martin Odler

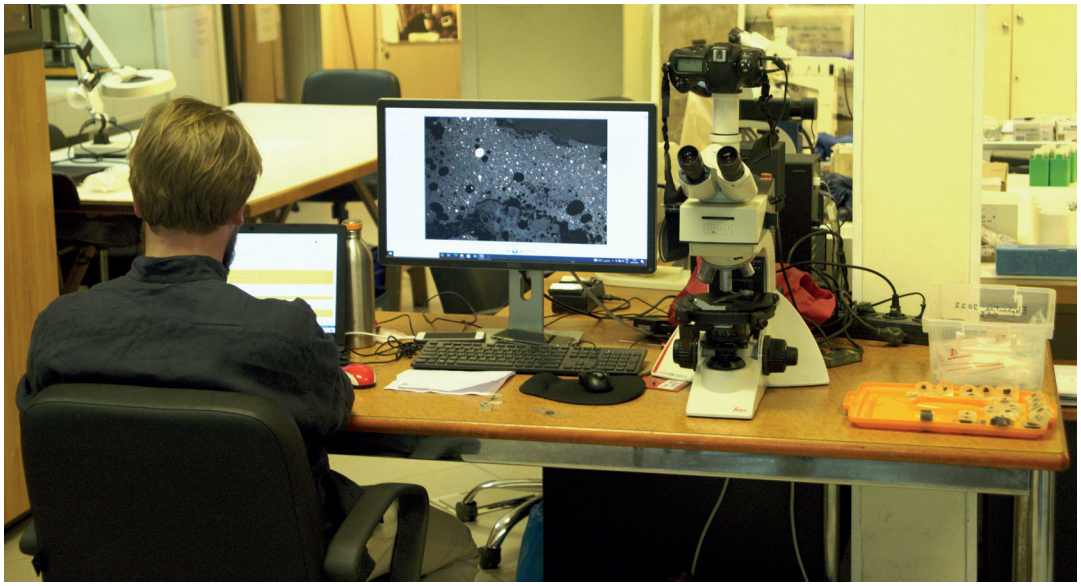

Fig. 4: Study of the mounted samples by Jiří Kmošek, photo: Martin Odler

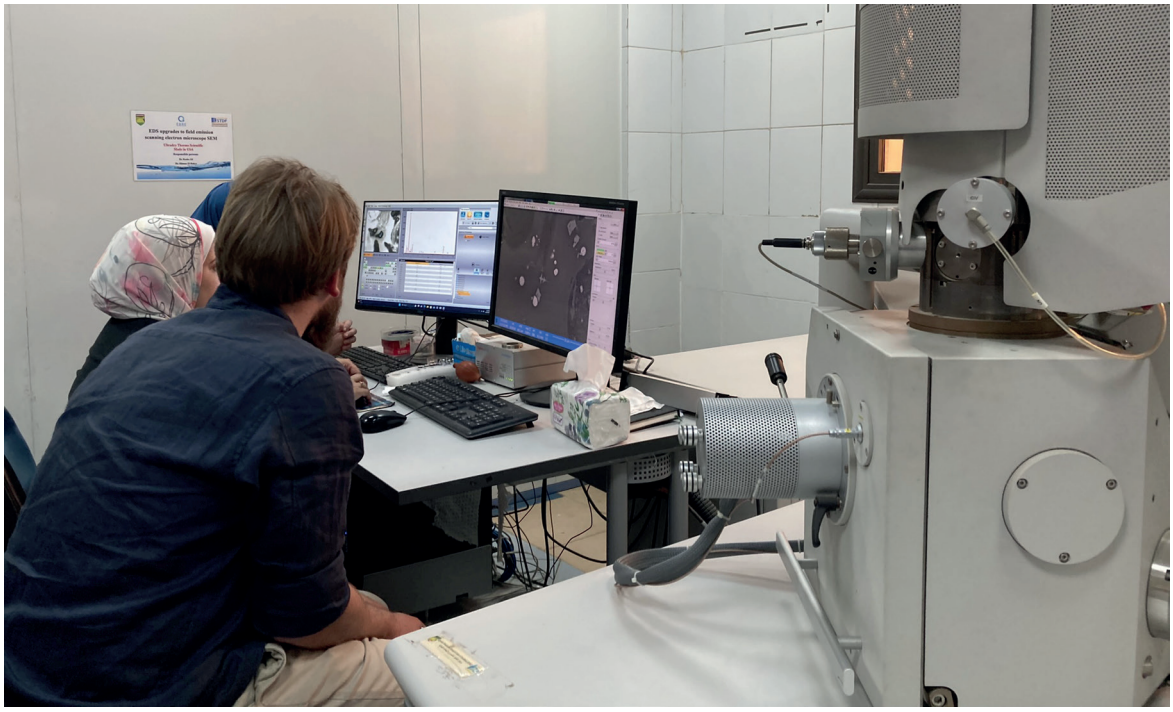

Fig. 5: Analysis of the samples with the SEM-EDS at the Desert Research Center, photo: Martin Odler

numbered in the house, 83 of these are floor levels, and 158 specific fills.[20] An important observation is that only four out of all the contexts contained sherds predating the late Middle Kingdom. The deposition therefore reflects the duration of the existence of House 169,[21] and provides a general dating also for the respective metalworking remains, and thus, the copper metallurgical activity on the site. Metalworking remains present another dimension of the craft activities that might have been happening around the house. Altogether, House 169 provided evidence for the production of food, especially bread,[22] extracting and refining of the pigments,[23] jewellery made of amethyst, ostrich eggshells, gastropod, and bivalve shells.[24] The overall weight of the metalworking remains from House 169 is almost 130 grams (Tab. 2), with the highest concentration in the court R08.

A green and brown mineral fragment with the XRF spectra 190 and 191 was found on one out of more than fifteen floors of the rear northern court R08 in House 169 (Fig. 6).[25] It is coming from the heavy fraction of the flotation. The main elements in the mineral bit were copper and arsenic, with a minor addition of lead. Both the fact that it was a mineral, as well as

20 Warden 2022: 75.
21 Warden 2022: 77.
22 Sigl/Kopp 2022: 62–66.
23 Sigl/Kopp 2022: 66.
24 Kopp 2022.
25 Sigl/Kopp 2022: 61.

Fig. 6: Mineral fragment 47501Z/d-2-8,
pXRF spectra 190 and 191, photo: Martin Odler

the interesting composition, provided a basis for it to be one of the selected pieces for further study in the IFAO laboratory, under the lab number 13305.

From the same court, and a succession of its floors, a prill with the XRF spectrum 192 (Fig. 7) was retrieved, incidentally having both main elements as the mineral (copper and arsenic), and also a minor addition of lead. The prill is corroded, thus the information on the chemical composition is only semi-quantitative at best. But it gives us a hint that minerals such as the one previously listed were used in the metallurgical operations and not for the pigment production, which was also attested within the house deposits.

The slag fragment of XRF spectrum 223 was found in the flotation of a fill in a presumably roofed room R09, in the western corner of the house. It had the main elements of iron, copper, and arsenic, with the admixture of cobalt. The slag bit was again corroded and also covered by soil, which had attached itself to it in the post-depositional history (Fig. 8).

The only crucible fragment retrieved from the whole of House 169 was a vessel with XRF spectra 290 and 291. It was found in the fill layer of the, most probably open, court R04 (Fig. 9). It was made of coarse ware, and a slaggy layer was on the inside of the vessel. With a weight of more than 10 grams, it was one of the heaviest fragments in the studied corpus. The main elements of the composition were iron, copper, and arsenic, thus similar to the bit of slag, but there were also other trace elements, including tin. This made the crucible fragment another candidate for further study in the IFAO laboratory, where it was registered under the IFAO lab number 13314 (Fig. 10). The inner microstructure of the slag layer on the pottery vessel is almost fully amorphous with the occasional presence of metallic two-phase arsenical

Fig. 7: Prill 47501V/h-2-7, pXRF spectrum 192, photo: Martin Odler

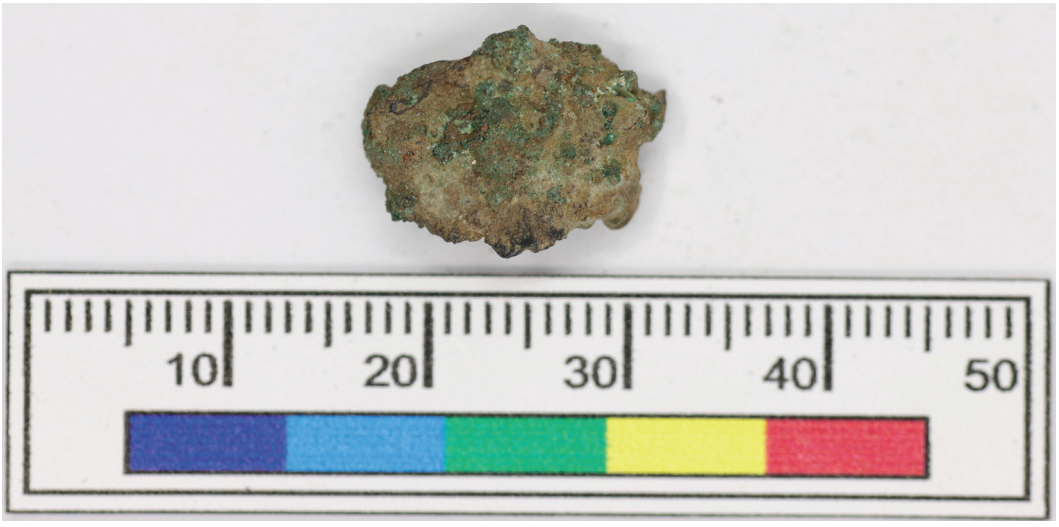

Fig. 8: Slag fragment 47501C/e-2-4, pXRF spectrum 223, photo: Martin Odler

copper micro prills, accompanied by a small amount of iron oxides. Corroded round phases, consisting mainly of iron, are also visible in the microstructure of the sample (Fig. 11).

Finally, a corroded artefact fragment, XRF spectrum 202, was found in the heavy fraction of the flotation from the court R04, in a fireplace (Fig. 12). The main elements were copper and tin, with an admixture of arsenic, but the artefact was heavily corroded. It resembles a fragment of wire. On the basis of the high concentration of amethyst fragments in court R04, Kopp presumes that the production of amethyst jewellery was one of the functions of the area.[26] The drill heads for the drilling of amethyst beads must have been quite thin and could have been made of copper wire, as he proposed.[27] They might have looked just as the artefact fragment with the XRF spectrum 202.

26 Kopp 2022: 256, Fig. 8.
27 Kopp 2022: 259.

Fig. 9: Crucible fragment 46501G/s-21, pXRF spectra 290, 291, photo: Martin Odler

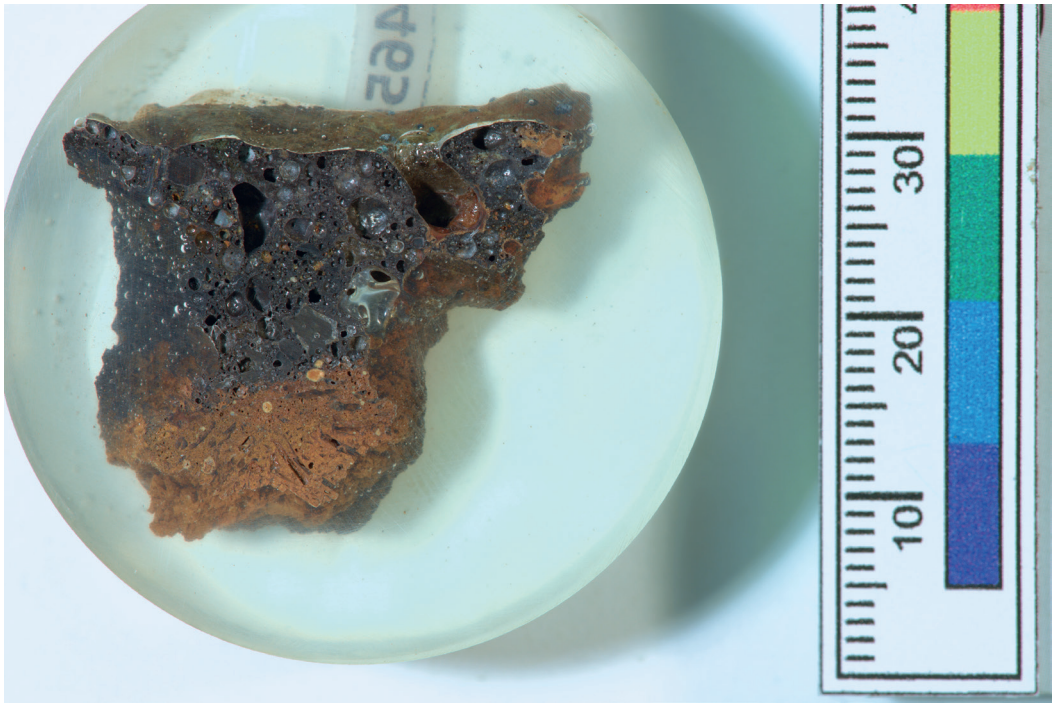

Fig. 10: Crucible fragment 46501G/s-21, under the IFAO lab number 13314 mounted in resin, photo: Martin Odler

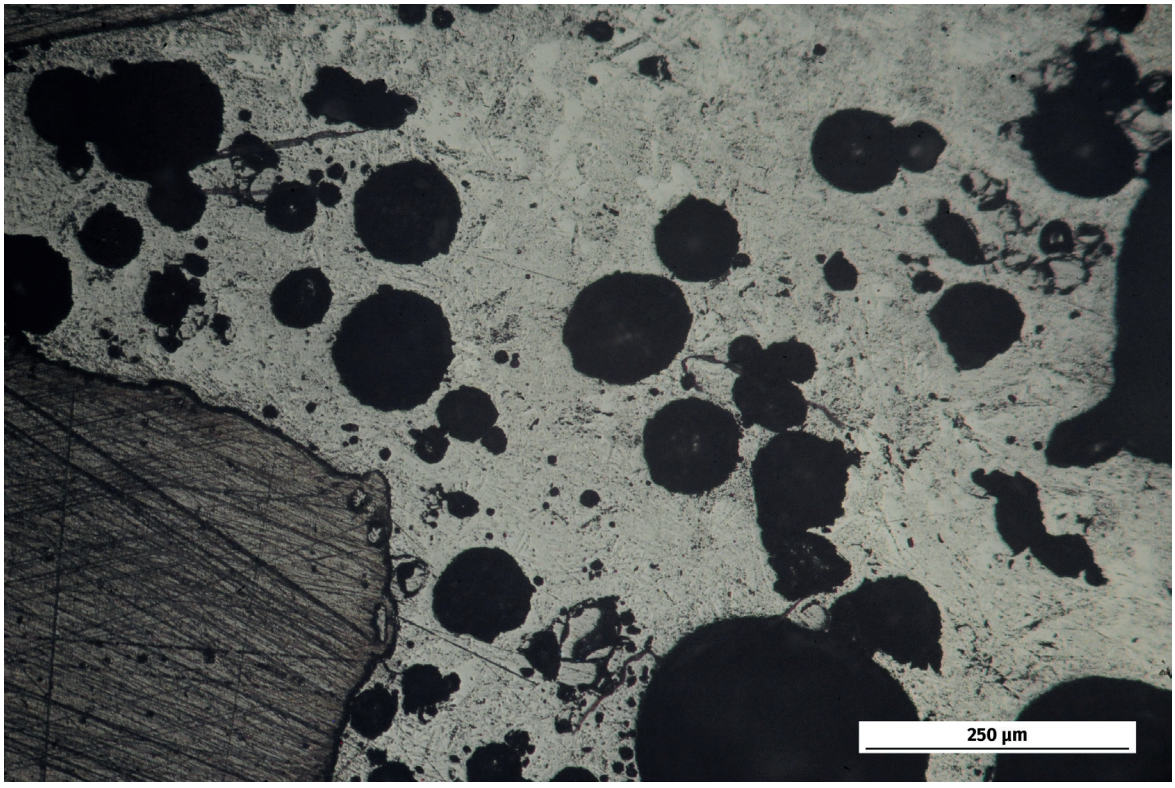

Fig. 11: Microstructure of slag layer present on the analysed crucible fragment (IFAO lab number 13314), photo: Jiří Kmošek

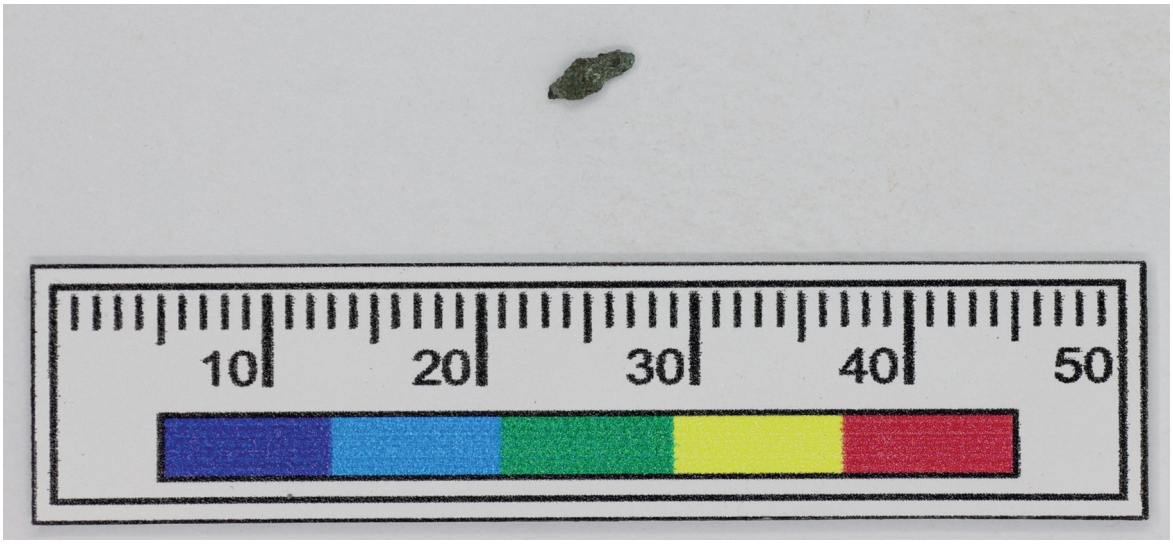

Fig. 12: Artefact fragment 47501Q/f-2-4, pXRF spectrum 202, photo: Martin Odler

These finds alone would provide sufficient evidence of the copper metallurgy happening nearby the house, and there are fortunately hundreds of pieces of evidence to confirm such activities. But only with a further detailed statistical evaluation can they add to the spatial analysis of the household function and use within House 169.[28]

8 General chronological structure and broader significance of the corpus

The main observable development within the corpus is a slow but steady increase of the use of tin bronze, in contrast to the number of the occurrences of arsenical copper, which is gradually decreasing. Unidentified single intrusions and perturbations might be an issue; thus, we are rather depending on the broad data framework within the excavated squares.

The chronological ordering of the initial batch of twelve samples (studied by us in 2019) was confirmed in general terms also with the study of the rest of the material. It enables us to observe the continuous use of the arsenical copper in the Dynasty 11 and 12 (with possible, but marginal occurrence of tin). Rather frequent occurrence of gold among the trace elements may indicate that the metallurgy at the site was connected to the well-documented jewellery production from semi-precious stones, found in Dynasty 12 and Dynasty 13 houses,[29] but it could also be a property of the used ore itself. The traces of gold were demonstrated for copper ore found at Old Kingdom Buhen in Lower Nubia.[30] Only further study of the material stored at Elephantine may demonstrate the validity of one or both of these hypotheses.

The introduction of tin bronze can be dated to Dynasty 13 and the Second Intermediate Period, which is in a broad agreement with observations on other Egyptian and Nubian sites.[31] Of all the results obtained on Elephantine, the simultaneous occurrence of tin and arsenic in analysed fragments of ceramic crucibles is most interesting. This is possibly the consequence of the transition of arsenical copper metallurgy to the tin bronze metallurgy, and of presumed recycling of older material as was also recently documented at C-Group Aniba, contemporary with early Dynasty 12.[32]

The corpus of Middle Kingdom and Second Intermediate Period metallurgical remains from Elephantine is small but significant, as it provides datable comparison to much larger assemblages from the Dynasty 12 Ayn Soukhna and the Dynasty 13 and Second Intermediate Period Tell el-Dabᶜa.[33] Intriguingly, a detailed study of Kerma metalwork from Upper Nubia

28 Sigl 2022.
29 Sigl/Kopp 2020; Kopp 2022.
30 el-Gayar/Jones 1989.
31 Gilmore 1986; Odler/Kmošek 2020.
32 Odler/Kmošek 2020.
33 Abd El-Raziq/Castel/Tallet 2011; Verly et al. 2021; Philip/Cowell 2006.

found more mutually exclusive groupings of arsenical coppers without tin and tin bronzes without arsenic.[34]

Our team is also working on the Early Bronze Age Old Kingdom settlement material from Giza and Late Bronze Age material from Tell el-Retaba, completing the survey of the Bronze Age Egyptian copper metallurgy, especially from settlements.[35] The corpus from Elephantine will help to demonstrate, how even the tiniest recovered settlement remains can further our understanding of the ancient *chaîne opératoire*, in this case of copper and its alloys. Returning to the point of size and scale from the beginning, metalworking remains from Elephantine may be tiny, but they are extremely important.

Acknowledgements

The research of Martin Odler was carried out as part of the UKRI-funded EgypToolWear – Metalwork Wear Analysis of Ancient Egyptian Tools project, a Horizon Europe Guarantee (originally Marie-Sklodowska Curie Fellowship), project reference no. EP/X026434/1. At the same time, research in 2023 for Jiří Kmošek was supported by the Research Scholarship of the German Archaeological Institute through the project "Copper metallurgy on the Elephantine Island during the Middle Kingdom". The research of Jiří Kmošek was also supported by the DOC Fellowship of the Austrian Academy of Sciences at the Institute of Science and Technology in Art, Academy of Fine Arts Vienna (PhD research project of Jiří Kmošek). The data used in this paper comes from the Realities of Life project of the German Archaeological Institute, Cairo, and we would like to thank the institute's directors and members for their continuous kind support over the years (Stephan J. Seidlmayer, Dietrich Raue, Johanna Sigl, Martin Sählhof, Marie-Kristin Schröder, Peter Kopp). We would like to thank the representatives of the Ministry of Tourism and Antiquities, Egypt, for the cooperation and support, especially Dalia Ahmed Meligy, Ashraf Nageh and their staff (Centre for Research and Conservation, MoTA); Desert Research Center (Abdel-Hameed M. El-Asar, Rasha Ali); Fernanda da Silva Lozada (Realities of Life project member); Anita Quiles, Nadine Mounir and Islam Ezzat (IFAO). The work in Egypt was partially supported by the action spécifique 19463, funded by the IFAO. We would like to thank Johanna Sigl, Leslie Anne Warden, and Ivana Šmulíková for the comments and suggestions on the draft of the text. The research visits of Martin Odler in 2021 and 2022 were funded by the European Regional Development Fund Project "Creativity and Adaptability as Conditions of the Success of Europe in an Interrelated World" (No. CZ.02.1.01/0.0/16_019/0000734).

34 Rademakers et al. 2017.

35 Preliminary reports on Giza: Odler/Kmošek 2019; 2022. A report on Tell el-Retaba is in preparation.

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Tab. 1: Selected finds from the Realities of Life project described in the article

pXRF spectrum no.	Season	Typology	Alloy	Admix-tures	Weight (grams)	Context no.	Find no.	sub_ item	Date	Sampling method	House	Room	Context type
190, 191	47	mineral	CuAs	Pb	2.19	47501Z/d	2	8	19.02.2018	floatation (heavy fraction)	H169	R08	Floor
192	47	prill	CuAs	Pb	1.545	47501V/h	2	7	10.02.2018	floatation (heavy fraction)	H169	R08	Floor
223	47	slag	FeCuAs	Co	1.025	47501C/e	2	4	01.11.2017	floatation (heavy fraction)	H169	R09	Fill layer
290, 291	46	crucible	FeCuAs	SnZnNiCo	10.61	46501G/s	21		20.02.2017		H169	R04	Fill layer
202	47	artefact	CuSn	As	0.008	47501Q/f	2	4	01.02.2018	floatation (heavy fraction)	H169	R04	Fireplace

Tab. 2: Total counts and weight of the metalworking remains from House 169

Artefact categories	mineral	prill / mineral	crucible	slag	prill	artefact / prill	artefact	gold	Total Count	Total weight (grams)
Rooms of House 169	4	1	1	16	122	1	35	1		
---				1	3				4	0.971
R02				4	13				17	10.582
R03	1			1	8		1		11	21.063
R04			1	5	21	1	18		46	21.405
R04/R07					1				1	0.155
R05					2		2		4	6.167
R07	1			1	7		2		11	1.749
R08	2			3	50		7	1	63	46.367
R09		1		1	9		5		16	17.067
(blank)					8				8	4.095
Grand Total	4	1	1	16	122	1	35	1	181	129.621

Tab. 3: Results of the pXRF analysis for the metalworking remains, chemical composition, in weight %

Reading No	Typology	Alloy	Admixtures	Cu	Fe	As	Sn	Sb	Pb	Zn	Ni	Bi	Ag	Co	Mn	Ti
190	mineral	CuAs	Pb	87.85	9.59	1.11	< 0.02	< 0.03	0.12	< 0.04	< 0.02	0.02	< 0.02	< 0.03	0.04	0.59
191	mineral	CuAs		87.41	3.01	0.57	0.01	< 0.02	0.03	< 0.03	< 0.01	< 0.01	< 0.01	< 0.01	0.02	0.19
192	prill	CuAs	Pb	90.65	5.43	2.05	< 0.03	< 0.04	0.05	< 0.04	< 0.02	0.01	0.22	< 0.02	0.09	1.07
202	artefact	CuSn	As	62.38	3.34	0.89	32.51	< 0.1	0.03	< 0.08	< 0.09	< 0.02	< 0.04	< 0.07	< 0.08	0.55
223	slag	FeCuAs	Co	79.72	8.83	10.26	0.03	0.03	< 0.01	< 0.02	< 0.02	0.01	< 0.02	0.08	0.12	0.75
290	crucible	FeCuAs	SnZnNiCo	66.43	30.14	0.67	0.26	0.04	0.02	0.08	0.08	0.01	< 0.02	0.36	0.17	1.21
291	crucible	FeCuAs	SnSbZn-NiCo	69.73	26.49	0.79	0.32	0.12	< 0.01	0.07	0.06	0.01	< 0.02	0.36	0.16	1.33

The international workshop ‘Excavating the Extra-Ordinary 2. Challenges & Merits of Working with Small Finds’ is the continuation of the successful format from 2019. Thematically, it deals with the challenging work with seemingly ‘ordinary’ small finds and their processing. This year, the range of content has been interdisciplinarily expanded to include the field of Near Eastern Archaeology.

To this end, specialists from excavations, museums and institutions presented and discussed the latest findings at Johannes Gutenberg University in Mainz in November 2022. This volume offers contributions from the workshop, including dealing with large quantities of material, analysing fragmentary finds and addressing methodological problems. The variety of materials discussed ranges from stone, wood and pottery artefacts to metal objects. The new volume this time also presents findings such as the functional reuse of objects of material culture.