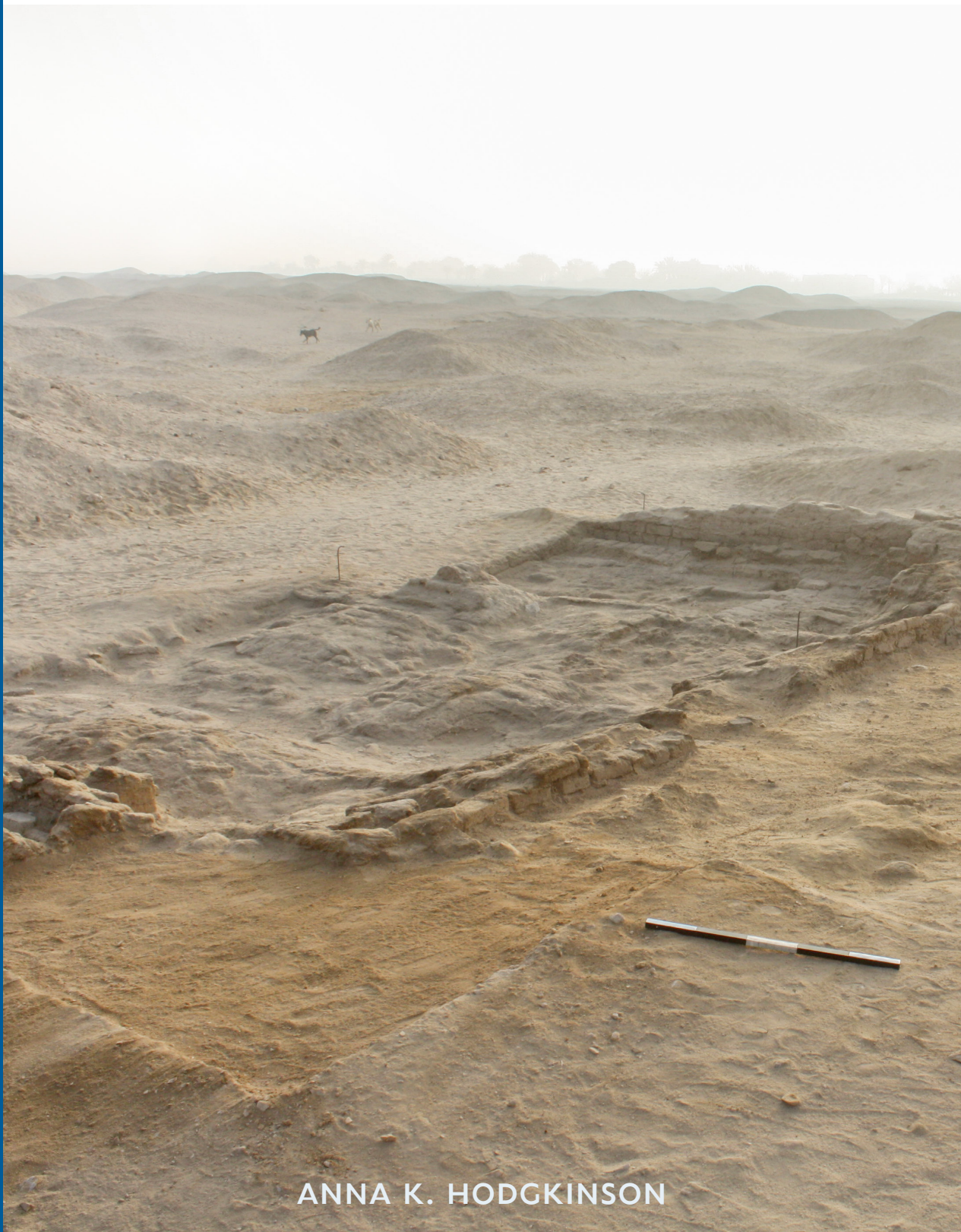




WORKING IN THE SUBURBS

The Archaeological Remains from Amarna Site M50.14–16



ANNA K. HODGKINSON

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FROM AMARNA SITE M50.14–16**

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by

ANNA K. HODGKINSON

with contributions by

*Alan J. Clapham, Sarah K. Doherty, Rainer Gerisch,
Salima Ikram, Frederik W. Rademakers and Kimberley Watt*

THE EGYPT EXPLORATION SOCIETY
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*This volume is dedicated to the memory of two people whose guidance,
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ACKNOWLEDGEMENTS

IT IS JUST over 100 years since the first excavation and publication of site M50.14–16 by Charles Leonard Woolley, and just over ten years since the site was first re-excavated anew by a team directed by me, Anna K. Hodgkinson, under the auspices of the Amarna Project and with the kind permission of the Egyptian Ministry of Tourism and Antiquities. Since Woolley's work at M50.14–16 in 1922, the site has been subject to discussion, especially with regard to its role in the glass and faience industry of Amarna. Several scholars have alluded to the 'glaze kiln' described by Woolley, and the material related to industrial activity excavated during the 1922 excavation. Although the main focus of the 2014 and 2017 excavation lay on the glass industry that was said to be present in the courtyard, the approach was a comprehensive one: as a team, we did our best to study every aspect of the archaeological remains encountered at the site and took into account the impact of the 1922 excavation and subsequent events.

This volume comprises 17 chapters (written by me, if not indicated otherwise): the introduction presents a brief overview of the site, its location and the 1922 excavation and objects, as well as the survey and excavation methods applied in 2014 and 2017. Chapter 2 discusses the archaeological remains found during the 2014 and 2017 excavations, presented by grid square, while the architecture of the two houses and the walls excavated in the courtyard are discussed in chapter 3. Chapter 4 (Kimberley Watt) presents the moveable stone furniture. The ceramic assemblage is presented and analysed in chapter 5 (Sarah K. Doherty), and the environmental remains are examined in chapters 6 (wood charcoal: Rainer Gerisch), 7 (plant remains: Alan J. Clapham) and 8 (zooarchaeology: Salima Ikram). Chapters 9–14 focus on the *chaînes opératoires* of the industrial processes encountered at the site, starting with the manufacture of glass and faience (chapters 9 and 10), followed by (copper-based) metallurgy (chapter 11: Frederik W. Rademakers), other objects related to high-temperature industry (chapter 12), the cold-working of stone and other materials into beads (chapter 13) and the stone and metal tools (chapter 14). These chapters are followed by the presentation and contextualisation of the various finished objects excavated at the site: jewellery made of various materials is discussed in chapter 15; various household-related items are presented in chapter 16 (16.1: cosmetic containers of glass and faience etc.; 16.2: items for decorating furniture and architecture; 16.3: bone and wood objects; 16.4: jar sealings and stoppers; 16.5: clay objects (papyrus seals and associated raw material; unidentified mud objects (possible tokens)); and 16.6: figurines and small-scale sculpture). Finally, chapter 17 comprises the analysis of the materials presented in chapters 2–16 (including an activity area analysis) and draws conclusions on the overall nature of the site.

In the same way as Amarna cannot be viewed as a single-period site with simple archaeology, an excavation, evaluation and publication project of this extent is not a task that can be carried out by one single person. I am extremely grateful to my family, friends and colleagues who have contributed to this work in one way or another. I emphasise the fact that this is a team effort and that funding was obtained through a variety of sources. Any omissions are entirely unintentional and my fault: I apologise to those who were left out.

Therefore, I first and foremost thank the late Barry Kemp wholeheartedly for all his support and encouragement, as well as his permission to excavate at site M50.14–16. Barry and I first visited the site together in 2013, a year after I started working at Amarna, and he gave me all the background information, including the grid reference points for Grid 12, that I needed to start the work. Sincere thanks are also due to the representatives of the Egyptian Ministry of

Tourism and Antiquities and the Supreme Council of Antiquities. Particular thanks are due to Ahmed Fathy, Gamal Abu Bakr, Fathy Awad, and Hamada Kellawy in the Minya/Mallawi/Amarna area for their support of the fieldwork. I am also indebted to the magazine inspectors, Tharwat Shawky Demian and Mustafa Khallaf and to the other local inspectors, including Mohamed Ibrahim, Zahara Ahmed Abd el-Fadil, Shima Sobhy and Martha Aatef Essa for their support.

The 2014 field season was funded by the G.A. Wainwright Fund (University of Oxford), the Corning Museum of Glass (Rakow Grant), the Thames Valley Ancient Egypt Society and the Association for the History of Glass. The team of archaeologists consisted of the following members: Anna K. Hodgkinson (field director), Susan Kelly, Ashley Bryant, Kimberley Watt, Mohamed Khalil Mohamed Khalil Osman (inspector from the Ministry of Tourism and Antiquities) and two trainee inspectors, Dora Mohamed Nagy Abdel Salam and Tharwat Shawky Demian. The team employed eight workmen from Hagg Qandil: Walid Mohamed Omar, Hilal Mohamed Omar, Abdel Hafiz Abdel Aziz, Reda Omar Mohamed, Ahmed Mokhtar Mahmoud, Salah Osman Mehenni, Bilal Nazzer Omar and Hosny Osman Mohamed.

The 2017 field season was funded through a Fieldwork and Research Grant from the Egypt Exploration Society (EES), which also covered two study seasons in 2018 and 2019. In 2017, the team of archaeologists consisted of the following members: Anna K. Hodgkinson (field director), Antonio Cantele, Kay Kossatz, Thais Rocha da Silva, Kimberley Watt, Cordula Werschkun, Kareman Abdelalim (inspector from the Ministry of Tourism and Antiquities) and trainee inspector Nabil Abdelteiff. Thirteen workmen from Hagg Qandil and Et-Till were employed: Walid Mohamed Omar, Ahmed Mokhtar Mahmoud, Salah Osman Mehenni, Hilal Mohamed Omar, Abdelaal Talaat Abdelaal, Ahmed Hamdy Ali, Bilal Nazzer Omar, Hosny Osman Mehenni, Abdel Hafiz Abdel Aziz, Reda Omar Mohamed, Osman Mohamed Osman, Hassan Mohamed Raleb and Mohamed Abdelghafar Abdelhag.

The 2018 study season (financed by the EES) included the following members: Anna K. Hodgkinson (glass, faience, small finds in general), Thais Rocha da Silva (faience beads, other small finds), Cordula Werschkun (agate debris) and Kay Kossatz (illustration work). We were joined by Qaud Kamel, conservator of the Ministry of Tourism and Antiquities. In 2019, again funded by the EES, the following team members studied material from the M50.14–16 excavations: Sarah K. Doherty (ceramics), Frederik W. Rademakers (metallurgy) and Rainer Gerisch (wood charcoal). Cecilie Lelek Tvetmarken pre-sorted the animal bones, carried out the flotation of soil samples and worked on the excavation archive.

In 2018, I was able to bring a portable X-Ray Fluorescence instrument to Amarna to carry out chemical analysis of glass and faience on-site at Amarna (see chapters 9 and 10). This was made possible through a post-doctoral fellowship from the excellence cluster Topoi (Freie Universität Berlin, project number A-6-Cofund-1) and the generous loan of equipment by Verena Lepper at the Egyptian Museum of the Berlin State Museums. I am very grateful to the team at the Rathgen Research Laboratory, also of the Berlin State Museums, in particular Ina Reiche and Stefan Röhrs, for granting access to equipment and training, for lending me standard reference materials and for aiding with the evaluation of analysis results.

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(*Industrielle Tätigkeiten in den Wohnbezirken: Die Aufarbeitung der archäologischen und materiellen Hinterlassenschaften der häuslichen Werkstatt M50.14–16 in Amarna* in German; grant number 441869182), which also covered part of the costs of this publication. Additional financial support for this volume was provided by the Institute of Egyptology at Freie Universität Berlin, where the project was hosted. I am extremely grateful to Jochem Kahl for his unwavering support of the project and for providing me with access to information and teaching opportunities. The closely woven network of colleagues at Freie Universität Berlin have also contributed to the success of the project, and special thanks are due to Ana Sofia de Carvalho Gomes for her support and encouragement.

In 2021, I was accompanied at Amarna by Katrin Glosauer, who studied the faience tiles, while Rainer Gerisch was once more present in 2022 to continue the study of the wood charcoal. The same season encompassed a study of the plant remains by Alan J. Clapham, while in 2023, Salima Ikram studied the animal bones.

A second Rakow Grant from the Corning Museum of Glass, granted in 2022, made possible a series of archaeological experiments with the aim of making glass from its raw materials (publication pending). These experiments, as well as a series of bead-making experiments using low-level technology, were conducted by myself and my very close friend and colleague, Miriam Bertram.

The archaeological material illustrated in this volume was drawn by a number of people, including Andy Boyce, Juan Friedrichs, Katrin Glosauer, Kay Kossatz and Cordula Werschkun. The stellar object photographs were taken by photographer Andreas Mesli, while site photographs, and some of the object images, were taken by the team of archaeologists, as indicated. The colourful figures showing compositions of drawings and/or photographs, Plans 1–4 and Figures 2.5, 2.54 and 2.55 were produced by Fabien Balestra based on the drawings made by archaeologists in the field, after they had been digitised by the author and Katrin Glosauer. The section drawings included in chapter 2 were also digitised by Fabien Balestra. The author is grateful to photogrammetrist Paul Docherty for producing the 3D model included in chapter 17.

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The team at Amarna is not just a bunch of colleagues, but consists of close friends – almost family. These people make living and working at Amarna a unique and wonderful experience. We live, work, eat, laugh and cry together and always support one another and one could not wish for better friends: love and thanks are due to Miriam Bertram, the late Barry Kemp, Sue Kelly, Fabien Balestra, Juan Friedrichs, Julia Vilaro Rodriguez, Marsha Hill, Kristin Thompson, Delphine Driaux, Stephanie Boonstra, Alexandra Winkels and our wonderful house staff: Mohamed Omar, Abdu Mohamed Omar, Do'a Gamal, Mohamed Hamada and our driver Heissam Rabi'a, together with the teams from Et-Till and El-Hagg Qandil – thank you all!

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Anna K. Hodgkinson, February 2025

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I am deeply grateful to Dr Anna Hodgkinson for giving me the opportunity to join two unforgettable fieldwork missions to Amarna. I will always treasure the walks from the dig house to the site, the thrill of discovering even the tiniest pieces of faience or glass, and her inspiring excitement at uncovering evidence of workshop activities. Her trust in me during the 2014 season, when I mentored junior colleagues, was invaluable. Writing this chapter has been a rewarding challenge, and I owe much to her guidance and encouragement. I would also like to pay tribute to Barry Kemp, who will always remain the protector of this magical site.

Chapter 5 – Sarah K. Doherty:

I would like to thank Anna Hodgkinson for the invitation to study this pottery assemblage and for supporting the work presented in this chapter. I am very grateful to Jennifer Peacock for copy-editing this chapter, to Frederik Rademakers for his improving comments and to Katrin Glosauer for inking the drawings. Any errors are entirely my own.

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This contribution was written in memory of Professor Karl Wilhelm Butzer (1934–2016), Austin. Not long after the manuscript was completed, the team learned with deep regret of the passing of Mr Kemp at Amarna. He will be greatly missed. This chapter is now dedicated in the first place to him.

Chapter 11 – Frederik W. Rademakers:

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ABBREVIATIONS

Museums and institutions

Ashmolean Ashmolean Museum, Oxford
BM British Museum, London
Bolton Bolton Museum, Bolton
Cairo Egyptian Museum, Cairo
Colorado Colorado Museum of Natural History
DOG Deutsche Orient-Gesellschaft
EES Egypt Exploration Society
Florence Museo Egizio, Florence
Garstang Garstang Museum, University of Liverpool
Horniman Horniman Museum, London
Hunterian Hunterian Museum, University of Glasgow
IFAO Institut français d'archéologie orientale du Caire
ISAC Museum of the Chicago Institute for the Study of Ancient Cultures
MFA Boston Museum of Fine Arts
MMA Metropolitan Museum of Art, New York
Petrie Museum Petrie Museum of Egyptian and Sudanese Archaeology, London
San Diego San Diego, Museum of Us
St. Louis St. Louis Archaeological Institute of America
V&A Victoria and Albert Museum, London

Measurements etc. in tables

max. maximum
H height
W width
T thickness
diam. diameter
w/o without
D depth
segm. segment(s)

Conventions for archaeological units and structures

<structure> (e.g. walls, installations)
 [cut] (e.g. the shape/hollow form of a pit)
 (deposit/fill) (e.g. fills of pits and other features, post-abandonment depositions and collapse deposits)
floor (e.g. surfaces that were used for various activities)

CHRONOLOGY

The dates provided in this brief chronological overview are taken from Shaw (2000, with permission). Please see that publication for further detail. Note that the question of the succession of Akhenaten will not be discussed here.

Predynastic Period	c.5300–3000 BCE
Early Dynastic Period	c.3000–2686 BCE
Old Kingdom	2686–2160 BCE
First Intermediate Period	2160–2055 BCE
Middle Kingdom	2055–1650 BCE
Second Intermediate Period	1650–1550 BCE
New Kingdom	1550–1069 BCE
18th Dynasty	
Ahmose (Nebpehtyra): 1550–1525 BCE	
Amenhotep I (Djeserkara): 1525–1504 BCE	
Thutmose I (Aakheperkara): 1504–1492 BCE	
Thutmose II (Aakheperenra): 1492–1479 BCE	
Thutmose III (Menkheperra): 1479–1425 BCE	
Hatshepsut (Maatkara): 1473–1458 BCE	
Amenhotep II (Aakheperura): 1427–1400 BCE	
Thutmose IV (Menkheperura): 1400–1390 BCE	
Amenhotep III (Nebmaatra): 1390–1352 BCE	
Amenhotep IV/Akhenaten (Neferkheperurawaenra): 1352–1336 BCE	
Neferneferuaten (Smenkhkara): 1338–1336 BCE	
Tutankhamun (Nebkheperura): 1336–1327 BCE	
Ay (Kheperkheperura): 1327–1323 BCE	
Horemheb (Djeserkheperura): 1323–1295 BCE	1550–1295 BCE
19th Dynasty	1295–1186 BCE
20th Dynasty	1186–1069 BCE
Third Intermediate Period	1069–664 BCE
Late Period	664–332 BCE
Ptolemaic Period	332–30 BCE
Roman Period	30 BCE–395 CE

PDF CONTAINING ADDITIONAL MATERIAL

This book has an additional PDF accompanying it, which contains most of the tables of data and larger versions of the site plans and some of the Harris matrices. You will be referred to the PDF within the text where relevant. To download this PDF for free, please visit <https://www.ees.ac.uk/resource/working-in-the-suburbs-the-archaeological-remains-from-amarna-site-m50-14-16.html> or scan this QR code:



CHAPTER 1: INTRODUCTION AND BACKGROUND

Anna K. Hodgkinson

1.1 General introduction: aim and scope of this volume

THIS VOLUME PRESENTS, discusses and contextualises the archaeological site known as M50.14–16, a New Kingdom domestic and workshop site in the Main City South at Tell el-Amarna (Amarna: ancient Akhetaten in Middle Egypt, c.1353–1336 BCE; Figures 1.1 and 1.2).¹ Site M50.14–16, which is located c.80–100 m to the south of the house of Ranefer (N49.18) and near the Grid 12 excavations carried out in the early 2000s (Kemp and Stevens 2010a; 2010b; see Figure 1.3), was excavated first in 1922 and then in 2014 and 2017.

Site M50.14–16 was initially excavated in a hurried fashion and poorly documented at the end of the 1922 season at Amarna by Charles Leonard Woolley (1880–1960) on behalf of the Egypt Exploration Society (EES) (Peet and Woolley 1923: 19). In his excavation diary (EES archive TA.001.01), Woolley briefly mentions the site as being an industrial complex, describing it as a ‘centre for glaze-making industries’, although he states the following day that there were only ‘poor remains from factory’ (Figure 1.4). Unfortunately, no photographs or any detailed drawings beyond a rough plan of the site were produced (Figure 1.3 and Plan 4). The excavators also left the building remains (mostly mud brick) uncovered, leading to their subsequent erosion through wind and water.

It is because of the poor level of documentation of the 1922 excavation that previous studies discussing site M50.14–16 were only able

to draw brief and vague conclusions about the fact that glass and faience were processed in this area as well as about the extent of these industries in relation to the surrounding areas (e.g. Shortland 2000a: 68; Nicholson 2007: 130). However, despite the poor record from the early excavation, it was obvious that the area in which M50.14–16 is located had been involved in the manufacture of vitreous objects (see Hodgkinson 2017: 23, 100–102, 232, 277). Therefore, the author initiated a new project aimed at establishing the extent and set-up of the industrial activities present at the site, and to explore the role played by M50.14–16 in the industrial landscape of Amarna. New excavations, led by the author in 2014 and 2017, yielded a substantial amount of detailed and well-documented archaeological data regarding the site. The excavated area, which covered a total of c.520 m², comprises a main, domestic building (M50.16), a secondary building (M50.15) and (outside) working areas (M50.14) (Plan 4). The latter contains some stretches of mud-brick walls that possibly functioned as partition walls, subdividing the courtyard into areas and rooms, some of which may have been roofed.² Some *in-situ* evidence of industrial activities was excavated, the most prominent industry being glass working (e.g. glass ingots and fragments of the same in addition to glass rods and extracts) in addition to faience manufacture (e.g. clay moulds, inlays and waste from bead manufacturing),

¹ Dates are from Shaw 2000; see the Chronology, pvii. Life dates for archaeologists are from Bierbrier 2012.

² Please note that an alternative interpretation for these walls has been suggested: see pp55–57, 175; Figure 3.32.



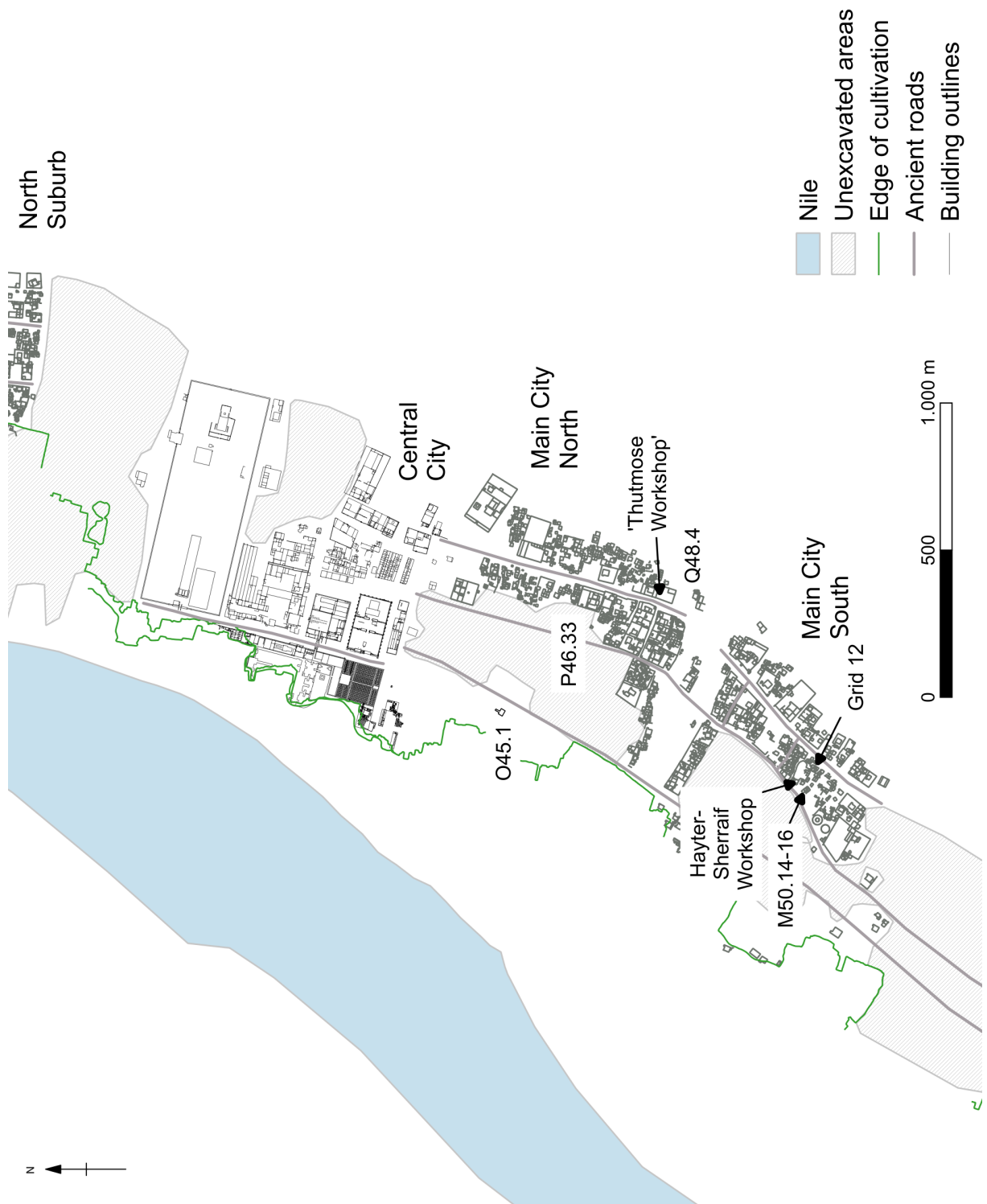


Figure 1.2 Map of Amarna (south of the North Suburb) showing the location of site M50.14-16 and other sites discussed in this volume. (Map: A.K. Hodgkinson, based on data from Kemp and Garfi 1993.)



Figure 1.3 Location of site M50.14-16 in relation to the house of Ranefer, Grid 12 and house N50.23 in the Main City South. (Composite map of pl. I from Peet and Woolley 1923 and fig. o.2 from Kemp and Stevens 2010a. Courtesy of the Egypt Exploration Society.)

Figure 1.4 Excerpt from Woolley's field diary, outlining the work carried out at site M50.14-16 between 21 and 25 January 1922 (TA.001.01). (Courtesy of the Egypt Exploration Society.)

was expected - probably the largest house yet dug on the site except Petrie's No 13. It has been completely dug out before (burnt over) & the masonry by Petrie: but many frs. of inscription found.

Jan. 17. Work on House E. Started masonry walls as impossible to finish house out in 2 days. Found charred masonry with remains of painted inscription. Pigat arrived for division of spoils.

Jan. 18. Went through all stuff with Edgar & arranged division. ~~He~~ Eight men stopped work at mid-day to clean their clothes for returning home tomorrow. At lunch time received letter from E.E.S. stating that a further floor had been placed to my credit, so re-started all work in the afternoon. Inscription shows that the house (E) is that of the vizier.

Jan. 19th. Rest day. Edgar left.

Jan. 20. Continued work on House E, cleaning properly masonry of masonry walls. House proves to be splendid example, the best yet found on the whole site. Many painted niches (much ruined) contain the owner's title, but name still uncertain. Plan very elaborate and fittings such as stone baths, mastabas etc. well preserved.

Jan. 21. Continued on House E. Found at top of stepped ramp

The lower part of one of the stone panels, almost in position, with the name & titles of the vizier Mokht. Finished cleaning up the house & in the afternoon moved all the men across to new site just south of R. R. station's house.

Jan. 22. Photographing & moving house E. The new site proves to be, as hoped, a center of glaze-making industry: many moulds, frit-balls, crucibles & frs. of slag & glaze lying up.

Jan. 23. Continued on M-N site: very poor results from factory: but No 13 produced new type of off-white in situ & a stone doorway painted red.

Jan. 24. Continued on M-N site. Started packing. Stole men from Newton's office. Whiteman arrived.

Jan. 25. Continued on M-N site & finished up houses there. Saw andah of stolen stone. Stopped work for season.

Jan. 26. Paid off Quftis & sent them home, keeping only Ali Osman: arranged for Mokht. Awarad & Hamadi to return after 10 days to act as chauffeurs: Mokht. Awarad to be relieved by Ambarah after 6 weeks, & after 6 weeks to return & share duty with Ambarah permanently, Hamadi going home. Kept all Quennawi's men, as the chief of the stone was amongst them. Heard story about stone current in village.

Jan. 27. Missing stone restored. Sent Quennawi home, keeping on

Ali Soliman for postal duties etc. Packing.

Jan. 28. Packing. Wamwiri (N) arrived.

metal working (e.g. crucibles and casting spills) and agate processing (including agate debris and unfinished beads). The findings appear to indicate that the site played an important role in the glass industries of Amarna as well as constituting an important link in the industrial network present in the Main City South and in the international exchange of glass during the Late Bronze Age (LBA).³ Furthermore, the site is a unique example of an urban domestic workshop for the manufacture of vitreous materials at the household level, potentially forming a missing link in the urban network of industrial activities at Amarna.

The 2014 and 2017 fieldwork: (1) verified and built upon the 1922 site plan; (2) documented the extent of the 1922 excavation and the damage caused by subsequent neglect and exposure of the brickwork; (3) produced a detailed archive of the archaeological and artefactual remains from the site; and (4) subsequently protected the walls and archaeological features that had been excavated and recorded from further decay by covering them with sand. The excavations were followed by a number of study seasons, which took place at Amarna in 2018, 2019 and 2021–2023.

During the study seasons and post-excavation analysis, the archive of the 2014 and 2017 excavation seasons (see Hodgkinson 2015; 2019) was reviewed and the individual object categories analysed and documented by various materials specialists (Figure 1.5). This allowed a reconstruction of the historical development and role of the site. While the careful study of all objects provided an insight into the individual and linked *chaînes opératoires* of production (i.e. the production chains that describe the selection and procurement of raw materials,

their mixing, shaping and transformation; see Sellet 1993; Schlanger 2005), the study of the spatial distribution of objects through digital mapping enabled the tentative identification of activity zones. The analysis of the archaeological evidence of manufacture delivered new information on LBA socio-economic processes in an urban environment, in particular with regard to the *chaîne opératoire* of craft production and its organisation. The contextualisation of the site within its direct environment facilitated the understanding of M50.14–16 as an urban domestic workshop and the activities carried out by its occupants at the site and across Amarna. A more detailed overview of the aims and objectives of the analysis can be found in section 1.7.

Various theories and methods were used for the analysis of the material that was excavated in both 1922 and the 2010s: archaeological and architectural examinations together with the analysis of the archival material from the early excavation and museum research for tracing the objects from the 1922 season. The *chaîne opératoire* approach was used to contextualise the objects related to industrial activities. A theoretical and culture-historical approach was applied to the analysis of the objects related to household activities (seals, implements, jewellery) and personal piety (figurines, pendants). Spatial analysis (using geographical information systems: GIS) was used on the excavated material in order to detect patterns in the use of space and to better understand how manufacture was organised at the site. Finally, a social and socio-economic analysis enables us to interpret the site in light of its character as a domestic workshop, not only in its own right, but also in its direct neighbourhood at Amarna and in the cityscape as a whole.

1.2 Background to the 2014 and 2017 excavation seasons

The 1922 excavation

Site M50.14–16 was first excavated over a period of five days in late January 1922 under

the direction of Woolley, an archaeologist who would later become famous for his excavations at the site of Ur (in ancient Mesopotamia, modern

³ It is, however, necessary to stress here that despite the modern and meticulous excavation and recording system used during the new excavation, the impact of the 1922 excavation means that the bulk of the excavated material cannot be considered as being *in situ*.



(a)



(b)



(c)



(d)

Figure 1.5 People at work in the excavation house in 2018, 2019 and 2022: (a) C. Werschkun recording agate debitage; (b) Q. Kamel conserving the blue-painted vessel object no. 42030; (c) R. Gerisch identifying charcoal; and (d) A.K. Hodgkinson working on the glass from site M50.14–16. (Photos: A.K. Hodgkinson, R. Gerisch and A. Mesli.)

Iraq), where he worked between 1922 and 1934. Further members of the 1921–1922 mission to Amarna, carried out on behalf of the EES, included Francis Giesler Newton (1878–1924), Battiscombe Gunn (1883–1950), Thomas Edward Lawrence (1888–1935) and Philip Langstaffe Ord Guy (1885–1952) in addition to a large Egyptian workforce (Griffith Institute 2015). Newton acted as the mission's architect and was therefore in charge of the drawing of plans, including that of site M50.14–16 (Peet and Woolley 1923: pl. I). The objective of the work at the site was the clearance of as much ground as possible, the examination of any buildings of interest to the excavators and to bring back objects for the museums that sponsored the excavations (Figure 1.6). Therefore, no specific agenda or research question existed for the work at site M50.14–16.

The work was published in the form of a preliminary excavation report (Woolley 1922) and is also covered in the first volume of *The City of Akhenaten* series, which includes a plan of the area (see Figure 1.3) as well as information on the houses, the few registered finds and a separate description of a painted niche

(neither photographed nor drawn) (Peet and Woolley 1923: 19, 43, pl. I). In addition, the archive of the EES in London contains a small number of materials related to the 1922 excavation, including Woolley's excavation diary for the season, an object catalogue and a notebook in which amulet/pendant types, beads, mould types and ring bezels were recorded, sometimes with their provenance (EES archive TA.002.08).

The 1921–1922 season at Amarna took place between 20 October 1921 and 10 February 1922. Apart from a series of houses in the Main City, the work concentrated on the Workmen's Village, the 'Precinct of the Southern Pool' (the *Maru Aten*) and the so-called 'River Temple'. The work at site M50.14–16 was conducted during a brief period at the end of January 1922 when the team was working on the house of the Vizier Nakht (initially designated 'House E', K50.1), which proved to be somewhat more complex (and rewarding), as can be discerned from Woolley's diary. It is possibly due to this fact that site M50.14–16 did not receive much attention in 1922. This resulted in there being neither any drawings (except for the overall plan



Figure 1.6 Archival photo showing people at work in grid square O.49 during the 1921 excavation season at Amarna (EES negative TA.NEG.21.57). Looking east. (Courtesy of the Egypt Exploration Society.)



Figure 1.7 The site prior to excavation in 2014: looking north across M50.14 and M50.16 and the large spoil heap north of the houses, towards the house of Ranefer. (Photo: A.K. Hodgkinson.)

by Newton, see Figure 1.3) nor any photographs of the site. As outlined in greater detail below (section 1.3), objects were registered on object cards, while pottery was registered according to its type, most of it being discarded at the site.

According to Woolley's excavation diary, work at M50.14–16 took place between 21 and 25 January 1922. The entry in his diary from 21 January 1922 first describes the work at 'House E', after which Woolley wrote: 'Finished cleaning up the house + in the afternoon moved all the men across to new site just south of Ranefer's house'. On 22 January, Woolley noted in his diary: 'Photographing + noting house E. The new site [referring to M50.14–16] proves to be, as hoped, a centre of glaze-making industry: many moulds, frit pans, crucibles + ps. of slag + glaze turning up'. The following day he wrote: 'Continued on M-N site: very poor results from factory[...]', and on 24 January he noted: 'Continued on M-N site. Started packing. Stela stolen from Newton's office'. This indicates that the focus was gradually sliding away from industrial site M50.14–16 to other matters. The final entry concerning the site was made on 25 January: 'Continued on M N

site + finished up houses there'. The season appears to have been concluded around this time; the final diary entries were concerned with the stolen stela (later retrieved), packing up and paying the workers. The very final entry of the season dates to 28 January: 'Packing. Wainwright arrives' (Figure 1.4).

It was on 18 January, i.e. before work began on site M50.14–16, that Woolley wrote about the finds division process in his diary. The fact that this had already taken place before the start of the excavation demonstrates that the excavators probably did not expect there to be many objects from the site.

According to the published and archival information, the area excavated in 1922 encompasses the two houses, M50.15 and M50.16, and the southern and eastern sections of the courtyard, M50.14, a total of c.410 m². The area to the west of house M50.16 was not cleared in 1922, and this is discernible from both the 1922 and the 1964 aerial photographs (Figure 1.11 and Figure 1.12; see below). In 2014, a large spoil heap was found to cover the area north of the northern boundary walls of the two houses (Figure 1.7): since the 1922 excavation area is

also delimited by these, it is likely that this mound, at least in part, already existed in 1922 and that the material from the interior of the houses was added to it. In the southern courtyard, the area up to the remains of the enclosure wall (only preserved in the south-east; see pp112–113, 134, 173) was cleared and the most prominent sections of walls and features were recorded on a new plan of the site. Newton's plan (see Figure 1.3 and Plan 4) shows three circular features (pits) in the southern and south-eastern sections of the courtyard (also encountered in 2014 and 2017), in addition to a cylindrical ceramic oven and a possible 'box hearth' in the south-eastern part of house M50.16 and a ceramic jar (not encountered in 2014) in room 7 of the same house.

The only previous season conducted on behalf of the EES in the Main City at Amarna was between 18 January and 23 March 1921, led by Thomas Eric Peet (1882–1934). This work uncovered, among other buildings in the Main City South, the house of Ranefer (N49.18), which was re-excavated in the early 2000s under the direction of Barry Kemp (1940–2024) (Kemp and Stevens 2010a; 2010b). Prior to this, the only excavations that had been carried out in the city of Amarna were those led by William Matthew Flinders Petrie (1853–1942) in 1891–1892 and by Ludwig Borchardt (1863–1938) on behalf of the Deutsche Orient-Gesellschaft (DOG) in 1922–1914. It was Petrie who first attempted to reconstruct the glass working industry of the city (Petrie 1894: 25) after his work uncovered a large amount of debris related to glass production (Smirniou and Rehren 2011) and thousands of faience moulds in and near the Central City (Figure 1.8). The area near where the faience moulds were found in the far-northern Main City North was later excavated under the direction of Paul Nicholson as site O45.1 and recognised as a workshop for the manufacture of glass, faience and pottery. Two large furnaces, capable of achieving temperatures sufficient for the production of raw glass, were found there (Nicholson 2007; see pp29, 287–288).⁴

Petrie (1894: 25) provides some rough information on the locations in which he excavated the objects related to the vitreous materials

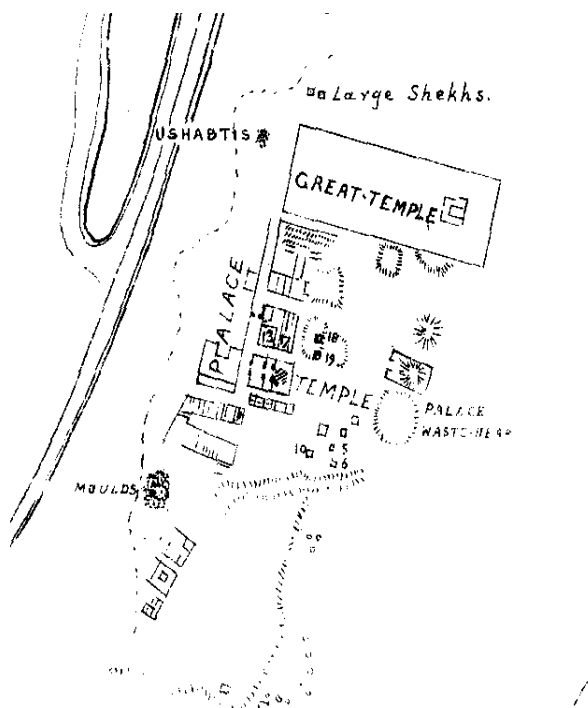


Figure 1.8 Petrie's map of Amarna (excerpt). (From Petrie 1894: pl. XXXV.)

industry (glass and faience), although none of the workshops he described in his volume *Tell el Amarna* could be relocated. However, he reconstructs what he believed to be the correct process (Figure 1.9). This reconstruction is based on some of the excavated objects as well as some oven debris he came across, and which he describes as follows (Petrie 1894: 25):

Fortunately the sites of three or four glass factories, and two large glazing works, were discovered; and though the actual work-rooms had almost vanished, the waste heaps were full of fragments which shewed the methods employed: moreover the waste heaps of the palace, as we have mentioned in Chap. II, contained hundreds of pieces of glass vases which illustrate the finished objects. We can therefore now trace almost every stage and detail of the mode of manufacture; and in this chapter we shall follow the course of the processes employed for both glass and glazes.

Unfortunately, Petrie neither recorded the

4 Nicholson (2007: 13–20) also provides a thorough overview of Petrie's understanding of the glass industry.

precise locations of the objects related to this industry that he excavated at Amarna nor noted what happened to them. The Petrie Museum contains a large number of objects that describe the *chaîne opératoire* of vitreous materials manufacture, although without a precise provenance.

Petrie's publication was available to Woolley at the time of his excavation season in 1921–1922, and it is because of Petrie's reconstruction that Woolley's preliminary report on the domestic quarters excavated during this season reads (Woolley 1922: 64):

Digging in this industrial quarter we found this year a centre of glass and glaze manufacture. There were no factories; the workmen carried on their trade with the simplest of appliances in their own small houses and courtyards, after the normal fashion of the East, so that there was little to distinguish these ruins from others of their size; but from them we recovered a fine series of specimens illustrating every stage of the industry. This material is precisely similar to that obtained by Petrie, who (*Tell el-Amarna*, p. 24) has so thoroughly discussed the process of manufacture that there is no need to repeat it here.

One cannot be absolutely certain that the site described here by Woolley actually refers to site M50.14–16, although neither this report nor the final publication or Woolley's journal make any other mention of glass workshops excavated during this season.

The excavation methods and recording system used in 1922

The method of excavation used by the early

archaeologists was by no means as thorough as it is nowadays (see sections 1.6 and 1.7). A multitude of (frequently unnamed) labourers (male and female: the women and girls carrying baskets, while the men operated the digging equipment) were employed, supervised by *Quftis* (specialist foremen and workers from Luxor) (Figure 1.6). Excavation was carried out mainly by the use of the so-called *turriah*, a type of mattock usually used in the fields by farmers for ploughing, with a long edge at the end, which permitted the removal of large amounts of soil. Detailed work, such as the cleaning of floor surfaces and more delicate tasks, was done by brush, while tweezers and other tools were also used (Chubb 1954: 54, 71, 83). This excavation method did not (or, rather, very infrequently) take into account stratigraphy or site formation processes, and all layers of soil were removed together without any record of their relationship to one another. At around the same time, the Wheeler-Kenyon method was being developed and adopted in Europe and Western Asia (from the 1930s), forming a contrast to what was happening at Amarna at the time. In addition, since the Harris matrix was not developed for use in archaeology until the 1970s (cf. Harris 1989: 7–13, 40–68), no stratigraphic matrices were produced for the site.

Amarna was considered a strictly 'one-period site', although recent excavation has proven that the history of occupation is far more complex, even in the relatively short period during which the city was settled (Kemp and Stevens 2010a: 5). An attempt to understand the stratigraphic sequence of the house of Ranefer was made by Peet and Angelo George Kirby Hayter (1863–1927) when they excavated a pit in the 'transverse hall' (Peet and Woolley 1923: 2; Kemp and Stevens 2010a: 14). The excavation of such pits was not a regular occurrence and served the sole purpose of reconstructing the occupation and

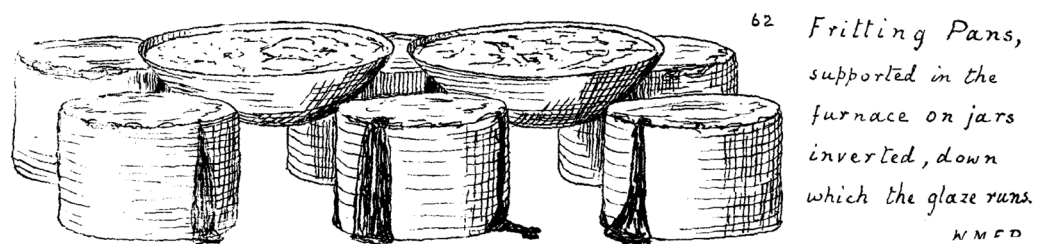


Figure 1.9 Petrie's reconstruction of the glass-making process. (From Petrie 1894: pl. XIII.)

remodelling of that particular house. This pit and later investigations, however, demonstrated that the first stages of *tell* formation can be observed at Amarna, with waste and builders' rubble being used to raise the level of the floors prior to rebuilding (Kemp and Stevens 2010a: 502).

In particular within houses, archaeological deposits from their use periods, their abandonment and the rubble from collapsed walls as well as windborne sands were removed as one, revealing any features below. Features related to post-abandonment activity, such as robber pits, etc., were usually not recorded during the old excavations (at least not in drawing), the latter being indicated only after all layers had been removed. It has to be noted, however, that only noticeable features were marked on the plan and in the archaeologists' notebooks, these being larger pits, standing firing structures and stone- and brick-built furnishings, including fixed stone furniture, brick-made benches and staircases. This superficial planning method then led to the definition of typologies, allowing a hierarchical ranking of the houses at Amarna, as carried out by Herbert Ricke (1901–1976) (Ricke 1932), Christian Tietze (1985; 2008) and Piers Crocker (1985) (see pp139–143).

In addition, walls were traced during the excavation: once a mud-brick wall had been encountered below the modern surface (if it was not preserved and visible above ground level) and its rough direction defined, it was followed and exposed by the workmen. Sometimes, this resulted in the floor layers not being found, in particular when a large amount of soil had to be moved or collapse layers of hardened mud bricks slowed down the excavation process. This 'chasing' of walls led to the courtyards of houses frequently remaining unexcavated. Thus, only the walls of the houses, the surrounding enclosure walls and some walls belonging to outbuildings, such as bakeries and smaller buildings inside the enclosure walls, were excavated and mapped. Quite often, the remaining area of the courtyard would not be cleared, and thus, features in these areas would go unnoticed. Since objects were collected and recorded according to building number, which referred to the whole building (i.e. the house and its courtyard), this practice is especially problematic when attempting to reconstruct

areas of activity.

As was the case with most plans from the 1922 mission, Newton's plan of buildings M50.14–16 is reasonably accurate, albeit rather rudimentary; the walls consisting of straight lines and there being some errors in the alignment of the northern walls of the houses, for instance. The problems regarding this plan's orientation and placement with regard to its immediate surroundings are discussed in section 1.6. Again, this displacement error is probably due to the lack of time at the end of the season (see Plan 4).

Unfortunately, in contrast to current archaeological practice, the excavated areas were not backfilled, but left open to the elements, which frequently led to standing walls collapsing. This was usually due to wind and sand erosion, resulting in sheet collapse, as described by Kemp (1995) (Figure 1.10). This collapse sealed any intact or disturbed floor deposits as well as any unexcavated archaeology in the area of M50.14, as described in chapter 2. In the case of buildings M50.14–16, the walls of which still stood

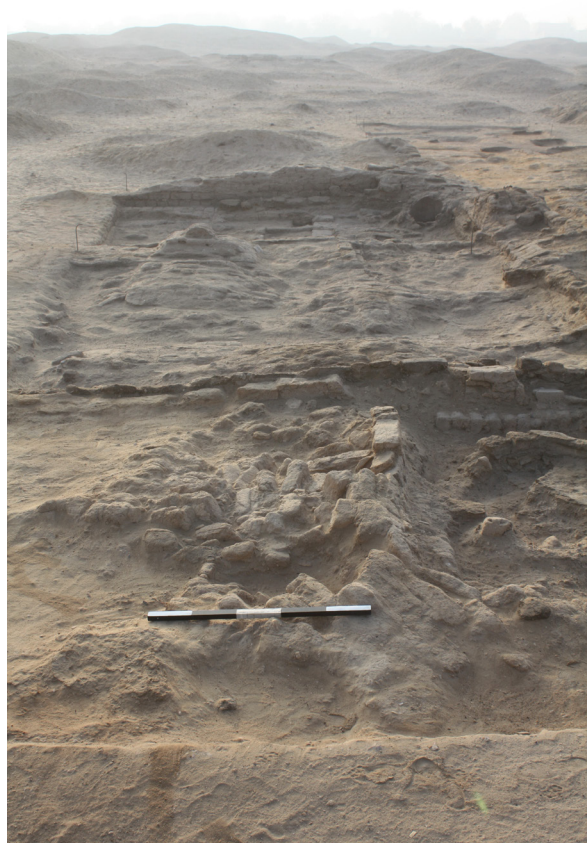


Figure 1.10 Sheet collapse in the north-western part of the site (grid square G/-3). Looking east. (Photo: A.K. Hodgkinson.)

at a height of 1.6 m according to Woolley (Peet and Woolley 1923: 19), the post-1922 damage was particularly problematic, especially since no photographs or drawings of the site exist.

The 1923 publication

The excavated remains of site M50.14–16 are all presented on page 19 of *The City of Akhenaten I* (Peet and Woolley 1923).

House M50.15 is described as follows, the text providing more information on the objects than the house itself:

M.50.15. (1922, Pl. I)

Normal type small house, very much ruined, even entrance not recognisable.

Objects: Clay moulds, M. 71, 72, 83, 84, 85: specimens of yellow, light green and blue paint: Bes amulet, A. 51: mud ball with seal impressions: bronze chisel, 22/597: fragment of Cypriote potsherd, decoration white on grey-black.

Pottery: xxv/197.

House M50.16, by contrast, was reasonably well preserved in 1922. Woolley describes it as follows:

M.50.16. (1922, Pl. I.)

Small and poor house, but lying in a hollow and so better preserved. Central walls standing 1.60 m. high: north side much ruined and north wall virtually gone. Entrance probably by north wall into room 1. Room 2 has access by raised door to cupboard under stairs (8) wherein was a round stone table. Room 3: Divan against west wall: against south wall – traces in plaster of where

water-jar stood: wall whitewashed: on this remains of painted design, festoons of parallel curves in red, blue, green and black, with transverse black stripes. Against east wall, traces in plaster of low round-topped fire-place (? or bin). Niche well preserved. Frame red with faint traces of inscription in yellow: ground red whereon yellow panel coming down to floor-level: on panel, between horizontal red lines (at 0.85 m. and 0.91 m. above floor) lotus flowers roughly sketched in red: above this, remains of coloured drawing of two people (man and woman?) seated on chairs facing left, with another figure standing before them (?): this design is bounded by red line above (height 1.31 m.), over which more traces of lotus design. Also in room 3 was found a fragment of the mud casing of a post, painted with lotus-petal designs.⁵ Room 5 had no door (walls standing 1.20 m. high), and was probably a cellar-bin reached from above only. 9 is an open courtyard containing a box hearth and a pot-lined beehive bread-oven.

Objects: Bronze needle, 22/594: bolt, 22/595.⁶

It is through the associated area to the south of the two houses, M50.14, interpreted as a courtyard by Woolley, that we know of the industrial nature of the complex. Woolley's identification of the complex as a 'glaze factory' has already been outlined above, but here is his description of this area:

M.50.14. (1922, Pl. I.)

Apparently a series of workrooms attached to the dwelling-houses M.

⁵ In his preliminary report, as part of a discussion regarding column-bases, Woolley mentions that '... in house N. 50/15 we found fragments of the mud plaster from round a wooden shaft decorated in bright colours, red, blue, white and yellow, with the conventional petal and circle patterns which appear on the walls and even on the frescoed pavements:...' (Woolley 1922: 64–65). Because of this, Kemp and Garfi (1993: 84) note that house M50.15 was 'called N50.15' in the aforementioned report. However, the fact that house N50.15 was excavated on behalf of the DOG in 1911 (Borchardt and Ricke 1980: 305–306) and Woolley mentions 'Dr Borchardt' in the same context may indicate that it is indeed house N50.15 that is being referred to here. While the DOG publication does not say whether or not this house contained such a mud casing, it is possible that the object was picked up by a member of Woolley's team in 1921 or 1922.

⁶ No fragments of the 'round stone table' were encountered during the new excavations.

50.15 and 16: there is no house-plan recognisable on this much-ruined site. At point X, remains of a glaze kiln: pit cut in sand 1.00 m. diam. by 0.50 m. deep, full of burnt brick, glass and glaze slag, and fragments of the pots used in the kiln for standing the glazed vessels on: the bottoms and sides of these are covered with tricklings of glaze.

Objects: Limestone mould, 22/586: clay mould, M. 78: two bronze needles and two bronze chisels.

Pottery: xxv/232.

Aerial photography taken of the site over the years and further investigations

In the early 1920s, an aerial photography survey was carried out by the Royal Air Force in Egypt, commissioned and, to an extent, led by Reginald Engelbach (1888–1946) (Engelbach 1929) and Pierre Lacau (1873–1963). In April 1922, three months after the end of the 1921–1922 season, the city of Amarna was photographed, and this fly-over produced a photograph that covers the Main City (see Figure 1.11). While the image is somewhat unsharp, the freshly excavated walls of the two houses, M50.15 and M50.16, are visible. The shadows of the walls in the 1922 photograph are comparable to those generated by the walls of the nearby house of Ranefer, the sunlight coming from the east or north-east. Although it is impossible to verify the preserved height of any of the walls, the central area of M50.16 appears darker than the other shadows, indicating that the eastern wall of this room was indeed preserved better than the others, although the 1.60 m cannot be ascertained. Spoil heaps from the 1922 excavation can be made out to the south (-west) of the site and to its north (see below). Unfortunately, the image is too unclear to make out any detail regarding the vitrified furnace debris or the other walls excavated in the courtyard, with the exception of an irregular, possible positive or negative feature (or a group of the same) to the south of house M50.16.

In addition to the 1922 photograph, a set of

images taken by the French Geographical Society (Société de Géographie) in 1964 also exists (Figure 1.12). The image covering the Main City South (no. 180) is much sharper and more detailed than the one taken in 1922: in addition to the ground-plans of the two houses, some detail is visible in the surrounding areas, including an area to the north-east, which was excavated in 2017 but possibly not entirely cleared in 1922. An irregular, almost linear spoil heap can be made out to the south of the area of the courtyard that had been cleared, while another heap can be discerned to the north of the two houses. It is evident that the walls of the houses had already collapsed to a great extent at this point and much sand had gathered, covering most of the site. The concentration of vitrified furnace debris is not discernible in this image.

Gwil Owen took a set of photographs of the site using a helium balloon in 2004 (Figure 1.13). Since the Grid 12 excavations were ongoing at the time and the entire surrounding area was surveyed at a high resolution (the balloon not being flown to a great height), the imagery covering site M50.14–16 is very clear. Again, the ground-plans of the houses are visible, as are the surrounding spoil heaps. A scatter of loose mud bricks on the surface of both houses indicates further, post-1964 wall collapse. A narrow, negative path delimits the northern ends of the houses from the spoil heap: it appears as though it served as a track for small vehicles and people and, therefore, may have contributed to the poor preservation of the site. Further, similar paths or tracks run through the southern and eastern parts of M50.14.

It is obvious from the balloon photograph that the area to the west of house M50.16 was not excavated in 1922: an outline of mud-brick collapse (also encountered beneath the overburden in 2014 and 2017) can be observed below a layer of sand in the balloon photo. This collapse derives from the western wall of M50.16, which appears to be standing to a considerable height in the 1922 aerial image, the latter not showing any excavation activity to its west. Furthermore, neither the 1922 aerial photo nor the published plan (Peet and Woolley 1923: pl. I; Figure 1.3) show any other houses in the direct vicinity of site M50.14–16. However, both the 1964 aerial and the 2004 balloon photographs show a range

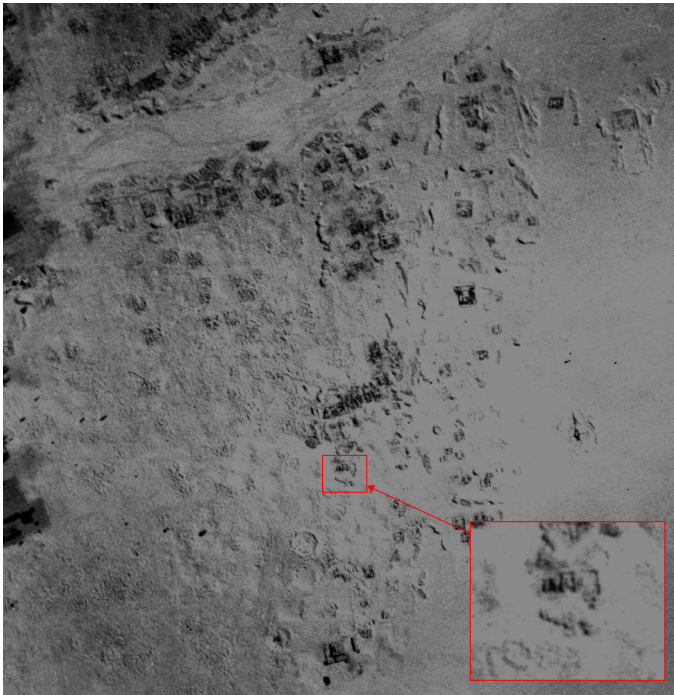


Figure 1.11 Aerial photograph of the Main City (cropped to focus on the Main City South), taken by the Royal Air Force (survey 14, image 14). Commissioned by P. Lacau and R. Engelbach in April 1922, shortly after the first excavation of site M50.14–16 (framed in red). (©"The Center of Studies and Documentation of Egyptian Antiquities (CEDAE)" Preservation and Documentation of Antiquities Sector – Supreme Council of Antiquities.)

Figure 1.12 Aerial photograph of the Main City (cropped to focus on the Main City South), taken by the French Geographical Society in 1964 (no. 180). Site M50.14–16 is framed in red. (Kindly supplied by R. Vergniew and B.J. Kemp. © IGN, EGYPT 1964, 007-100 (no. 180).)

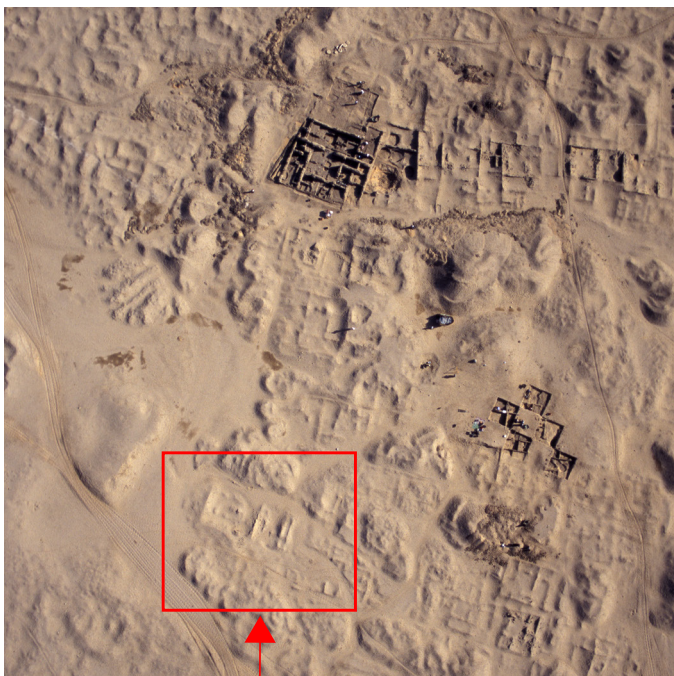


Figure 1.13 Balloon photo taken in 2004 of the excavations at the house of Ranefer and Grid 12, showing site M50.14–16 to the south. (Photo: G. Owen, the Amarna Project.)

of smaller houses, in particular to the east and up to house N50.27. This indicates that the site belonged to a neighbourhood rather than standing isolated in its own ground, and that it may have been more tightly woven into the urban fabric of the area during the time of its occupation than previously believed, which has also been suggested by Kate Spence (pers. comm. 2024; cf. pp55–56, 175; Figure 3.32). The northern edge of house N50.27 (which had initially been excavated by the DOG; see Borchardt and Ricke 1980: 316–319, pls VI, 104) was included in the Grid 12 excavations and the outlines of the surrounding houses were added to the general map of the site at a later stage (Kemp and Garfi 1993: sheet 7).

The impact of the 1922 work: The archaeological remains as encountered in 2014 and 2017

Unfortunately, none of the walls excavated within the houses in 2014 and 2017 were preserved to more than 0.6 m in height. Therefore, much detail, in particular the painted

niche described by Woolley that was never photographed, drawn or sketched,⁷ has been lost. In his preliminary report, Woolley (1922: 65) describes it as follows:

In M. 50/16, a small house, the feet of the figures, which with a little drapery and the legs of a throne, were all that survived, came only 0.90 metre above floor level; the top of the picture was at 1.35 metres above the floor, and over this was a design of some sort; there remained no evidence as to the total original height of the niche.

Since the wall in question, <15913>, is now only preserved to a height of 0.11 m (see Figure 1.14) and the painted plaster was not located during the 2014 excavation of house M50.16, this representation has now been lost, alongside any information regarding the occupants of the house (or their ancestors).

Two pieces of paper from a cigarette box by the company Matossian were found below the collapse of wall <17520>, in the eastern-central

⁷ The author has carefully examined the material from this excavation season in the archive of the EES: unfortunately, no photographs or further drawings from the work at M50.14–16 were found.

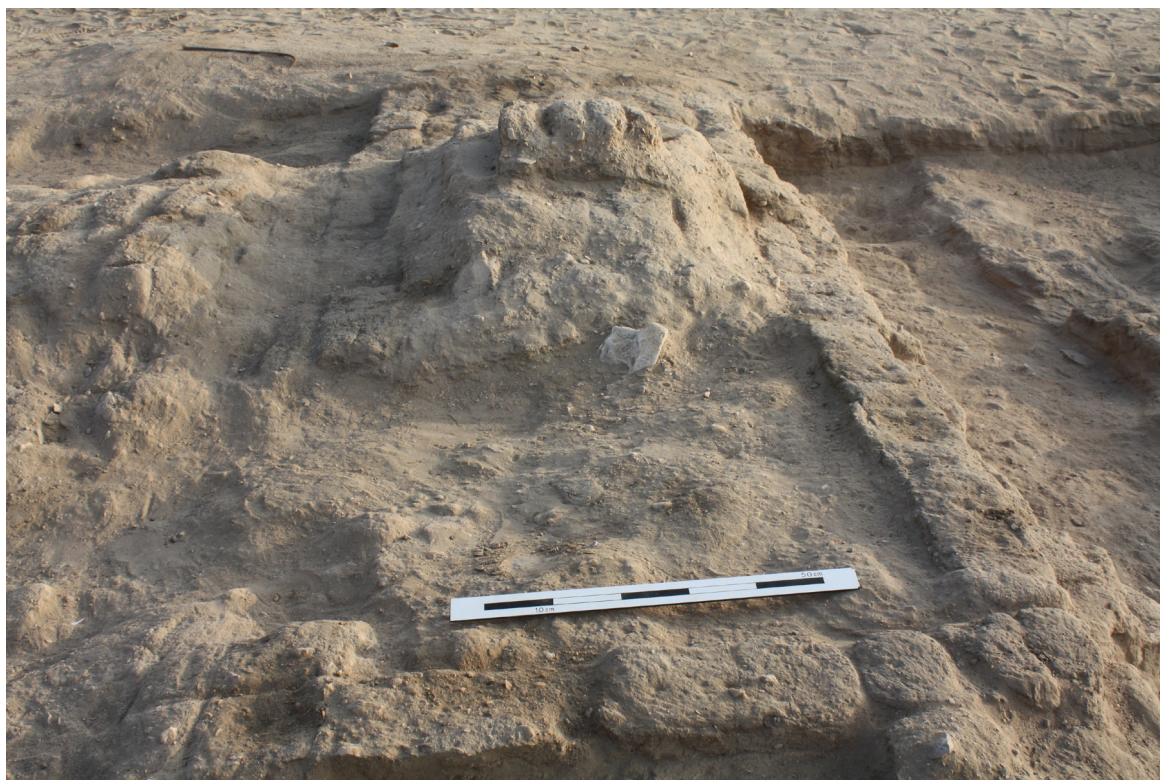


Figure 1.14 Wall <15913> and its collapse (left-hand side of the image) to the west of staircase <15616> as preserved in 2014. Looking north. (Photo: A.K. Hodgkinson.)



Figure 1.15 Box section through layers of sheet collapse overlying wall <17520> in grid square J/-3, below which the cigarette paper fragments were found in 2017. Looking east. (Photo: K. Kossatz.)

part of house M50.15 in 2017. These provide some information on the depth to which Woolley's team excavated in 1922 and the extent to which the exposure of the walls post-excavation caused these to collapse (Figures 1.15 and 1.16; Table 1.1; see pp102–105).⁸ The sheet collapse in question, (17672), extends c.0.6 m west of wall <17520>, covering a thin layer of sand, (17541), possibly the remains of the original floor of the central room of house M50.15. It is below collapse (17672) and on top of sand (17541) that the cigarette paper was found, demonstrating that the floor level had been cleared, the house recorded by Newton and then abandoned, with the cigarette paper having either been dropped there by a member of Woolley's team (or Woolley himself) or blown there and then been covered by sand and the later collapse of wall <17520>.

Woolley's description of courtyard M50.14 again highlights the fact that he remained loyal to Petrie's interpretation, who reconstructed the use of the cylindrical ingot moulds as stands for the so-called 'fritting pans' (Petrie 1894: 25; see pp219–220, 296–298). This theory has

been disproved by multiple scholars, including Nicholson (2007: 14–17), Melina Smirniou and Thilo Rehren (2016).

As mentioned above, courtyards were frequently not excavated during the early excavations, and this was – in part – probably the case with M50.14. While the main walls were drawn on the plan, and some walls even exist on the 1922 plan that were not encountered in 2014 or 2017, a number of finds and features were discovered *in situ* and these had most likely not been encountered by Woolley's team. These include the bead concentration (15702) in grid square J/-4, for example (see Plan 3).

Although the walls excavated in 2014 and 2017 in general appear to match those mapped in 1922, some smaller discrepancies were noted in the alignment of some of them. The short section of the southern enclosure wall found in grid square L/-5 matched the alignment of that drawn on the 1922 plan. However, another section further west is drawn as a continuous, straight stretch of wall. When this area was excavated in 2017, the archaeologist in charge

⁸ Although no date is preserved on these fragments, a complete box bearing the same design in the National Library of Israel (National Library system number 997003365960405171) is imprinted with the name of 'Palestine', giving the packet a pre-1948 date (I. Hoz, pers. comm. 2024).



Figure 1.16 Cigarette paper fragments by the company Matossian (object no. 42023) from J/-3, (17672). (Photos: A.K. Hodgkinson.)

encountered a pit, probably used as an oven, around which the wall had been built. The wall thus bends off to the south and then continues further west, while the same stretch on the 1922 plan continues further north.

Another area not uncovered by Woolley's team in 1922, but which was freed from debris in 2014 and 2017, is the possible granary courtyard in square G/-3, to the west of house M50.16 (Figure 1.10). The westernmost boundary of the 1922 plan appears to be the western wall of house M50.16, while a second wall with the same alignment had, in fact, been built against this outer wall. Both had fallen over and covered much of the area to the west. In the southern part of this area, another short stretch of wall had collapsed, south of which the poorly preserved remains of two circular structures were found, probably silos or granaries. Another short stretch of wall stood to the south-east of this structure, and this, again, was not marked on the 1922 plan.

The most intriguing issue, however, is that of the 'glaze kiln' described by Woolley as being located at 'point X' on the 1922 plan (Figure 1.3). The 'point X' marks a feature that is a roughly circular pit, [15709], the maximum diameter of which is 1.6 m, and which was excavated to a depth of 0.695 m in 2014. The pit was filled with silty layers that may have accumulated after the previous excavation, although this remains uncertain. During the new excavation, no standing or articulated structure was found

enclosed in a pit as described by Woolley (see above). Instead, c.10 m to the west of the point designated 'X' on the 1922 plan (south of the south-eastern corner of M50.16), a concentration of vitrified debris (mud brick, clay, sandstone) was found on the modern surface (see Figure 1.7). During the 2014 excavation, this debris was found to continue downwards within a shallow pit, but none of the pieces of vitrified debris were articulated, indicating that they belong to a structure that had previously been destroyed. While the feature containing the rubble was covered with some collapse and rubble, some of the debris was also found on the surface above, making it uncertain whether or not Woolley's team had actually excavated this spot, or whether they had simply encountered the debris and noted it.

Woolley's description of the 'glaze kiln' is problematic in that it does not specify whether or not an actual kiln structure was found. From the description, it seems more likely that the excavators only discovered the same kiln or furnace debris encountered in 2014, and that this was either marked in the wrong location (i.e. south-east of M50.16 rather than in the eastern part of the courtyard, at 'point X'). Alternatively, it is possible that the debris was excavated from within the pit marked with an 'X', but that it was subsequently moved to the area south-east of M50.16 and dumped into a shallow pit. This latter explanation seems unlikely since such material would presumably

Table 1.1 Fragments of cigarette paper, probably from the 1922 excavation or after.

Object no.	Prove-nance	Description	Length x Width x Thickness (cm)
42023	J/-3, 17672	Three fragments of cigarette paper, probably from shortly after the 1922 excavations.	Not measured
44105i and ii	J/-2, 17563	Two fragments of paper, possibly from a cigarette box. Irregular shape, brown due to encrustations. No writing discernible.	1.9 x 0.8 x <0.1
44104	K/-3, 17567	Fragment of what was probably cigarette paper. Double-layered/carton. Rectangular with rounded edges, somewhat frayed. Brown due to dirt encrustations. Possible writing below but not visible/legible.	5.2 x 4.4 x <0.1

have been moved to a spoil heap rather than being dumped in a location within the bounds of the excavated area. The excavators marking the remains of the kiln in the wrong location, probably because of time constraints and miscommunication in the field, is a more likely explanation. The layers contained within the pit marked with an 'X' (unit [15709]) did contain some fragments of glass (mainly objects related to glass working), although these may have been moved here as a result of secondary deposition, or during or after the 1922 excavation. The feature itself may have served as a fire pit or even held an oven structure at some point; the layers contained within being somewhat ashy in nature. However, this interpretation cannot be confirmed, and no remains of vitrified furnace debris were found inside any of the fills of this pit (see pp92–100, 315–325).

The balloon photo taken by Owen in 2004 shows the area excavated by Woolley's team and the spoil heaps his excavation produced in 1922 (Figure 1.13). Since then, some of the excavated area had been obscured by the accumulation of windborne material, the slumping of spoil heaps and the use of some of the area as passageways for motorbikes and other small vehicles, the tracks of which can be seen crossing through the central part of M50.15. While some of the spoil heaps visible in the balloon photo are more clearly connected with M50.14–16, others were less easy to assign. The aforementioned tall spoil heap can be seen to the north of the two houses, M50.16 and M50.15, oriented east–west. Its alignment and proximity to the two houses, together with the fact that it does not overlie them (except for some slumped sand in its

lowest part), make it likely that this spoil heap is associated with the excavation of the houses. The height of this spoil heap (by contrast to the lower spoil heap to the south, which most likely derived from the 1922 excavation of the shallow deposits of courtyard M50.14) may indicate that the sand from within the two slightly sunken houses was dumped here. It also served as a photographic vantage point during the 2014 and 2017 excavation seasons. Although none of the spoil heaps were systematically excavated, except when they partially covered the excavation squares, the visible content of these heaps was noted when walking across them: the tall spoil heap to the north of the houses appeared to contain fair amounts of rubble and pottery, making it possible that this material came from the domestic contexts and collapse layers within the two houses.

To the east of the northern spoil heap, though with a lesser height, is an area of spoil that probably covered the area of M50.14 to the east of the houses, the walls of which were poorly preserved. Here, the direction of the dumping action can be seen extending in a north-easterly direction inside the courtyard. The excavation of a small portion of this area of spoil in grid squares K/-2 and L/-2 revealed, among other items, objects related to metallurgical activities, i.e. copper-alloy working, indicating that this activity was carried out in this area of the courtyard during the Amarna Period.

A shallow and irregularly shaped area of spoil can be seen stretching east from the westernmost point of the site, from just south of M50.16 and all the way to the south-eastern edge of the area south of the houses, courtyard M50.14 (see

Figure 1.13). Again, the direction of dumping from north to south can be discerned from the tell-tale crescents of spoil bulging southwards from the heap, the latter being about half as tall as the high spoil heap to the north of the houses. Surface inspection of this fairly low spoil heap revealed objects related to industrial activity: vitrified oven debris, ceramic technological vessels (mainly cylindrical vessels for glass making or glass working, but also ceramic metal crucible fragments) and glass chips. Since the corpus of objects recovered during the excavation of the courtyard contained similar, industry-related items, it is most probable that this spoil was excavated by Woolley's team from

the area of M50.14. In fact, Woolley's description of objects recovered refers to 'burnt brick, glass and glaze slag' (Peet and Woolley 1923: 19), and fragments of what appear to be cylindrical vessels match the items found on and around this spoil heap. In addition, the fact that these items are mentioned in the publication but do not appear in the list of objects in the distribution register (EES archive DIST.REG.003) makes it likely that they were discarded or taken to a museum as technological samples, as described below. Again, this spoil heap was not excavated in 2014 or 2017, but items apart from household ceramics were collected during walk-over surveys.

1.3 Objects from the 1922 excavation

As outlined in section 1.2, only a small number of objects were registered during the 1922 excavations and listed in the publication of site M50.14–16 (Peet and Woolley 1923: 19). While these objects were recorded by building area, no note was made of their archaeological context or stratigraphy, so that the original find

spots of these items have now been lost.

The 1922 finds recording strategy

As was common during the early excavations, a large workforce was employed in 1922 at Amarna, with each team of workmen headed

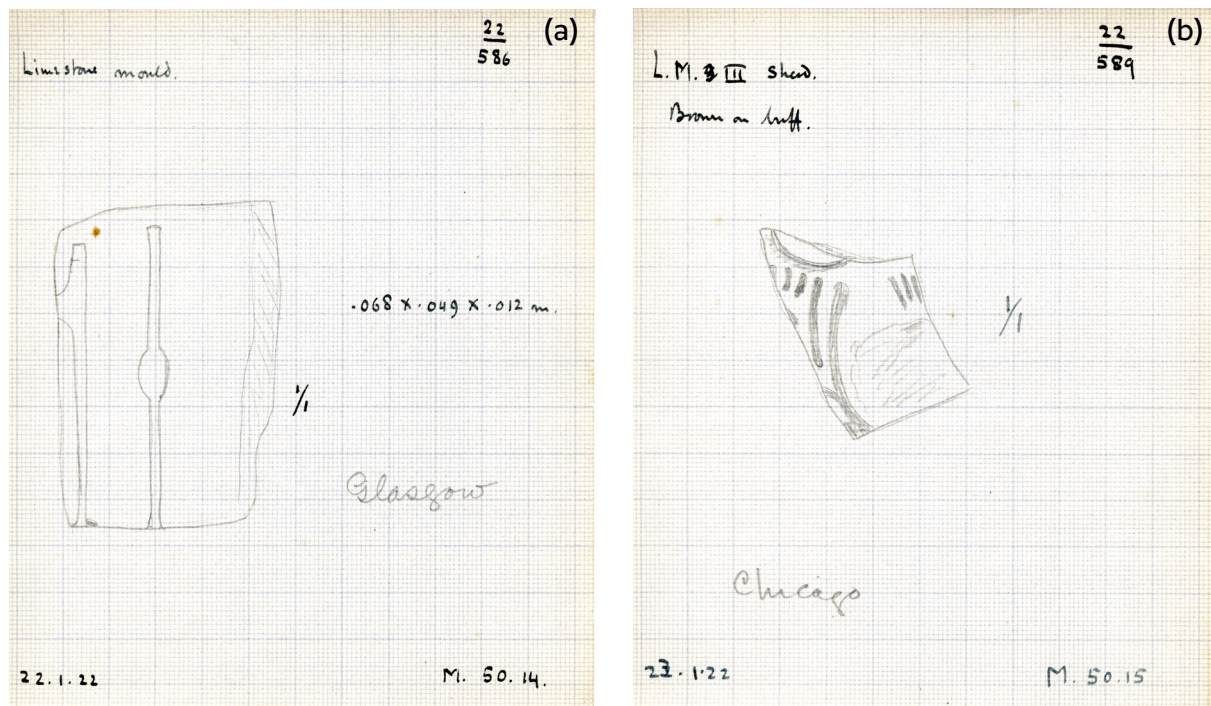


Figure 1.17 (above and opposite) Object cards showing the objects excavated at site M50.14–16 in 1922, from the archive of the EES: (a) a limestone metal-casting mould (Hunterian TA.OC.21-22.586); (b) a Mycenaean sherd (ISAC TA.OC.21-22.589); (c) a needle (San Diego TA.OC.21-22.594); (d) a wooden door bolt (MFA TA.OC.21-22.595); (e) a possible fish hook (Colorado TA.OC.21-22.596); (f) a chisel (Horniman TA.OC.21-22.597); (g) two chisels (St. Louis TA.OC.21-22.598); and (h) a blade (Horniman TA.OC.21-22.599). (Courtesy of the Egypt Exploration Society.)

Bronze needles.

 $\frac{22}{594}$ (c)

.098 Long.

San Diego

25.1.22

M. 50. 16

Bronze Scales

 $\frac{22}{595}$ (d)

Bolt, wood, with 2 bronze staples,

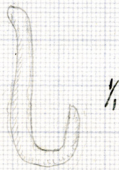
 $\frac{1}{1}$

Boston

25.1.22.

M. 50. 16.

Fish-hook (bronze)

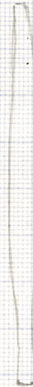
 $\frac{22}{596}$ (e) $\frac{1}{1}$

Colorado

25.1.22

M. 50. 16.

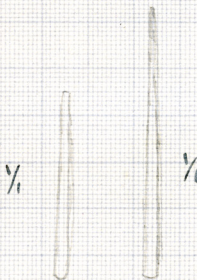
Chisel, bronze.

 $\frac{22}{597}$ (f)Presented to the
Horniman
Museum $\frac{1}{1}$

25.1.22

M. 50. 15

Two small chisels, (Bronze)

 $\frac{22}{598}$ (g) $\frac{1}{1}$ $\frac{1}{1}$

St. Louis

25.1.22

M. 50. 14

Bronze knife-blade.

 $\frac{22}{599}$ (h)Presented to the
Horniman
Museum $\frac{1}{1}$

25.1.22

M. 50. 15