Drilling tools and stone vessels of Heit el-Ghurab

Emmy Adel Malak Ayad

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The American University in Cairo

School of Humanities and Social Science

DRILLING TOOLS AND STONE VESSELS OF HEIT EL-GHURAB

A Thesis Submitted to

Department of Sociology, Anthropology, Psychology, and Egyptology

In partial fulfillment of the requirements for
The degree of Master of Arts

By Emmy Adel Malak Ayad

Under the supervision of Dr. Lisa Sabbahy
December 2014
I would like to dedicate this to my girls, Laila and Farida, my husband and my parents. I wouldn’t have been able to complete this work without their help, support, and understanding.
Acknowledgments

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Abstract

Lives of the ordinary ancient Egyptians can be obscure to us today. Most of what is known about their lives is based on the elite material culture. It is only by looking closely and examining the small and fragmented finds that one might gain an insight into the daily life of the average ancient Egyptian. This thesis presents a study of the drilling tools and stone vessel fragments of Heit el-Ghurab, a settlement site located at the southeastern section of the Giza Plateau, dating to the reigns of Kings Khafre and Menkaure. The site housed the pyramid builders and the administrators working on the construction of the pyramids of both kings. The finds are compared with similar parallels of the same time periods. The location of where the drilling tools and vessel fragments were located on site help in understanding the functions of the different buildings of the ancient site. The debitage of the manufacturing of stone vessels indicates possible productions of other artifacts. By thoroughly studying the tools and the different classes and materials of the stone vessels, one could better understand the reason for the existence of such a fine craft in a pyramid builders’ settlement site, while gaining knowledge about the lives of the average ancient Egyptians.
# TABLE OF CONTENTS

Dedication........................................................................................................................................................................2
Acknowledgments.......................................................................................................................................................................3
Abstract......................................................................................................................................................................................4
List of Tables............................................................................................................................................................................7
List of Images............................................................................................................................................................................8
List of Figures............................................................................................................................................................................9
List of Abbreviations.............................................................................................................................................................11
INTRODUCTION.......................................................................................................................................................................13

I. Methodology.......................................................................................................................................................................14

Chapter 1: HEIT EL-GHURAB SETTLEMENT SITE..................................................................................................................16

   I. An Overview of the Heit el-Ghurab Settlement Site........................................................................................................16
   II. An Overview of the Artifacts from Heit el-Ghurab...........................................................................................................22

Chapter 2: HEIT EL-GHURAB DRILLING TOOLS..................................................................................................................24

   I. Manufacturing of Stone Vessels.........................................................................................................................................24
   II. Catalog of the Heit el-Ghurab Drilling Tools....................................................................................................................30
       1. Drilling Bits.................................................................................................................................................................30
       2. Drill Capstones.........................................................................................................................................................38
       3. Drill Cores...............................................................................................................................................................40

Chapter 3: HEIT EL-GHURAB STONE VESSELS....................................................................................................................42

   I. An Overview of the Different Stone Vessel Typologies..................................................................................................42
   II. Catalog of Heit el-Ghurab Stone Vessels..........................................................................................................................45
       1. Bowls...........................................................................................................................................................................48
       2. Cylinder Jars............................................................................................................................................................62
       3. Miniature Vessels....................................................................................................................................................64
       4. Body Part Fragments.............................................................................................................................................67
   III. Catalog of Heit el-Ghurab Lids and Jar Stoppers............................................................................................................68
       1. Lids..............................................................................................................................................................................68
       2. Jar Stoppers...........................................................................................................................................................70

Chapter 4: DISTRIBUTION OF OBJECTS..................................................................................................................................74

   I. Distribution of Drilling Tools and Stone Vessels at the Heit el-Ghurab across Areas....................................................74
1. The Royal Administrative Building ................................................................. 74
2. The Gallery Complex .................................................................................. 77
3. Soccer Field West House Unit 1 and Soccer Field West Pottery Mound ............. 79
4. Area AA ...................................................................................................... 81
5. Soccer Field West House Unit 3 .................................................................. 84
6. Eastern Town and the Eastern Town House .................................................. 85
7. East of the Galleries and Backhoe Trench [BHT] ........................................... 88
8. Other Areas ............................................................................................... 90

Chapter 5: CONCLUSION ............................................................................... 92
I. Statistical Analysis: Correlation between Stone Vessels and Drilling Tools ........ 92
II. Discussion of Finds by Area ....................................................................... 94
III. Old Kingdom Stone Vessel Workshops ..................................................... 100
IV. Explanations for the Production of Stone Vessels at Heit-Ghurab .................. 101

Appendix 1: List of Stone Vessels of Heit el-Ghurab ....................................... 105
Appendix 2: List of Lids and Jar Stoppers of Heit el-Ghurab ............................. 113
Bibliography .................................................................................................. 115
List of Tables

Table 2-1: List of Old Kingdom tomb scenes depicting manufacturing of stone vessels............................ 29
Table 2-2: A complete list of drilling bits with locations on site................................................................. 38
Table 2-3: Complete list of drill capstones with locations on site. ............................................................ 39
Table 2-4: Complete list of drill cores with locations on site...................................................................... 41
Table 3-1: Total count of stone vessel classes. ......................................................................................... 45
Table 3-2: Total counts of materials of all classes of stone vessels.......................................................... 46
Table 3-3: Materials of the stone vessel classes....................................................................................... 47
Table 3-4: Typologies and counts of stone bowls .................................................................................... 48
Table 3-5: Materials of the different types of stone bowls. ..................................................................... 49
Table 3-6: Body part fragments’ materials. ............................................................................................. 67
Table 3-7: Total numbers of the different materials of jar stopper and lids ............................................. 68
Table 3-8: Total amount of lid materials.................................................................................................. 69
Table 3-9: Total amount of jar stopper materials.................................................................................... 70
Table 5-1: Total numbers of stone vessels and drilling tools by grouped areas....................................... 93
Table 5-2: Correlation results ................................................................................................................... 93
List of Images

Image 2-1: A reconstructed drilling apparatus fitted with a tubular copper drill ........................................... 26
Image 2-2: A reconstructed fork-shaped wooden shaft, fitted with a figure-of-eight drill bit .............................. 27
Image 2-3: A reconstructed drilling apparatus fitted with a figure-of-eight drill bit ........................................ 28
Image 2-4: Crescent-shaped borerheads ......................................................................................................... 32
Image 2-5: A possible crescent-shaped borerhead. ....................................................................................... 32
Image 2-6: Three conical shaped drill bits and one round-bottomed drill bit .................................................. 33
Image 2-7: Figure-of-eight drill bits. ............................................................................................................... 36
Image 2-8: Flower-shaped drill bit ................................................................................................................ 37
Image 2-9: Drill capstone with inner traces of drilling lines. ........................................................................ 39
Image 2-10: Tubular-shaped drill core ........................................................................................................... 41
List of Figures

Figure 1-1: Giza Plateau map. ..................................................................................................................... 17
Figure 1-2: A map of Heit el-Ghurab settlement site. ................................................................................. 20
Figure 2-1: A tomb relief showing different classes of Old Kingdom stone vessels as well as different stages of manufacturing stone vessels. ................................................................. 25
Figure 2-2: Conical-shaped drill bit. ........................................................................................................... 34
Figure 2-3: Figure-of-eight drill bit. ............................................................................................................ 35
Figure 2-4: "Flower"-shaped drill bit. ........................................................................................................... 37
Figure 2-5: A dome shaped drill capstone. ............................................................................................... 39
Figure 3-1: Chart showing the percentages of the different stone vessel classes. .................................... 46
Figure 3-2: Chart illustrating the percentages of different stone vessel materials. ................................. 47
Figure 3-3: Chart showing the percentages of the different bowl typologies. ........................................ 49
Figure 3-4: Convex-sided bowl with plain, unmodeled, rounded rim. ....................................................... 51
Figure 3-5: Concave-sided deep bowl with an incurved rim. ................................................................... 52
Figure 3-6: Convex-sided deep bowl with incurved rim and flat bottom. .................................................. 52
Figure 3-7: Convex-sided bowl with flat, square-shaped rim and possibly a rounded bottom. ............... 53
Figure 3-8: Convex-sided bowl with slightly incurved, square-shaped rim. ............................................ 53
Figure 3-9: Convex-sided bowl with plain, un-modelled, rounded rim and rounded bottom. ............... 54
Figure 3-10: Convex-sided, flat-bottomed bowl with no rim. ................................................................. 54
Figure 3-11: Unusual convex-sided, round-bottomed bowl with false spout. ............................................ 55
Figure 3-12: Vertical-sided, flat-bottomed bowl. ..................................................................................... 56
Figure 3-13: Vertical-sided bowl with flat, square-shaped rim. ................................................................. 57
Figure 3-14: Bent-sided bowl with square-shaped rim with faceted exterior surface. .............................. 58
Figure 3-15: Bent-sided bowl with square-shaped rim and faceted exterior surface. ............................ 58
Figure 3-16: Bent-sided bowl with square-shaped rim and faceted exterior surface. ............................ 59
Figure 3-17: Open-spouted bowl with plain, un-modelled rim, convex sides, and a rounded base. ....... 60
Figure 3-18: Straight-sided bowl with plain, un-modelled, slightly rounded rim. ................................. 61
Figure 3-19: Carinated bowl. ................................................................................................................... 61
Figure 3-20: Restricted bowl with rim sloping inwards towards the aperture of the bowl. ....................... 62
Figure 3-21: Cylinder jar with horizontally flat, square-shaped rim and a body sloping inwards towards the base. ........................................................................................................................................... 63
Figure 3-22: Cylinder footed jar with concave body. ................................................................................. 64
Figure 3-23: Miniature/model bowl with plain, un-modelled rim and rounded bottom. ......................... 65
Figure 3-24: Miniature bowl, convex-sided with plain, un-modelled, rounded rim and a rounded base. 66
Figure 3-25: Miniature/model restricted bowl with rim sloping inwards. ................................................. 66
Figure 3-26: Miniature round-bottomed jar with neck. .......................................................................... 67
Figure 3-27: Disc-shaped lid. .................................................................................................................... 69
Figure 3-28: Disc-shaped lid. .................................................................................................................... 70
Figure 3-29: Conical-shaped jar stopper. ................................................................................................. 71
Figure 3-30: Conical-shaped jar stopper. ................................................................................................. 71
Figure 3-31: An unusual disc-shaped lid with a small knob................................................................. 72
Figure 3-32: An unusual shaped jar stopper with a rectangular outline a knob on its bottom side............ 72
Figure 4-1: Map of the Royal Administrative Building area showing the distribution of the stone vessels and the drilling tools. ................................................................................................................. 76
Figure 4-2: Map of the Gallery Complex area showing the distribution of the stone vessels and the drilling tools. .................................................................................................................................................. 78
Figure 4-3: Map of the Soccer Field West House Unit 1 and Soccer Field West Pottery Mound showing the distribution of the stone vessels. ........................................................................................................................................... 80
Figure 4-4: Map of area AA and the Pedestal Building showing the distribution of the stone vessels and the drilling tools. ................................................................................................................................................. 80
Figure 4-5: Map of Soccer Field West House Unit 3 showing the distribution of the stone vessels and the drilling tools.................................................................................................................................................. 83
Figure 4-6: Map of the Eastern Town and the Eastern Town House showing the distribution of the stone vessels and the drilling tools.................................................................................................................... 85
Figure 4-7: Map of the East of the Galleries Area and the Backhoe Trench showing the distribution of the stone vessels and the drilling tools.................................................................................................................... 87
Figure 4-8: Map of Heit el-Ghurab site showing the distribution of all the drilling tools and stone vessels across the site. ................................................................................................................................................. 89
Figure 5-1: Chart illustrating the percentages of the drilling tools across the different areas of Heit el-Ghurab. ................................................................................................................................................. 91
Figure 5-2: Chart illustrating the percentages of stone vessels (including lids and jar stoppers) across the different areas of Heit el-Ghurab. .............................................................................................................. 99
Figure 5-3: Chart illustrating percentage of concentration of both drilling tools and stone vessels, including lids and jar stoppers, by areas.............................................................................................................. 100
# List of Abbreviations

<table>
<thead>
<tr>
<th>Area Abbreviation</th>
<th>Full Name</th>
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<tr>
<td>A7</td>
<td>A7</td>
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<tr>
<td>A8</td>
<td>A8</td>
</tr>
<tr>
<td>AA</td>
<td>AA</td>
</tr>
<tr>
<td>BBE</td>
<td>Buttress Building East</td>
</tr>
<tr>
<td>BBHT(N)-ST</td>
<td>Big Backhoe Trench North -Side Trench</td>
</tr>
<tr>
<td>BBNW</td>
<td>Buttress Building Northwest</td>
</tr>
<tr>
<td>D17x</td>
<td>4-D17x</td>
</tr>
<tr>
<td>EOG</td>
<td>East of Galleries</td>
</tr>
<tr>
<td>ET</td>
<td>Eastern Town</td>
</tr>
<tr>
<td>ETH</td>
<td>Eastern Town House</td>
</tr>
<tr>
<td>FS3</td>
<td>Field School Area 3 2005</td>
</tr>
<tr>
<td>Gallery III.3</td>
<td>Gallery Set III.3</td>
</tr>
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<td>Hypostyle Hall</td>
<td>Hypostyle Hall</td>
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<td>LNE</td>
<td>LNE</td>
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<td>Main Street</td>
<td>Main Street</td>
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<td>Manor</td>
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<tr>
<td>MSE</td>
<td>Main Street East</td>
</tr>
<tr>
<td>MSGH</td>
<td>Main Street Gate House</td>
</tr>
<tr>
<td>North Street</td>
<td>North Street</td>
</tr>
<tr>
<td>NSGH</td>
<td>North Street Gate House</td>
</tr>
<tr>
<td>RAB</td>
<td>Royal Administrative Building</td>
</tr>
<tr>
<td>SFW</td>
<td>Soccer Field West</td>
</tr>
<tr>
<td>SFWH1</td>
<td>Soccer Field West House Unit 1</td>
</tr>
<tr>
<td>SFWH3</td>
<td>Soccer Field West House Unit 3</td>
</tr>
<tr>
<td>SFWPM</td>
<td>Soccer Field West Pottery Mound</td>
</tr>
<tr>
<td>SSGH</td>
<td>South Street Gate House</td>
</tr>
<tr>
<td>SWI</td>
<td>Standing Wall Island</td>
</tr>
<tr>
<td>TBLF</td>
<td>The Big Leap Forward</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
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<td>--------------</td>
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</tr>
<tr>
<td>WCE</td>
<td>Wall of the Crow East</td>
</tr>
<tr>
<td>WCG</td>
<td>Wall of the Crow Gate</td>
</tr>
<tr>
<td>WCN</td>
<td>Wall of the Crow North</td>
</tr>
<tr>
<td>WCN/T2</td>
<td>Wall of the Crow North Trench 2</td>
</tr>
<tr>
<td>WCN/T2 ext</td>
<td>Wall of the Crow North Trench 2 Extension</td>
</tr>
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<td>WCNE</td>
<td>Wall of the Crow Northeast</td>
</tr>
<tr>
<td>WCS</td>
<td>Wall of the Crow South</td>
</tr>
<tr>
<td>WCS/WCG</td>
<td>Wall of the Crow South/Wall of the Crow Gate</td>
</tr>
<tr>
<td>WD</td>
<td>Western Dump</td>
</tr>
<tr>
<td>WES</td>
<td>Western Extension South</td>
</tr>
<tr>
<td>WRW</td>
<td>Western Roadway</td>
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Introduction

Most of what is known today about the lives of the ancient Egyptians is based on the elite material culture. But it is by studying and examining the smallest details and fragments, like those of stone vessels, that one can gain knowledge about the lives of the average ancient Egyptians. This thesis discusses the craftsmanship of producing stone vessels in Heit el-Ghurab, an Old Kingdom settlement site at Giza, while examining the reasons for finding stone vessels and the tools needed for their production in different areas of the site. Heit el-Ghurab is located at the southeastern part of the Giza Plateau and housed workmen and administrators working on the construction of the pyramids of Kings Khafre and Menkaure. Categories of finds were excavated from the site, including ceramics, plant remains, animal bones, and artifacts, among others. These objects revealed information that improved our understanding of the lives of its inhabitants. A wide range of artifacts was recovered from the site, including jewelry, household items, and tools of assorted types, materials, and functions. Most of the tools and artifacts found are either fragmented and/or reused, while it appears that the most complete and precious ones had been taken away when the site was abandoned in antiquity, by the end of the Fourth Dynasty. Artifacts from Heit el-Ghurab, which seem anomalous in a pyramid builder’s settlement are drilling tools used to produce stone vessels.

The research questions for this thesis seek the reasons behind the existence of drilling tools and stone vessels in Heit el-Ghurab. The workmen living at Heit el-Ghurab are expected to have been sustained by the government while they undertook the construction of the pyramids. They would have

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1 Evidence for both names, Khafre and Menkaure, was reconstructed from seal impressions from a Pottery Mound, an area in the Western Town, where officials of high ranks probably lived. Nolan and Pavlick, “Impressions of the Past: Seals and Sealings from Pottery Mound,” 4.
2 Lehner, “The Pyramid Age Settlement of the Southern Mount at Giza,” 30. Few areas of the site might have been inhabited during the Fifth Dynasty, Tavares, “Village, Town and Barracks,” 275, footnote 69.
3 Redding, “Status and Diet at the Workers’ Town, Giza, Egypt,” 74–75.
had their everyday-life vessels made of pottery. If this was the case, then why would a workmen’s settlement have drilling tools? Were stone vessels produced on the site? If yes, to whom were the vessels manufactured and for what purpose? Was it for domestic purposes? Or were the vessels produced for the overseers of the workmen? Were the workshops producing the vessels as funerary equipment?

I. Methodology

The aim of this thesis is to examine the reasons for finding drilling tools and stone vessels in a builders’ settlement site and what lies behind the existence of such a fine craft there. As a first step to addressing the research questions mentioned in the previous section, a detailed study of the drilling tools and stone vessels recovered from the Heit el-Ghurab site was done. This was achieved, first, by thoroughly cataloging, describing, and measuring the objects, as well as drawing the stone vessel fragments, in the lab. In order to categorize the drilling tools typologies, it was important to understand the different stages and techniques of the stone vessels production. These are discussed in chapter 2 with the main reference being the results of the experimental archaeology conducted by Denys Stocks, followed by a detailed catalog of the drilling tools: bits, capstones, and cores; excavated from Heit el-Ghurab. In the catalogs of both the drilling tools, chapter 2, and stone vessels, chapter 3, the finds are compared to similar examples from Early Dynastic and Old Kingdom sites. Parallels from the Valley Temple of King Menkaure were found to be relevant to the material from Heit el-Ghurab since it was contemporaneous in time and in location. Finds from the Mortuary Temple of King Raneferef at Abusir, dating to the Fifth Dynasty, also revealed high resemblance with stone vessels from Heit el-Ghurab.

The illustrations of the stone vessels in this thesis helped in identifying and classifying the vessels since the different classes were determined based on the rim, body, and base shapes. Preexisting stone vessel typologies created by different scholars were studied, such as Petrie’s,
Reisner’s, el-Khouli, among others. Barbara Greene’s typology, the most recent one, was chosen as the most suitable one to the Heit el-Ghurab stone vessel corpus, based on the date, which covered the Old Kingdom stone vessel typologies; and on the clear distinctions between vessel variations, rims, bases, and bodies. In chapter 3, Greene’s typology was applied to the settlement site’s vessels while creating an equivalent one, which was later used for Geographic Information System [GIS] distribution maps, in chapter 4. Drilling tools and stone vessels were excavated from different areas of the site. Some areas had high numbers of finds, while others barely had any, which are depicted in the GIS distribution maps. The distribution patterns and locations of where the artifacts were recovered from are summarized in chapter 4, starting with the areas of high clusters down to the areas with the least number of finds.

The conclusion, chapter 5, includes a statistical analysis for the relationship between the distribution of stone vessels and the distribution of drilling tools across different areas of the site, followed by interpretation of the results. In addition, the chapter focuses on socioeconomic aspects like the functions of different structures, sizes of house units, and unusual materials found, such as travertine, granite, and gneiss. The possible workshops of Heit el-Ghurab are then compared with Old Kingdom stone vessel workshops across Egypt, like in Elephantine, Hierakonpolis, and al-Shaykh Sa’id/Wadi Zabayda, near Deir el-Bersha. This helped in reaching conclusions about the functions of different areas of the settlement site and understanding the reasons for the existence of drilling tools and stone vessel fragments.
Chapter 1
Heit el-Ghurab Settlement Site

I. An Overview of the Heit el-Ghurab Settlement Site

Heit el-Ghurab is the settlement site of the workmen and administrators of the pyramids of Giza, dating to the mid-Fourth Dynasty, to the reign of the Kings Khafre and Menkaure. The site is located at the southeastern area of the Giza Plateau, figure 1-1, and was separated from the construction area of the pyramids by a large wall called the “Wall of the Crow”, hence the name of the site, Heit el-Ghurab.

Dr. Mark Lehner, the head of the Giza Plateau Mapping Project [GPMP] and the Ancient Egyptian Research Associates [AERA], has been excavating the workmen’s settlement site since 1988. The Giza Plateau Mapping Project started by surveying, mapping, and analyzing the landscape of the entire Giza plateau. During his analysis, Lehner worked with the assumption that “the valley temples of each pyramid would have fronted onto a harbor”, which would make the area north of the Wall of the Crow a harbor. This model would indicate that the areas to the north of the Wall of the Crow and to the east of the valley temple “must have been a zone of delivery both during the time the Egyptians were

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4 The pottery assemblage from the site dates to the mid-Fourth Dynasty, Wodzinska, “Preliminary Ceramic Report,” 283–324.
5 Evidence for both kings’ names, Khafre and Menkaure, was reconstructed from seal impressions from a Pottery Mound, an area in the Western Town, where officials of high ranks probably lived. No other royal names were found. Nolan, “Mud Sealings and Fourth Dynasty Administration at Giza”; Nolan and Pavlick, “Impressions of the Past: Seals and Sealings from Pottery Mound,” 4; Lehner, “The Pyramid Age Settlement of the Southern Mount at Giza,” 34.
building the pyramids and after the pyramids were complete and their temples were functioning.”

This analysis led him to believe that the Heit el-Ghurab settlement site was located to the south of the Wall of the Crow. Lehner started the excavation of the site by looking for the “settlement and infrastructure

---

that supported pyramid building” and the “economic and social installations ... that supported the functioning of the pyramid site as a center for ritual.”

Over several years of excavations, various areas of the site were unearthed that had different structures. The settlement is divided into four main zones, each composed of smaller areas with a diversity of functions, constructed for residents of different social classes, as seen in the map in figure 1-2. The four main divisions for Heit el-Ghurab areas are the Barracks (or the Gallery Complex), the Eastern Town [ET], the Western Town [WT], and the Royal Administrative Building [RAB].

The Barracks, or the Gallery Complex, lies south of the Wall of the Crow. It consists of four sets of rectangular shaped galleries. Each gallery set is separated by a street, running east to west, creating three streets: North Street, Main Street, and South Street. Each street has a small house to the west of the Gallery set, and are assigned the names of North Street Gate House [NSGH], Main Street Gate House [MSGH], and South Street Gate House [SSGH]. The Gallery Complex is surrounded by an enclosure wall to the west, running from the southern face of the Wall of the Crow, curving eastwards at the southern end of the complex. The barracks were also separated from the Eastern Town by a north-south enclosure wall, recently excavated. Inside each gallery unit, column bases on a low pedestal were excavated. Each unit “was divided into two sections along its length and has a series of bed platforms

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10 Lehner, “Preface and Acknowledgments,” xiii.
12 Lehner and the different GPMP team members had published various reports and articles with numerous details about the different areas of the site, its architecture, functions, and material culture and finds. Amongst the various publications are the Giza Occasional Papers [GOP] volumes published by the Ancient Egypt Research Associates [AERA], volumes 1 through 5, Aeragram Newsletters, as well as other individual articles, such as Lehner, “The Pyramid Age Settlement of the Southern Mount at Giza,” 27–74; Lehner and Tavares, “Walls, Ways and Stratigraphy: Signs of Social Control in an Urban Footprint at Giza,” 171–216; Tavares, “Village, Town and Barracks,” 270–277.
13 Throughout the years of excavations, Dr. Mark Lehner and his team members had been naming the areas of the site with different names, such as the “Soccer Field West” area [SFW], the “Eastern Town House” [ETH], the “Main Street Gate House” [MSGH], among others. These names all lie within the main four areas discussed here.
across the width, with a ‘house’ at the back, possibly for an overseer.”  

The Gallery Complex probably functioned as the barracks for the workforce.

The Eastern Town, or the ‘Village’, lies at the eastern side of the Gallery Complex and extends farther east “underneath the modern towns of Nazlet es-Semman and Kaft Gebel.”  It was a settlement area that was “less planned, more self-organized than the Gallery Complex.”  It is thought to have functioned as a ‘village’ due to the material culture found, its small houses, in comparison to the houses of the Western Town, and the “non-orthogonal, small streets.”  This area was separated from the Galleries area by an enclosure wall, as mentioned earlier, and by an area of pottery of what might have been a dumping area of the Royal Administrative Building, referred to as the “East of the Galleries” area [EOG]. The Eastern Town is rich in material culture, such as animal bones, especially a high number of pig bones, faunal remains, and grinding tools. Based on the material found in this area of the settlement, it is evident that the people living in the Eastern Town were of a lower status than those living in the Western Town and were possibly supporting the workers living in the Gallery Complex.

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15 Tavares, “Village, Town and Barracks,” 271.
18 Tavares, “Village, Town and Barracks,” 271.
19 Redding, “Status and Diet at the Workers’ Town, Giza, Egypt,” 75.
Figure 1-2: A map of Heit el-Ghurab settlement site, by Rebekah Miracle. Permission granted by AERA; © AERA.
South of the Gallery Complex and west of the Eastern Town lies a large building that was assigned the name Royal Administrative Building [RAB]. The back area of the Royal Administrative Building consists of a number of chambers to the west, an open courtyard to the east, and a number of silos to the south. It was surrounded by an enclosure wall, south of the Gallery Complex enclosure wall, securing the entire building from the north, east, and west sides. The southern part of the building and the enclosure wall lie underneath the modern-day soccer field at the south of the settlement site. The name of ‘Royal Administrative Building’ was assigned due to the discovery of “sealing fragments and silos within the enclosure [indicating] royal administration and storage.” Access to this building was secured and controlled with one entrance at the north-east corner.

To the west of the modern-day soccer field and the Royal Administrative Building is an area of ancient house units, given the name of the Western Town [WT]. The houses of this area are bigger in size than those of Eastern Town. One house of the Western Town, House Unit 1, was composed of “21 rooms, a very private bedroom … [which] includes a double bed platform and painted plastered walls.”

South of House Unit 1 is an area within an enclosure filled with great amounts of dumps and pottery fragments, hence named Pottery Mound [PM] by its excavators. This mound was rich with sealings as well as finds of different materials. The sealings recovered from the mound as well as those from Area AA, an area to the northwest of House Unit 1 and Pottery Mound, yielded information about the residents of the Western Town. The sealings included kings’ names, official titles, and institutional names. As for other finds, zooarchaeologist Richard Redding had studied the animal bones of the

23 Tavares, “Village, Town and Barracks,” 271.
26 Lehner, Kamel, and Tavares, Season 2005, 69.
Western Town. He came up with the possible conclusions that “the residents of the Western Town were probably an elite that, although provisioned, had access to the highest status meat resources and wild fauna,” and that the bones recovered from the Pottery Mound were “hind limbs of very young cattle, probably the remnants of offerings.”

Hence, the sealings, house sizes, animal bones indicate that the residents of the Western Town were probably either an elite group or the high officials of the settlement site.

II. An Overview of the Artifacts from Heit el-Ghurab

The material culture of Heit el-Ghurab is diverse, including plant remains, animal bones, lithics, pottery, sealings, and ancient artifacts, among others. The settlement site was functioning during the time of the construction of King Khafre’s pyramid through the reign of King Menkaure and the construction of his pyramid. But “before the builders finished the Menkaure Pyramid complex, people abandoned the settlement” and the site was dismantled. The ancient Egyptians took away all the complete artifacts and the ones of value, leaving behind only fragmented and/or worn out artifacts. Therefore, the condition of the artifacts makes it difficult to identify and classify a wide variety of objects.

The artifacts of Heit el-Ghurab are not just diverse in function but in size as well, varying from finds as small as a faience bead to finds as big as hammers and quern bases. Materials vary just as significantly, from organic material, like animal bones; stones, like quartzite, limestone, travertine, among other; and man-made material, like ceramics and faience. The artifacts’ categories ranged from personal adornment artifacts, craft tools, household items, accounting artifacts, to gaming pieces as well.

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28 “Status and Diet at the Workers’ Town, Giza, Egypt,” 75.
30 Tavares, “Village, Town and Barracks,” 270.
as miscellaneous artifacts. Personal adornment or jewelry items consist mostly of beads, with a few examples of bone or chert bracelets and faience amulets. A great number of tools were recovered from Heit el-Ghurab indicating different craft activities, such as construction/demolition, weaving, grinding, fishing, and drilling, among others. Household items are represented by a few tables, headrests, and stone vessels. Artifacts indicative of accounting and administrative activities are tokens, and a few seals.

As fragmented as the finds from Heit el-Ghurab may be, they tell us a complex story of social structure and everyday life. To “read” that story we need to engage in the rigorous study of material culture. This involves carefully studying and analyzing artifacts, and then grouping them into categories. Each kind of material culture of Heit el-Ghurab is studied by a different specialist. The results of the studies of all the finds are later integrated together based on the same archaeological and architectural contexts in which they were found. This approach helps us better understand the functions of the different buildings and areas of the Heit el-Ghurab, while gaining insights into the lives of the ancient Egyptians who were living there.

Chapter 2
Heit el-Ghurab Drilling Tools

I. Manufacturing Stone Vessels

A number of scholars have attempted to understand how the ancient Egyptians produced finely-worked stone vessels. Among the different scholars who studied this topic are Sir W. M. F. Petrie,\(^{32}\) A. el-Khouli,\(^ {33}\) G. A. Reisner,\(^ {34}\) A. Lucas,\(^ {35}\) T. R. Hester and R. F. Heizer,\(^ {36}\) A. Bevan,\(^ {37}\) and D. A. Stocks.\(^ {38}\) In particular, Stocks has conducted archaeological experiments on the drilling of different materials: beads, hard stone, wood, as well as stone vessels. The following section is a summary of Stocks, on how stone vessels were manufactured.\(^ {39}\)

Vessels manufactured of stone were first fashioned and modeled on the exterior to the desired shape. This process was done by using “copper chisels and adzes, flint punches, chisels and scrapers, and sandstone rubbers.”\(^ {40}\) Next, the interior was hollowed out. Based on tomb depictions, archaeological evidence, and the archaeological experiments conducted by Stocks, the tools required for the hollowing and boring of the interior of the stone vessels were: copper tubular drills, stone borers of different shapes and materials, weights, wooden shafts of different shapes, and copper chisels and mallets for cutting off the interior core after being drilled.

\(^{32}\) The Funeral Furniture of Egypt; and The Pyramids and Temples of Gizeh, 74–79.
\(^{33}\) El-Khouli, Egyptian Stone Vessels Predynastic Period to Dynasty III.
\(^{34}\) Reisner, Mycerinus.
\(^{35}\) Lucas, Ancient Egyptian Materials and Industries.
\(^{36}\) Hester and Heizer, Making Stone Vases.
\(^{37}\) Bevan, Stone Vessels and Values in the Bronze Age Mediterranean.
\(^{38}\) Stocks, Experiments in Egyptian Archaeology; “Experimental Archaeology I: Sticks and Stones of Ancient Egyptian Technology”; “Egyptian Technology II: Stone Vessel Manufacture”; “Making Stone Vessels in Ancient Mesopotamia and Egypt.”
\(^{39}\) See pervious note for the different publications summarized in this chapter.
\(^{40}\) Stocks, “Making Stone Vessels in Ancient Mesopotamia and Egypt,” 601.
The primary apparatus of the drill consisted of a main wooden shaft, tied to another wooden shaft with the top side of it bent at an angle, and weights hung in a net, or tied underneath the attached bent wooden section. Possibly, the ancient Egyptians searched for a wooden branch that fitted their requirements of having one end bent at an angle to provide an easy grip of the apparatus. Figure 2-1 depicts the apparatus required for the drilling of the stone vessel, with the two weights and the top bent part of the wooden shaft, as seen with the workman on the far left and the fourth workman from the left side.

The bottom part of the apparatus differed according to the different stages of drilling. For the first step of drilling, a copper tube drill was force fitted onto the main wooden shaft, image 2-1. Although it is not very clear, it is possible that the first workman on the left side of figure 2-1 is using the tubular copper drill. Copper tube drills of different diameters were used to create wider holes/mouths of the vessels. Pressure was applied to the top of the wooden shaft by pressing on a capstone. The copper drill perforated all the way to the bottom of the vessel’s height and the core was

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41 Stocks emphasized that the weights were used to apply pressure to the drilling activity and not for momentum purposes, in “Egyptian Technology II: Stone Vessel Manufacture,” 16.
44 Evely, Minoan Crafts, 77; Stocks, “Making Stone Vessels in Ancient Mesopotamia and Egypt,” 596.
then cut off and cleared using a copper chisel, a mallet, and a scraper. The third workman from the left, in figure 2-1, is depicted clearing out the interior of the stone vessel or possibly polishing it.

![Image 2-1: A reconstructed drilling apparatus fitted with a tubular copper drill, made by D. Stocks. Image from Stocks, D. Experiments in Egyptian Archaeology: Stoneworking Technology in Ancient Egypt, page 151, fig. 5.16. Copyright © 2003 by Routledge, New York. Reprinted by permission of Taylor and Francis Group.](image)

Stone and flint borers were used next to widen the mouth and create the shoulders of the vessels. The borers were fitted onto the fork-shaped wooden part, images 2-2 and 2-3. The flint borers were used only on soft stones like limestone and travertine, while the stone borers were used on harder stones. The different shapes of stone borers are figure-of-eight, conical, round-bottomed, and crescent shapes, while the flint borers are bar and crescent shaped. The drilling bit attached to a fork-shaped wooden shaft is the object that became the hieroglyphic determinative of the word ḫm, or ‘craft’. While using the copper drill, stone borer, or flint borers, the ancient Egyptians probably added in dry sand as an abrasive material. The polishing of the inner and outer surfaces of the vessels was done

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45 “Egyptian Technology II: Stone Vessel Manufacture,” 15.
46 “Egyptian Technology II: Stone Vessel Manufacture,” 16.
either by pebbles or by sand. The polishing stage is depicted figure 2-1 by the second workman from the left side and the second workman from the right side, as they are holding small rounded objects, probably pebbles, and working on the exterior of the vessels.

Image 2-2: A reconstructed fork-shaped wooden shaft, fitted with a figure-of-eight drill bit, made by D. Stocks. Image from Stocks, D. Experiments in Egyptian Archaeology: Stoneworking Technology in Ancient Egypt, page 143, fig. 5.5. Copyright © 2003 by Routledge, New York. Reprinted by permission of Taylor and Francis Group.

49 Jaros-Deckert, "Steingefäße," 1285.
Stocks discussed and introduced a method of drilling that he calls Twist-Reverse Twist Drill (TRTD). This means that while drilling a vessel, one would rotate the wooden shaft for about 90 degrees to one side then rotate it back to the starting position. He resorted to this method of drilling after experimenting with different techniques of hollowing stone vessels. The bow-driven drilling technique was one method that Stocks experimented with, which is tying the drilling apparatus to a bow string to rotate it, therefore making the perforation. This resulted in creating an uneven rim and in some instances, in breaking thin-walled vessels caused by applying mechanical pressure on the vessel, since the vessels’ sides were shaped prior to the hollowing of the interior.

Our information regarding the manufacturing of stone vessels comes from archaeological evidence, along with tomb depictions. Scenes of daily life were common in ancient Egyptian tombs,

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50 Denys Stocks describes the method of TRTD in many of his publications. The most detailed description of such technique is in *Experiments in Egyptian Archaeology*, 152–155.

51 A relief of such a technique is depicted in the Sixth Dynasty tomb of Mereruka at Saqqara; Duell, *The Mastaba of Mereruka*, 1:pl. 30.
including workshop scenes. Such scenes depict workers manufacturing the funerary equipment for the deceased.52 The relief of the stone vessels makers is among different workshop scenes, like sculptors, carpenters, working of metals, and others.53 The earliest relief of making stone vessels, thus far, dates to the Fourth Dynasty, in the tomb of Nebenmakhet, King Khafre’s son, from Giza.54

Table 2-1: A representative list of Old Kingdom tomb scenes depicting manufacturing of stone vessels in workshop scenes.

<table>
<thead>
<tr>
<th>Tomb Owner</th>
<th>Location</th>
<th>Dynasty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nebemakhet (LG86)</td>
<td>Giza, Central Field</td>
<td>IV</td>
</tr>
<tr>
<td>Khuwnera (MQ1)</td>
<td>Giza, Temple of Menkaure</td>
<td>IV</td>
</tr>
<tr>
<td>Senedjemib Mehi</td>
<td>Giza</td>
<td>V</td>
</tr>
<tr>
<td>Ti</td>
<td>Saqqara</td>
<td>V</td>
</tr>
<tr>
<td>Snefrunefer II</td>
<td>Saqqara</td>
<td>V</td>
</tr>
<tr>
<td>Ptahma'kheru</td>
<td>Saqqara (Block now in Egyptian Museum)</td>
<td>late V</td>
</tr>
<tr>
<td>Kaemrehu</td>
<td>Saqqara</td>
<td>late V</td>
</tr>
<tr>
<td>Ankhmahor Sesi</td>
<td>Saqqara</td>
<td>early VI</td>
</tr>
<tr>
<td>Mereruka Meri</td>
<td>Saqqara</td>
<td>VI</td>
</tr>
</tbody>
</table>

54 A list of Old Kingdom tomb reliefs depicting the manufacturing of stone vessels is in table 2-1.  
55 A History of the Giza Necropolis, 1:351; Hassan, Excavations at Giza 1932-1933, IV:140, fig. 81.  
58 Épron, Le Tombeau de Ti: Dessins et Aquarelles, vol. 3, fig. clxxiii.  
60 Quibell, “Planche XXII. Making of Stone Vases,” fig. xxii.  
61 Borchardt, Denkmäler des Alten Reiches (ausser den Statuen) im Museum von Kairo, 1:235, fig. 48.  
62 Capart, Une Rue de Tombeaux à Saqqarah, 2:fig XXXIII.  
63 Duell, The Mastaba of Mereruka, 1:30.
II. **Catalog of the Heit el-Ghurab Drilling Tools**

As mentioned in the previous section, different drilling tools had different functions and were used for different stages of the manufacturing of the stone vessels. The following section discusses seventeen drilling bits, nine drill capstones, and three drill core recovered from Heit el-Ghurab. Copper drill bits and wooden shafts were not found in the excavations of the site.

1. **Drilling Bits**

A borer or a drill bit is the stone attached to the perforating end of the drilling apparatus and is used to perforate the stone. As mentioned previously, the different shapes of the drilling bits are: tubular shaped bit, which were usually of copper; bar and crescent shaped bits, which were usually of chert; and figure-of-eight, conical, round-bottomed, and crescent shaped, which were usually of stones other than chert. To date, only three crescent shaped drilling bits of chert were found, while the remaining examples, fourteen in total, are all of quartzite (conical, figure-of-eight, round-bottomed, and

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64 Davies, *The Rock Tombs of Deir El Gebrawi*, fig. xiii.
65 Lepsius, *Denkmäler aus Aegypten und Aethiopien*, fig. xix.
66 Drilling bits or borers are named differently in different publications. Petrie calls it borers, Petrie, *Tools and Weapons*, 45; while Bevan calls it grinders, Bevan, *Stone Vessels and Values in the Bronze Age Mediterranean*, 40–60.
67 According to lithic specialist Sabine Boos, one of the three chert borerheads is only a “possible borerhead”. Another example of a lithic borer was found in Main Street, part of the Galleries Complex. According to Cordula Werschkun, it was of an unusual shape for Old Kingdom borers, yet it resembled other Paleolithic tools. She mentioned that such borerhead was only used to perforate organic material: “Main Street Lithics,” 160.
a “flower” shaped drilling bits). For a complete list of all drill bits from the settlement site with the different areas in which they were found, see table 2-1.

i. Crescent-shaped chert borer-heads.

The three chert drilling tools or borer-heads68 are crescent shaped when viewed from the side and are knapped bifacially, creating convex vertical sides in cross section and a thin ridgeline. The upper side has a small indentation while its opposite side is curved for perforating soft stones. Examples of this drilling bit are numbers 28031.1948.22 and 28025.1834.3, shown in image 2-4. Parallels were found at Hierakonpolis, dating to the Naqada II period.69 As for crescent borer number 535-181.6, in image 2-5, a similar example was found at Heirakonpolis, also dating to the Naqada II period,70 yet the manufacturing of the Heit el-Ghurab example is slightly different, and might be a borerhead.71

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68 “Borers” for lithic specialists could either mean awls produced in the Stone Age or drilling tools. Hence, in this context, it is mentioned as borerhead to avoid confusion, as noted by lithic specialist Sabine Boos.
70 Hikade, “Urban Development at Hierakonpolis and the Stone Industry of Square 10NSW,” 186, fig. 1: 5.
71 Information about the three borerheads was granted to me by lithic specialist Sabine Boos, personal communication.

Conical-shaped drill bits

As for the quartzite drilling bits, five conical-shaped drill bits were found. The conical-shaped bits are usually conical in shaped when viewed from the side, round in shape when viewed from the bottom, and figure-of-eight in shape when viewed from above. The rounded part of the tool is the perforating bit. The indentations on the sides of the drill bit are the place where the fork-shaped shaft were attached and tied. Among the different examples of conical-shaped tools are object numbers 1352 and 2936, shown in image 2-6. The vertical sides around the circumference of the tool have traces of fine concentric lines, resulting from drilling, as depicted in figure 2-2. Object number 2291, shown in image 2-3, is a unique example since it does not have hafting grooves like other examples of the same shape. Examples of conical shaped drill bits were found in the Old Kingdom site of Hierakonpolis, made of sandstone, and in an Early Dynastic workshop at Tell el-Farkha, made of quartzite.

Image 2-6: Three conical shaped drill bits and one round-bottomed drill bit. Conical shaped drill bits object numbers: 1352, 2291, and 2936; round-bottomed drill bit object number: 3548, material: quartzite, photo number 412360, by the author. Permission granted by AERA; © AERA.

For a complete list of conical-shaped tools found in Heit el-Ghubar, see table 2-2. In image 2-6, object number 3548 is not a conical-shaped drill bit but a round-bottomed example.


iii. Figure-of-eight drill bits

The figure-of-eight drilling bits (a total of six from Heit el-Ghurab) are eight-shaped when looked at from above, hence its name, a hemispherical shape when viewed from the side along its length, ending in a ridge line at both ends of the tool, and a roughly rectangular shaped in cross section. The two grooves on each side of the stone are where the fork-shaped wooden shaft fit. The examples from the site have traces of concentric lines on the upper and lower glossy horizontal surfaces, as depicted in figure 2-3, suggesting that both surfaces might have been used for drilling. The grooves are worn out, probably from use, as seen in image 2-7. Similar examples of the same material dating to Naqada II
Period\textsuperscript{75} and of sandstone, limestone, and diorite, dating to the Old Kingdom Period\textsuperscript{76} were found at Hierakonpolis. At Tell el-Farkha, a figure-of-eight drill bit was found dating to Dynasty 0.\textsuperscript{77}

\begin{quote}
\textit{Figure 2-3: Figure-of-eight drill bit. Object number: 1510, material: quartzite, drawing number: 203, by Johnny Karlsson. Permission granted by AERA; © AERA.}
\end{quote}

\begin{footnotesize}
\textsuperscript{75} Hikade, “Urban Development at Hierakonpolis and the Stone Industry of Square 10NSW,” 186, fig. 1: 7–9.

\textsuperscript{76} Quibell and Green, \textit{Hierakonpolis II}, pl. LXII.

\textsuperscript{77} Jórdeczka and Mrozek-Wysocka, “Stone Working: Tools and Workshops,” 290, fig. 17.
\end{footnotesize}
iv. Flower-shaped drill bits

A variation of the figure-of-eight drilling bit is the flower-shaped drill (one example from Heit el-Ghurab). It has a hemispherical shaped cross section when viewed from the side, creating a ridge line around the circumference, as depicted in figure 2-7. When viewed from above, it has a circular outline with four hafting grooves, as seen in image 2-8. The tool probably started as a figure-of-eight drill bit and later developed into this shape. Both convex upper and lower surfaces have traces on concentric lines. Old Kingdom parallels of the same shape and material was found in a stone vessel workshop at Elephantine.78

78 Dreyer, Elephantine VIII, 135, fig. 46: 349; pl. 44.  

Image 2-7: Figure-of-eight drill bits. Object numbers: 1503, 1510, 2699, 2865, 2937, and 3534, material: quartzite, photo number: 412384, by the author. Permission granted by AERA; © AERA.
v. Round-bottomed drill bits

Another shape of drilling bits recovered from Heit el-Ghurab is one round-bottomed drill. It has a crescent shaped cross section with a rounded bottom when viewed from the side and a figure-of-eight shape when viewed from the top, shown earlier in image 2-6. Even though the round-bottomed drill bit types were used to drill stone vessels, as mentioned by Stocks, this particular tool might have been in a
manufacturing stage of creating other shapes, such as conical and figure-of-eight shapes, since it has no traces of drill use.

Table 2-2: A complete list of drilling bits with locations on site.

<table>
<thead>
<tr>
<th>Object Number</th>
<th>Area</th>
<th>Feature Number</th>
<th>Shape</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>28025.1834.3</td>
<td>AA</td>
<td>28025</td>
<td>crescent</td>
<td>Chert</td>
</tr>
<tr>
<td>28031.1948.22</td>
<td>AA</td>
<td>28031</td>
<td>crescent</td>
<td>Chert</td>
</tr>
<tr>
<td>535.181.6</td>
<td>AA</td>
<td>535</td>
<td>crescent</td>
<td>Chert</td>
</tr>
<tr>
<td>1352</td>
<td>SFW</td>
<td>20629</td>
<td>conical</td>
<td>Quartzite</td>
</tr>
<tr>
<td>2291</td>
<td>SFWH3</td>
<td>24626</td>
<td>conical</td>
<td>Quartzite</td>
</tr>
<tr>
<td>2298</td>
<td>SFWH3</td>
<td>24626</td>
<td>conical</td>
<td>Quartzite</td>
</tr>
<tr>
<td>2936</td>
<td>RAB</td>
<td>5599</td>
<td>conical</td>
<td>Quartzite</td>
</tr>
<tr>
<td>3483</td>
<td>BBNW</td>
<td>21710</td>
<td>conical</td>
<td>Quartzite</td>
</tr>
<tr>
<td>1503</td>
<td>EOG</td>
<td>20390</td>
<td>figure-of-eight</td>
<td>Quartzite</td>
</tr>
<tr>
<td>1510</td>
<td>SFW</td>
<td>20629</td>
<td>figure-of-eight</td>
<td>Quartzite</td>
</tr>
<tr>
<td>2699</td>
<td>RAB</td>
<td>28586</td>
<td>figure-of-eight</td>
<td>Quartzite</td>
</tr>
<tr>
<td>2865</td>
<td>BBHT(N)-ST</td>
<td>26726</td>
<td>figure-of-eight</td>
<td>Quartzite</td>
</tr>
<tr>
<td>2937</td>
<td>BBE</td>
<td>7038</td>
<td>figure-of-eight</td>
<td>Quartzite</td>
</tr>
<tr>
<td>3534</td>
<td>AA</td>
<td>25185</td>
<td>figure-of-eight</td>
<td>Quartzite</td>
</tr>
<tr>
<td>3548</td>
<td>MSE</td>
<td>27067</td>
<td>figure-of-eight</td>
<td>Quartzite</td>
</tr>
<tr>
<td>2700</td>
<td>RAB</td>
<td>27476</td>
<td>flower-shaped</td>
<td>Quartzite</td>
</tr>
<tr>
<td>3548</td>
<td>MSE</td>
<td>27067</td>
<td>round-bottomed/figure-of-eight</td>
<td>Quartzite</td>
</tr>
<tr>
<td>3296</td>
<td>SFW</td>
<td>24636</td>
<td>Fragment of a drill bit</td>
<td>Quartzite</td>
</tr>
</tbody>
</table>

2. Drill Capstones

Capstones have a circular outline when viewed from above and a dome shaped cross section, with a convex upper surface and a concave bottom surface, as depicted in figure 2-5. The indentation on the bottom surface is the place where the wooden shaft would fit79 (as mentioned in the section 2.1 ‘Manufacturing of stone vessels’ above). A total of nine capstones were recovered of limestone, sandstone, and travertine, as listed in table 2-3. The travertine capstone shows the concentric drilling lines from use, as shown in image 2-9.

Figure 2-5: A dome shaped drill capstone. Object number: 1244, material: limestone, drawing number: 199, by Johnny Karlsson. Permission granted by AERA; © AERA.

Image 2-9: Drill capstone with inner traces of drilling lines. Object number: 2289, material: travertine, photo numbers: 805582 and 805583, by Yukinori Kawae. Permission granted by AERA; © AERA.

Table 2-3: Complete list of drill capstones with locations on site.

<table>
<thead>
<tr>
<th>Object Number</th>
<th>Area</th>
<th>Feature Number</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000-35</td>
<td>WES</td>
<td>1939</td>
<td>Sandstone</td>
</tr>
<tr>
<td>2001a-132</td>
<td>WCG</td>
<td>3748</td>
<td>Limestone</td>
</tr>
</tbody>
</table>
3. Drill Cores

In spite of the absence of copper tubular drills from Heit el-Ghurab, evidence for their use on site existed: drill capstones and drill cores. Drill capstones were used to apply pressure on the tubular drill apparatus and drill cores were residues of drilling with a copper tubular drill. Three drill cores were found in Heit el-Ghurab, two of which are of travertine, found at the Royal Administrative Building, and one of limestone, found in Main Street, as listed in table 2-4. The drill cores are tubular in shape with a circular cross section, presented in image 2-10. The diameters of all examples vary from 2 to 2.4 centimeters, reflecting the sizes of the drills that were originally used.80 Travertine examples of tubular drill cores were published by Petrie in *Tools and Weapons*.81

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80 It is sometimes difficult to differentiate the categories of drill cores and jar stoppers from each other, since both categories have almost the same shape. Yet, the larger diameter and the slightly conical outline of the jar stoppers make the distinction between both categories. (Jar stoppers are discussed in chapter 3).

A total of twenty-nine drilling tools made of different materials were recovered at Heit el-Ghurab. The dominant material of the drilling bits is quartzite, of the drilling capstones is limestone, and of the drill cores is travertine. All of these finds supported by the workshop scenes of the tomb reliefs of the Old Kingdom that revealed the different stages for stone vessel production, in addition to the experimental archaeology work conducted by Denys Stocks, led to the belief that stone vessel production took place on different areas of the site. The locations of where the drillings tools were found and how they tie together with the stone vessels excavated in Heit el-Ghurab is discussed in chapter 4.
Chapter 3
Heit el-Ghurab Stone Vessels

I. An Overview of the Different Stone Vessel Typologies

Scholars have realized the importance of stone vessels since they were first discovered in excavations and have tried to work typologies, like ceramic typologies, for dating. Throughout the years, many scholars have attempted to create or edit existing typologies of stone vessels. Among the earliest was Sir William Flinders Petrie. In 1913, he has published his book *Tarkhan I and Memphis V*\(^{82}\) and in 1914, *Tarkhan II*,\(^ {83}\) which covered stone typologies from the Naqada III Period through the Early Dynastic Period. His typology is based on his famous method of sequence dating. He had used the same method for dating Predynastic pottery.\(^ {84}\) Sequence Dating had proved to be a useful tool for stone vessels, yet it lacked certain aspects, such as stratigraphy of finds.\(^ {85}\) Petrie’s typology covers vessels from the Predynastic to the Early Dynastic Periods, which does not directly relate to the corpus of the stone vessels from Heit el-Ghurab.

George Andrew Reisner laid the foundation of stone vessel typologies, starting with his book *Mycerinus*, in 1931, and followed up with *History of Giza Necropolis II*, and *A Provincial Cemetery of the Pyramid Age: Naga-ed-Dar III*. In *Mycerinus*, Reisner assembles a long typology from the Predynastic Period until the end of the Fourth Dynasty, and includes the stone vessels of King Sahure of the Fifth

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82 Petrie, Wainwright, and Gardiner, *Tarkhan I and Memphis V*.
83 *Tarkhan II*.
84 An example of such a technique is described in the “Mode of Dating” and “Materials and Forms” sections in his book: *The Funeral Furniture of Egypt*, 1–3.
85 Petrie’s other publications discussing stone typologies are: *Prehistoric Egypt*; Petrie and Quibell, *Naqada and Ballas*. 42
Dynasty.\textsuperscript{86} His classification of stone vessels, which resembled the ceramic typologies, was first categorized by time period then by vessel class. In some of the classes, he groups bowls, dishes, and beakers together under one class, which are considered to be different classes by other scholars. Reisner also grouped together vessels of various body shapes, like convex-sided, straight-sided, and concave-sided, which is an unusual grouping, while only differentiating between the base shapes, as either being round or flat.\textsuperscript{87} In \textit{A Provincial Cemetery of the Pyramid Age: Naga-ed-Dar}, Reisner approaches the classification of stone vessels differently, by associating them to different cemeteries and grave types, beginning with the Second Dynasty stone vessels and went as far as the Sixth Dynasty.\textsuperscript{88} The same approached was followed in \textit{History of Giza Necropolis II}, where Reisner and Smith appended more vessel classes to the previously created typology.\textsuperscript{89} His typology and stone vessel examples were useful for this research since they were contemporaneous with the time period and location of the Heit el-Ghurab material.

In 1978, Ali El-Khouli’s created a stone vessels typology that covers the Predynastic Period until the end of the Third Dynasty. He categorizes the stone vessels into broad classes, like jars, bowls, beakers, and others, then subdivides them into types for each broad class, based on the body, rim, or base shapes as well as additional features, such as handles and decorations. The types are then further grouped, first by period then by site.\textsuperscript{90} He divided the stone vessels in thirty two broad types. El-Khouli noted minor differences in different sections of the stone vessels, like the rims for instance, while at other times misses some variations, like body shapes. Since his typology ends at the Third Dynasty, it was not used as reference for the material from Heit el-Ghurab.

\begin{flushright}
\textsuperscript{86} Reisner, \textit{Mycerinus}.
\textsuperscript{87} An example of that is his type 1-X, Reisner, \textit{Mycerinus}, 148–151.
\textsuperscript{88} He used the same approach in his publication Reisner, \textit{A Provincial Cemetery of the Pyramid Age: Naga-Ed-Der III}; \textit{A History of the Giza Necropolis}.
\textsuperscript{89} Reisner and Smith, \textit{A History of the Giza Necropolis. The Tomb of Hetep-Heres the Mother of Cheops}.
\textsuperscript{90} El-Khouli, \textit{Egyptian Stone Vessels Predynastic Period to Dynasty III}, xix.
\end{flushright}
By 1994, Stan Hendrickx modified and added to the existing stone vessels typologies, in *Elkab* V. Like Reisner, he used the same definitions and classifications of the ceramic vessels for stone vessel typology. In his stone vessel typology, he distinctly differentiates between the rim types, necks, and shapes, while discussing different materials, provenances, and the manufacturing techniques.

Barbara Greene’s dissertation, in 1994, deals with the materials and forms of the stone vessels of ancient Egypt from the Predynastic Period to the Roman Period. Her main concern was the stone vessel materials. As for the typology of the stone vessels, Greene mentioned that she did not intend to create a new typology but based her divisions on chronological groups. The terms she used to describe the shapes are “based on that proposed by the International Group for the Study of Egyptian Pottery.” Her classifications of stone vessels depends mostly on the basic variations of the typologies, with attention on some of the subtypes of each class. Since Greene’s typology is the most recent one with clear distinctions between vessel variations, it was used as the main source for the classes and types of the Heit el-Ghurab vessels. The criteria she uses for differentiating between different vessels are the form shapes, “open-form” or “closed-form.” The different classifications of the open-forms, convex-sided, straight-sided, concave-sided, and vertical-sided; vessel index, which is the relationship between the width and the height of the vessel; and place of the maximum body diameter for the jars, top, middle, or lower part.

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II. **Catalog of Heit el-Ghurab Stone Vessels**

More than eighty-five stone vessel fragments have been recovered from Heit el-Ghurab. Due to the fragmentary condition of the discovered stone vessels, it was not possible to get a very precise classification of the different classes. The classifications are based on diagnosable parts, like rims and/or bases, while fragments of the vessel bodies that are badly fragmented, small in size, and do not have rims and/or bases are referred to as body parts. A total of sixty-five stone vessels are classified and presented in this chapter, which is about 80% of the entire collection, while sixteen fragments are considered body part fragments, representing about 20%. The vessel classes of Heit el-Ghurab are: bowls, cylinder jars, and miniature vessels, table 3-1 and figure 3-1. The material of most of the stone vessels is limestone, yet vessels of other materials were found as well, like travertine, gneiss, granite, among others, table 3-2, 3-3, and figure 3-2.

Table 3-1: Total count of stone vessel classes.

<table>
<thead>
<tr>
<th>Stone Vessel Classes</th>
<th>Total number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bowl</td>
<td>50</td>
</tr>
</tbody>
</table>

After carefully studying the stone vessel fragments, it was realized that in some cases fragments of the same stone vessel were either found in different areas or on different digging seasons. Such fragments are grouped together and counted as one stone vessel. This results in a total of eighty-one stone vessels, including the body part fragments.

The main source for the classes and types mentioned in this research is based on Greene’s dissertation, “Ancient Egyptian Stone Vessels: Materials and Forms.”, as mentioned previously. Other sources used for the classifications are Reisner, Mycerinus; Reisner, A History of the Giza Necropolis; Reisner and Smith, A History of the Giza Necropolis. The Tomb of Hetep-Heres the Mother of Cheops; and Vlčková, Abusir XV.

Body part fragments of stone vessels are referred to in tables, charts, and maps as “Vessel/Body part fragments”.

Appendix 1 includes a full list of all the stone vessels of Heit el-Ghurab, its material, feature numbers, areas, dimensions, as well as vessel class and type.

Table 3-1 lists all the different stone vessels classes, which is also demonstrated in the chart of figure 3-1.

Philip LaPorta, a geologist, worked on classifying different materials of the stone vessels, like some of the gneiss examples and the phyllite bowl. Table 3-2 presents the total number of materials for the stone vessels, which is also depicted in figure 3-2. Table 3-3 lists all the different classes of stone vessels with counts of the materials in which they were made of.
<table>
<thead>
<tr>
<th>Stone Vessel Classes</th>
<th>Total number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vessel/body part fragments</td>
<td>16</td>
</tr>
<tr>
<td>Cylinder Jar</td>
<td>8</td>
</tr>
<tr>
<td>Miniature Vessel</td>
<td>7</td>
</tr>
</tbody>
</table>

**Figure 3-1: Chart showing the percentages of the different stone vessel classes.**

**Table 3-2: Total counts of materials of all classes of stone vessels.**

<table>
<thead>
<tr>
<th>Materials</th>
<th>Total number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limestone</td>
<td>51</td>
</tr>
<tr>
<td>Travertine</td>
<td>15</td>
</tr>
<tr>
<td>Gneiss</td>
<td>9</td>
</tr>
<tr>
<td>Granite</td>
<td>4</td>
</tr>
<tr>
<td>Phyllite</td>
<td>1</td>
</tr>
</tbody>
</table>
## Materials

<table>
<thead>
<tr>
<th>Materials</th>
<th>Total number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dioirite</td>
<td>1</td>
</tr>
</tbody>
</table>

---

**Figure 3-2: Chart illustrating the percentages of different stone vessel materials.**

**Table 3-3: Materials of the stone vessel classes.**

<table>
<thead>
<tr>
<th>Stone Vessel Classes</th>
<th>Materials</th>
<th>Total number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bowl</td>
<td>Limestone</td>
<td>36</td>
</tr>
<tr>
<td>Bowl</td>
<td>Gneiss</td>
<td>6</td>
</tr>
<tr>
<td>Cylinder Jar</td>
<td>Travertine</td>
<td>6</td>
</tr>
<tr>
<td>Miniature Vessel</td>
<td>Limestone</td>
<td>6</td>
</tr>
<tr>
<td>Vessel/body part fragments</td>
<td>Limestone</td>
<td>7</td>
</tr>
<tr>
<td>Bowl</td>
<td>Travertine</td>
<td>5</td>
</tr>
<tr>
<td>Vessel/body part fragments</td>
<td>Travertine</td>
<td>4</td>
</tr>
<tr>
<td>Vessel/body part fragments</td>
<td>Granite</td>
<td>3</td>
</tr>
</tbody>
</table>

---

47
Stone Vessel Classes | Materials | Total number
---|---|---
Cylinder Jar | Limestone | 2
Vessel/body part fragments | Gneiss | 2
Bowl | Phyllite | 1
Bowl | Granite | 1
Bowl | Dioirite | 1
Miniature Vessel | Gneiss | 1

1. Bowls

The main class of stone vessels found at Heit el-Ghurab is the bowl, with its different types, table 3-4 and figure 3-3 and materials, table 3-5. The variations in bowl types depend on the shape of the body, the rim, and the base. Different shapes of the vessel body are: convex-sided, vertical-sided, bent-sided, and straight-sided. The rims variations are rounded, squared, incurved, restricted, and carinated. The base shapes are either round-bottomed or flat-bottomed. The following section discusses and explains the different typologies of stone bowls found on the site.

Table 3-4: Typologies and counts of stone bowls

<table>
<thead>
<tr>
<th>Bowl Typologies</th>
<th>Total number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convex-sided bowl</td>
<td>32</td>
</tr>
</tbody>
</table>

101 In this chapter, classes and types are meant to refer to different things. Classes of stone vessels are the main class/category of the stone vessel, like bowl and jar. As for the terms typologies or types, they are meant to refer to the sub-categories of the class, such as ‘bent-sided bowls’.

102 Greene differentiates between the bowl types by giving names such as ‘convex-sided bowls’ or ‘vertical-sided bowls’, among others. Yet, in some of the bowl typologies, she gives them names based on their bases, like ‘round-bottomed bowls’. Greene, “Ancient Egyptian Stone Vessels: Materials and Forms,” 279–281. For the purpose of the vessel typologies of this research, the ‘round-bottomed bowl’ type was not used as such. The approach followed here was to differentiate first by the different shapes of the bodies, i.e. ‘convex-sided bowls’ and then, by base and rim shapes, as applicable to different examples.
### Bowl Typologies

<table>
<thead>
<tr>
<th>Bowl Typologies</th>
<th>Total number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical-sided bowl</td>
<td>7</td>
</tr>
<tr>
<td>Bent-sided bowl</td>
<td>5</td>
</tr>
<tr>
<td>Open-spouted bowl</td>
<td>2</td>
</tr>
<tr>
<td>Straight-sided bowl</td>
<td>2</td>
</tr>
<tr>
<td>Carinated bowl</td>
<td>1</td>
</tr>
<tr>
<td>Restricted bowl</td>
<td>1</td>
</tr>
</tbody>
</table>

*Figure 3-3: Chart showing the percentages of the different bowl typologies.*

<table>
<thead>
<tr>
<th>Bowl Types</th>
<th>Material</th>
<th>Total number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convex-sided bowl</td>
<td>Limestone</td>
<td>25</td>
</tr>
</tbody>
</table>

*Table 3-5: Materials of the different types of stone bowls.*

49
<table>
<thead>
<tr>
<th>Bowl Types</th>
<th>Material</th>
<th>Total number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical-sided bowl</td>
<td>Limestone</td>
<td>5</td>
</tr>
<tr>
<td>Convex-sided bowl</td>
<td>Gneiss</td>
<td>4</td>
</tr>
<tr>
<td>Bent-sided bowl</td>
<td>Limestone</td>
<td>4</td>
</tr>
<tr>
<td>Bent-sided bowl</td>
<td>Travertine</td>
<td>1</td>
</tr>
<tr>
<td>Carinated bowl</td>
<td>Gneiss</td>
<td>1</td>
</tr>
<tr>
<td>Convex-sided bowl</td>
<td>Granite</td>
<td>1</td>
</tr>
<tr>
<td>Convex-sided bowl</td>
<td>Travertine</td>
<td>1</td>
</tr>
<tr>
<td>Convex-sided bowl</td>
<td>Phyllite</td>
<td>1</td>
</tr>
<tr>
<td>Open-spouted bowl</td>
<td>Limestone</td>
<td>1</td>
</tr>
<tr>
<td>Open-spouted bowl</td>
<td>Travertine</td>
<td>1</td>
</tr>
<tr>
<td>Restricted-bowl</td>
<td>Dioirite</td>
<td>1</td>
</tr>
<tr>
<td>Straight-sided bowl</td>
<td>Limestone</td>
<td>1</td>
</tr>
<tr>
<td>Straight-sided bowl</td>
<td>Travertine</td>
<td>1</td>
</tr>
<tr>
<td>Vertical-sided bowl</td>
<td>Gneiss</td>
<td>1</td>
</tr>
<tr>
<td>Vertical-sided bowl</td>
<td>Travertine</td>
<td>1</td>
</tr>
</tbody>
</table>

i. Convex-sided bowls

Convex-sided, open-formed bowls are the most commonly identified type of vessel from Heit el-Ghurab, table 3-4. It was classified by Reisner as ‘round-bottomed dishes and bowls’, or type IX and as ‘flat-bottomed dishes and bowls, or type X.\(^\text{103}\) Thirty-two convex-sided examples were recovered, mostly of limestone, but a few examples were of gneiss, travertine, granite, and phyllite, table 3-5. The convex-

\(^\text{103}\) *Mycerinus*, 158–162.
sided bowls are differentiated by variations of rim and base shapes.\textsuperscript{104} Twenty-nine fragments have the rim remaining, while two examples are of bases only. The different rim variations are: plain, un-modelled, eighteen; incurved, square-shaped, five; square-shaped, three; and incurved, three. As mentioned, the dominant rim shape is the plain, un-modelled one, as depicted in figure 3-4. Gneiss parallels to convex-sided bowls with plain, un-modelled, rounded-rims were found at the Mortuary Temple of King Raneferef at Abusir.\textsuperscript{105}

![Convex-sided bowl with plain, unmodeled, rounded rim. Object number: 3830, material: limestone, area: WCS/WCG, feature number: 3274, drawing number 16, by Caroline Hebron. Permission granted by AERA; © AERA.](image)

As for the incurved-shaped rims, a few examples are more modeled and defined than other examples. The gneiss rim example depicted in figure 3-5 is of a remarkable shaped large bowl, with an outer diameter of 24 centimeters. It has been carefully shaped on the exterior and the interior. The exterior has two fine grooves, creating parallel lines below the rim area, while the interior has a concave indentation below the rim. Another unique example is depicted in figure 3-6, which has a complete profile with an incurved rim and a flat base preserved. Similar Diorite examples of the same time period

\textsuperscript{104} The variations of this type of bowl are in Greene’s dissertation on pp. 289—292.

\textsuperscript{105} Vlčková, Abusir XV, 138, pl. 22: 98/I/85–y; 532/I/82–b.
and location were found in King Menkaure’s Valley Temple.\textsuperscript{106} This could indicate that both vessels might have been produced by the same craftsmen. More parallels of diorite were found in the cemeteries at Naga ed-Der, dating to the Fourth Dynasty\textsuperscript{107} and in Ballas.\textsuperscript{108} At least three other examples, made of gneiss, were found in the King Raneferef’s Mortuary Temple at Abusir, dating to the Fifth Dynasty.\textsuperscript{109}

Square-shaped rims can vary from being thick and hardly modelled, figure 3-7, to being incurved, figure 3-8, which is a big bowl made of black granite with an 18 centimeter rim diameter.

Granite is an unusual material for stone vessels from Heit el-Ghurab, with only three other body part

\hspace*{1cm}

\textsuperscript{106} Reisner, \textit{Mycerinus}, 186, fig. 57: 21.
\textsuperscript{107} Reisner, \textit{A Provincial Cemetery of the Pyramid Age: Naga-ed-Der III}, 46–47, fig. 14: 12, 13.
\textsuperscript{108} Petrie and Quibell, \textit{Naqada and Ballas}, 1:36; pl. XIII: 107.
\textsuperscript{109} Vlčková, \textit{Abusir XV}, 142, pl. 26: 533/I/a–c.
vessel fragments recovered from site, as listed in table 3-3. Diorite parallels of the incurved, square-shaped bowl types were found in the King Menkaure’s Valley Temple.\textsuperscript{110}

![Figure 3-7: Convex-sided bowl with flat, square-shaped rim and possibly a rounded bottom. Object number: 3838, material: limestone, area: NSGH, feature number: 3437, drawing number: 16, by Caroline Hebron. Permission granted by AERA; © AERA.](image)

![Figure 3-8: Convex-sided bowl with slightly incurved, square-shaped rim. Object number: 1077, material: granite, area: SSGH, feature number: 1210, drawing number 241, by the author. Permission granted by AERA; © AERA.](image)

With the regards to the base variations of the thirty-one convex-sided bowls, only twelve fragments have the base remaining or such a large part of the vessel profile that one can assume the shape of the base. The different base variations of the convex-sided bowls are: nine round-bottomed\textsuperscript{111} and three flat-bottomed,\textsuperscript{112} two of which have no rims. Although flat-bottomed bowls have a flat base on the exterior, the interior is slightly rounded, as seen in figures 3-6 and 3-10. A similar example of a

\textsuperscript{110} Reisner, Mycerinus, 186, fig. 57: 12; 23.
\textsuperscript{111} Example of convex-sided, round-bottomed bowls is depicted in figure 3-9.
\textsuperscript{112} Examples are in figure 3-6 and 3-10.
diorite convex-sided, round-bottomed bowl was found in the Mortuary Temple of King Sahure at Abusir. \(^{113}\) A slight difference is that the Abusir bowl has an incised line on the exterior, close to the base.

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\(^{113}\) Borchardt, *Das Grabdenkmal des Königs Sahu-Re: Der Bau*, 1:116. fig. 153, 3rd row on the right.
An unusual example of a convex-sided bowl type is presented in the Heit el-Ghurab collection: a bowl with a false spout, meaning the spout is not drilled through, figure 3-11. Another interesting fact about this bowl is that it was broken into two parts and each was found in a different excavation season and in a different strata.

![Figure 3-11: Unusual convex-sided, round-bottomed bowl with false spout. Object numbers: 1359 and 2843, material: limestone, area: RAB, feature numbers: 21124 and 25363, drawing number 187, by Sherif Mohamed Abdel Moneam. Permission granted by AERA; © AERA.]

\[1359 + 2843\]

**ii. Vertical-sided bowls**

Vertical-sided bowls have vertical sides curving towards the bottom, creating round-bottomed bases, although a few exceptions have flat-bottomed bases.\(^{114}\) Seven bowls of limestone, gneiss, and travertine were excavated.\(^{115}\) Six fragments have the rim preserved: five plain, un-modelled shaped and

\(^{114}\) Greene classifies this type of bowl as “round-bottomed bowl with plain rim – rim vertical or slightly incurring” “Ancient Egyptian Stone Vessels: Materials and Forms,” 279. Yet, for the purpose of this research and since all the bowl types are differentiated based on different shapes of the bowl bodies, it is classified under “Vertical-sided bowls”. In some cases, the base is not completely preserved, yet the shape of the base is determined based on the big percentage of the body profile remaining.

\(^{115}\) See table 3-5 for the total counts of each material.
one square-shaped; and one has no rim but only a rounded base. Reisner categorizes the vertical-shaped bowls with rounded bases as a sub-type of ‘Round-bottomed dish and bowl’, designated the name of ‘globular cups’, or type IX b.\textsuperscript{116} The vessels depicted in figures 3-12 and 3-13 are uncommon. Figure 3-12 shows a unique example with a flat base. Unlike flat-bottomed convex-sided bowls, the interior of this vessel is more squared in shape than its exterior base. Also, traces of red ochre were found on the interior. As for figure 3-13, the bowl has an unusual flat, squared-rim. Diorite parallels of the vertical-sided, round-bottomed vessels were found in the Valley Temple of King Menkaure at Giza.\textsuperscript{117}

\begin{figure}[h]
\centering
\includegraphics[width=0.8\textwidth]{figure3-12.png}
\caption{Vertical-sided, flat-bottomed bowl. Object number 1754, material: limestone, area: SFWPM, feature number: 21557, drawing number 212, by Will Schenk. Permission granted by AERA; © AERA.}
\end{figure}

\textsuperscript{116} Reisner, Mycerinus, 196.
\textsuperscript{117} Reisner, Mycerinus, 186, fig. 56: 4, 5.
iii. Bent-sided bowls\textsuperscript{118}

Bent-sided bowls are a peculiar, uncommon type of vessel, with a vertical, square-shaped rim and vertical sides, slightly sloping inwards towards the base. A clear line divides the upper part of the vessel body, just below the rim area, from the rest of the body, creating a horizontal line around the circumference. Three of the five bent-sided bowls found in Heit el-Ghurab have a vertical or diagonal line on the exterior creating a faceted surface, as seen in figures 3-14 to 3-16. Reisner classifies the ‘bent-sided bowls’ under the broad class of ‘round-bottomed cups, dishes, and shallow bowls’, as type IX-c.\textsuperscript{119} The examples he refers to from Giza, dating to the Fourth Dynasty, are slightly different in shape than the ones found at Heit el-Ghurab, in that they do not have the same faceted exteriors. Similar examples of the bent-sided bowls were located at Giza and not in other areas, hence suggesting that this type might be limited to the Giza Plateau.

\textsuperscript{118} This type of stone bowls is not mentioned in Greene, “Ancient Egyptian Stone Vessels: Materials and Forms.”
\textsuperscript{119} In A History of the Giza Necropolis. The Tomb of Hetep-Heres the Mother of Cheops, 2:91, this type is classified under type XI-c, while referring to the examples in A History of the Giza Necropolis, 1:489, fig. 297b: 14–1–51, 14–1–52, and 14–1–56, which he classifies under type IX-d. This was an addition to Reisner’s stone vessel typologies, since it was not mentioned in his classification in Mycerinus, 130–201.
Figure 3-14: Bent-sided bowl with square-shaped rim with faceted exterior surface. Object number 1569, material: limestone, area: RAB, feature number: 5440, drawing number: 205, by Johnny Karlsson. Permission granted by AERA; © AERA.

Figure 3-15: Bent-sided bowl with square-shaped rim and faceted exterior surface. Object number: 1689, material: limestone, area: WRW, feature number: 22045, drawing number: 250, by the author. Permission granted by AERA; © AERA.
iv. Open-spouted bowls\textsuperscript{120}

Only two open-spouted bowls were recovered from Heit el-Ghurab, of travertine and limestone. Both have convex-sided bodies; plain, rounded rims; rounded bottoms; finished exteriors; and almost the same dimensions,\textsuperscript{121} figure 3-17. The travertine bowl is more polished and has a finer modelled rim. Reisner does not have a separate typology for the open-spouted bowls, yet he grouped them with the main classes, based on either rims or bases. A grey stone example of similar shape was found in King Sahure’s Mortuary Temple at Abusir,\textsuperscript{122} and a Basalt one in King Menkaure’s Valley Temple at Giza, but with a flat base.\textsuperscript{123}

\textsuperscript{120} Greene, “Ancient Egyptian Stone Vessels: Materials and Forms,” 307–308.
\textsuperscript{121} See Appendix 1 for more information.
\textsuperscript{122} Borchardt, Das Grabdenkmal des Königs Sahu-Re: Der Bau, 1:118, fig. 162.
\textsuperscript{123} Reisner, Mycerinus, 187, fig. 59: 8.
v. Straight-sided bowls

Two straight-sided bowls, of travertine and limestone, were found at the site. Both are fragments of plain, round-shaped rims, figure 3-18. Based on the classification by Greene and Resiner, the straight-sided bowls are usually flat-bottomed, yet no bases were preserved from Heit el-Ghurab examples. As mentioned previously, Reisner did not differentiate between the different body shapes in creating the stone vessel typologies, hence this type of bowl was grouped under ‘flat-bottomed cups, dishes, and bowls’, or type X. A similar travertine example was found in the tomb of Queen Hetepheres I at Giza.125

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vi. Carinated bowls\textsuperscript{126}

One gneiss carinated bowl, or sometimes referred to as the Meidum bowl, was recovered from Heit el-Ghurab, figure 3-19. Gneiss is a rare material on site, which makes up 10\% of the materials of stone vessels on site, as listed on table 3-3. The small thickness of the body of the vessel and its rim indicate the fine craftsmanship required to manufacture it. Reisner classifies the carinated bowls under ‘miscellaneous types’. Travertine\textsuperscript{127} and diorite\textsuperscript{128} similar examples were found in the Valley Temple of King Menkaure, and gneiss examples in King Raneferef’s Mortuary Temple at Abusir.\textsuperscript{129}

\textsuperscript{127} Mycerinus, 283, fig. 30.  
\textsuperscript{128} Reisner, Mycerinus, 186, fig. 56: 8–10.  
\textsuperscript{129} Vlčková, Abusir XV, 140, pl. 24: 525/1/82–b.
vii. Restricted bowls

One diorite restricted open-bowl was found in the site, figure 3-20. According to Greene’s dissertation, it belongs to the “open-form” class, which differs in meaning from the term used in the pottery classification. Similar examples were found in King Menkaure’s Valley Temple at Giza, which were classified under ‘squat cup with band-rim on contracted mouth’, or type XI-c.

Figure 3-20: Restricted bowl with rim sloping inwards towards the aperture of the bowl. Object number: 2786, material: diorite, area: SFWH1, feature number: 27157, drawing number: 244, by the author. Permission granted by AERA; © AERA.

2. Cylinder Jars

Cylinder jars of various types were excavated in Egypt on sites dating to as early as the Predynastic Period and are common during the Old Kingdom Period. The cylinder jars found at Heit el-Ghurab are not numerous in quantity, when compared to the bowl class, depicted in figure 3-2. Seven cylinder jar fragments were recovered, five rims and two bases, in addition to one complete travertine cylinder jar.

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131 Reisner, Mycerinus, 186, fig. 56: 18–19.
132 Reisner, Mycerinus, 198.
133 Greene referred to jars as beakers, “Ancient Egyptian Stone Vessels: Materials and Forms,” 260–275, yet in the context of this research, the term “jar” is used instead, referring to the same thing.
134 Reisner, Mycerinus, 131.
with flat squared rim, but in a fragile condition. Like the bowl types, the types of the cylinder jars were determined based on the rim, body, or base. The rim variations are: squared rims, five, figure 3-21; and plain, un-modeled rims, two. The jar body shape variations are: concave-sided, four; straight-sided, two; and sloping-inward towards the base, two, figure 3-21. The two base fragments recovered are of footed-jars, like the one depicted in figure 3-22. Travertine parallels to the square-shaped rim jars were found in the Valley Temple of King Menkaure at Giza, which were classified by Reisner as ‘cylindrical jars: plain with heavy rim’, or type I c.

Figure 3-21: Cylinder jar with horizontally flat, square-shaped rim and a body sloping inwards towards the base. Object number: 3265, material: travertine, area: RAB, feature number: 5440, drawing number: 6, by Caroline Hebron. Permission granted by AERA; © AERA.

Table 3-3 lists the different materials of the jars.
Reisner, Mycerinus, 181, fig. 46: 78–79.
Reisner, Mycerinus, 192.
Jar bases vary being straight, flared, concave, or footed. The only examples found at Heit el-Ghurab are the footed bases, as mentioned previously. Figure 3-22 is a travertine jar with a slightly concave-shaped body. Travertine examples of the same shape were found at Giza in the tomb of Queen Hetepheres I,\textsuperscript{139} grouped by Reisner under ‘cylindrical jar with concave sides and splayed base,” or type I-d.\textsuperscript{140}

![Figure 3-22: Cylinder footed jar with concave body. Object number: 3776, material: travertine, area: WCS, feature number: 3321, drawing number: 25, by Caroline Hebron. Permission granted by AERA; © AERA.](image)

3. Miniature Vessels\textsuperscript{141}

Miniature, or sometimes referred to as model vessels, are small-sized vessels with finished exteriors but unnecessarily finished or completely hollowed out interiors. Their forms were derived from real

\textsuperscript{139} Reisner and Smith, \textit{A History of the Giza Necropolis. The Tomb of Hetep-Heres the Mother of Cheops}, vol. 2, fig. 135: 1032; 1042.


\textsuperscript{141} Greene did not have a separate class for miniature/model vessels in the stone vessel typologies. She mentioned them under the uses of different materials and as a “small” vessel type.
stone or pottery vessels. Miniature vessels are usually found in tombs, foundation deposits,142 or among offerings143 and had been in use as early as the Predynastic and Early Dynastic Periods. Forms of miniature vessels were not affected by the development of real stone and pottery styles over time.144 The Heit el-Ghurab miniature vessels variations are limestone convex-sided bowls, five, a gneiss restricted vessel; and a limestone miniature jar.

Limestone convex-sided vessels have rim diameters ranging from 3 to 11 centimeters. Some are shallow with minimum boring evidence, figure 3-23, while others are drilled all the way through to the bottom, figure 3-24. A similar example of a travertine miniature shallow vessel was found in King Menkaure’s Valley Temple145 and was classified by Reisner as a ‘model vessel’ under type X, ‘round-bottomed dish and bowl.’146

142 Foundation deposits are caches of votive offerings found under temples, pyramids, tombs, or town walls, Weinstein, “Foundation Deposits,” 559.
143 Allen, "Miniature and Model Vessels in Ancient Egypt,” 20.
144 Allen, "Miniature and Model Vessels in Ancient Egypt,” 19.
145 Mycerinus, 184, fig. 52: 33.
146 Reisner, Mycerinus, 199.
Restricted bowls have the same rim and body shape as the real vessels, but smaller in size. The gneiss miniature vessel of Heit el-Ghurab has fine, thin walls and a diameter of 4 centimeters.\textsuperscript{147} A diorite parallel to the restricted bowl type was found in the Valley Temple of King Menkaure at Giza.\textsuperscript{148}

Figure 3-26 is of a limestone, ovoid-shaped miniature jar with a long straight rim and a rounded bottom. This jar is a model for a common pottery vessel, given the type name of ‘Old Kingdom 1’ by Anna Wodzinska\textsuperscript{149} and is sometimes referred to as a ‘beer jar.’ It is not drilled through since, as Peter Lacovara discussed, it “was the outward form [of the model vessel] that was apparently important.”\textsuperscript{150}

\textsuperscript{147} For more details about the dimensions, see Appendix 1.
\textsuperscript{148} Reisner, \textit{Mycerinus}, 186, fig. 56: 17.
\textsuperscript{150} “No. 7. Set of Eighty Model Vessels,” 77.
4. Body Part Fragments

Sixteen body part fragments of limestone, travertine, granite, and gneiss were found, table 3-3, making up 20% of the stone vessel corpus, table 3-1 and figure 3-1. Body part fragments are these with neither a rim, shoulder, nor a base. Since the body parts are badly fragments and small in size with no diagnosable feature preserved, the class and type of the vessel cannot be determined.

Table 3-6: Body Parts’ materials.

<table>
<thead>
<tr>
<th>Body Parts’ materials</th>
<th>Total number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limestone</td>
<td>7</td>
</tr>
<tr>
<td>Travertine</td>
<td>4</td>
</tr>
<tr>
<td>Granite</td>
<td>3</td>
</tr>
<tr>
<td>Gneiss</td>
<td>2</td>
</tr>
</tbody>
</table>
III. Catalog of Heit el-Ghurab Lids and Jar Stoppers

A total of fifty-two lids and jar stoppers are among the artifacts that were recovered from the settlement site of Heit el-Ghurab. These objects are associated with stone vessels, hence are discussed in this chapter. Materials of lids and jar stoppers include travertine, limestone, ceramic, as well as few from other materials, table 3-7.\textsuperscript{151}

\begin{table}[h]
\centering
\begin{tabular}{|l|c|}
\hline
Material & Total number \\
\hline
Travertine & 20 \\
Limestone & 18 \\
Ceramic & 9 \\
Quartzite & 1 \\
Granite & 1 \\
Gneiss & 1 \\
Clay & 1 \\
Chert & 1 \\
\hline
\end{tabular}
\caption{Total numbers of the different materials of jar stopper and lids}
\end{table}

1. Lids

Thirty-four lids of various materials, table 3-8, were recovered, mostly of limestone, travertine, and ceramic. Lids are disc-shaped, with circular to oval in shape outline when viewed from top, and a slightly concave inner surface, as depicted in figures 3-27 and 3-28.

\textsuperscript{151} For more details about the different lids and jar stoppers and the areas in which they were found, see Appendix 2.
Table 3-8: Total amount of lid materials

<table>
<thead>
<tr>
<th>Lid Materials</th>
<th>Total amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limestone</td>
<td>14</td>
</tr>
<tr>
<td>Ceramic</td>
<td>8</td>
</tr>
<tr>
<td>Travertine</td>
<td>8</td>
</tr>
<tr>
<td>Granite</td>
<td>1</td>
</tr>
<tr>
<td>Chert</td>
<td>1</td>
</tr>
<tr>
<td>Clay</td>
<td>1</td>
</tr>
<tr>
<td>Granite</td>
<td>1</td>
</tr>
</tbody>
</table>

Figure 3-27: Disc-shaped lid. Object number: 1293, material: ceramic, area: RAB, feature number: 673, drawing number: 203, by Johnny Karlsson. Permission granted by AERA; © AERA.
2. Jar Stoppers

Eighteen jar stoppers of travertine, limestone, ceramic, and quartzite, table 3-9, were found at Heit el-Ghurab. Jar stoppers are conical-shaped with circular or oval cross-sections, as seen in figures 3-29 and 3-30.

<table>
<thead>
<tr>
<th>Jar Stopper Material</th>
<th>Total amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travertine</td>
<td>12</td>
</tr>
<tr>
<td>Limestone</td>
<td>4</td>
</tr>
<tr>
<td>Ceramic</td>
<td>1</td>
</tr>
<tr>
<td>Quartzite</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 3-9: Total amount of jar stopper materials
Figure 3-29: Conical-shaped jar stopper. Object number: 2097, material: travertine, area: BBNW, feature number: 5458, drawing number: 217, by Will Schenk. Permission granted by AERA; © AERA.

Figure 3-30: Conical-shaped jar stopper. Object number: 1261, material: travertine, area: SFW, feature number: 20550, drawing number: 198, by Johnny Karlsson. Permission granted by AERA; © AERA.
Other ambiguous shapes were also excavated, figures 3-31 and 3-32. They are a cross between lids and jar stoppers, in that they have flat surfaces, like lids, and a protruding knob on the bottom side, which may function as a jar stopper.

Figure 3-31: An unusual disc-shaped lid with a small knob. Object number: 2059, material: limestone, area: SFWPM, feature number: 24454, drawing number 215, by Will Schenk. Permission granted by AERA; © AERA.

Figure 3-32: An unusual shaped jar stopper with a rectangular outline a knob on its bottom side. Object number: 2042, material: limestone, area: SFWPM, feature number: 24458, drawing number: 217, by Will Schenk. Permission granted by AERA; © AERA.
This catalog of stone vessel typology has been compiled after studying pre-existing typologies of many scholars. Greene’s and Reisner’s typologies are the references used. A variety of more than eighty-five stone vessel fragments of different classes and materials were excavated from Heit el-Ghurab, with the bowl class constituting the majority. Although most of the vessels are fragmented, yet their existence is indicative about the high degree of craftsmanship required for its manufacturing. The areas from which the vessel fragments were excavated and its relationship to the drilling tools will be examined in depth in the following chapter.
Chapter 4

Distribution of Objects

I. Distribution of Drilling Tools and Stone Vessels at the Heit el-Ghurab across Areas

The previous chapters presented catalogs of the drilling tools and stone vessels of Heit el-Ghurab. This section discusses the distribution of these artifacts across the different areas of the site, starting with areas of high clusters of finds down to areas with the least number of finds. It is worth noting that the site areas are not all contemporaneous. They were built and demolished at different times. This is due to the fact that the site had been affected by at least five floods. Some of these floods had affected parts of the site, while others had caused complete destruction, as had happened during the Fifth Dynasty.152 The different stratigraphic layers of building, demolition, and remodeling of structures is evident in multiple areas, such as the Royal Administrative Building area, the East of Gallery area, and in trenches, like the Big Backhoe Trenches [BBHT] 1 and 2.

1. The Royal Administrative Building Area

The Royal Administrative Building is the area with the highest number of excavated artifacts in Heit el-Ghurab. This is due to the fact that it was fully excavated and that it had functioned as a workshop, an administrative center, and a storage building. The Royal Administrative Building lies to the south of the Gallery Complex and to the west of the Eastern Town. During the life of the settlement site, the Royal Administrative Building area was made up of two major buildings: the ‘Early Building’ and, a later  

152 Butzer, Butzer, and Love, “Urban Geoarchaeology and Environmental History at the Lost City of the Pyramids,” 3362.
building, recently assigned the name of the ‘Royal Administrative Building’.\textsuperscript{153} The Early Building dated to the reign of King Khafre or, at the latest, to the early reign of King Menkaure, based on the clay seal impressions found on the floors of the courtyard of the building.\textsuperscript{154} After the life span of the Early Building, it was demolished and, later on, the Royal Administrative Building was erected in the same location from limestone and mudbrick.\textsuperscript{155} The seal impressions recovered from the later building, Royal Administrative Building, bear the name of King Menkaure, with a few examples bearing the name of King Khafre.\textsuperscript{156}

Neither drilling tools nor stone vessels were recovered from the Early Building. Only one fragment of a gneiss bowl was found from the demolition phase of the building. The bowl fragment is identified as a carinated bowl type, the only existing example of such shape from the entire site. The lack of evidence of drilling activities in the Early Building could be an indication that either the drilling of stone vessels was not practiced during the lifetime of the building or that the tools were taken away by the inhabitants before it was abandoned.

As for the drilling tools and stone vessels of the later building of the Royal Administrative Building area, the majority of the finds were excavated from the courtyard, as seen in figure 4-1, and none were from the western rooms. The courtyard is located on the northern section of the building, to the west of the rooms, and to the north of the silos. Overall, the artifacts recovered from the courtyard suggest that it was where most crafts took place.\textsuperscript{157} Six drilling tools were found at the Royal Administrative Building: three quartzite drill bits, two travertine drill cores, and one limestone drill.

\textsuperscript{153} In the following section, the name of ‘Royal Administrative Building’ is used to refer to the entire Royal Administrative Building area as well as the later structure bearing the same name, while making a clear distinction of which one is referred to, either the area or the building.
\textsuperscript{154} Murray, “Archaeological Science 2009,” 158.
\textsuperscript{156} Murray, “Archaeological Science 2009,” 165.
\textsuperscript{157} Murray, “Archaeological Science 2009,” 160.
capstone. As for the stone vessels, twenty-one vessels of different classes and materials were recovered: twelve bowls, four miniature vessels, and two cylinder jars, as well as five jar stoppers and three lids.

Figure 4-1: Map of the Royal Administrative Building area showing the distribution of the stone vessels and the drilling tools. Created by Rebekah Miracle. Permission granted by AERA; © AERA.

The finds of the Royal Administrative Building are remarkable, since they represent a complete picture of the different types of drilling tools as well as all the classes of stone vessels. The assemblage of finds contains unique drilling tools and stone vessels that were not found in other areas of the site, such as: the only ‘flower’-shaped drilling bit, object number 2700, table 2-1; a limestone convex-sided
bowl with a false spout, object numbers 1359+2843\textsuperscript{158}, and a travertine open-spouted bowl, object 2796.

2. The Gallery Complex

The stone vessels and drilling tools of the Gallery Complex are scattered across its different areas. In this section, a summary of the vessels and tools of all the galleries, the gate houses, and the streets are grouped and discussed together.\textsuperscript{159} The Gallery Complex, as discussed in chapter 1, lies to the south of the Wall of the Crow, north of the Royal Administrative Building, and west of the Eastern Town. It is composed of four sets of galleries, each containing rectangular shaped structures, which functioned as barracks for the workers. The Gallery Sets were divided by east-west running streets. Three houses, North Street Gate House [NSGH], Main Street Gate House [MSGH], and South Street Gate House [SSGH], were located to the west of Gallery Sets II, III, and IV, with one side of each house facing the east-west running streets. According to Lehner, “the purpose of these buildings may have been to control and monitor the movement of material and people through the streets into and out of the gallery system.”\textsuperscript{160} The North Gate Street House is mirrored to the west with a house, referred to as the Manor. It has the width of three gallery units and has two bakeries attached to its eastern wall. Evidence of decoration was excavated in the interior of the building.\textsuperscript{161}

\textsuperscript{158} The bowl fragment has two object numbers since it is made up of two pieces. Each fragment was excavated at a different digging season and in different contexts/features. One feature dates to the time of the Royal Administrative Building and the second is earlier in date, dating to the demolition phases of the Early Building. Yet, according to the excavator of the area, Freya Sadarangani, the feature in which the latter fragment was found was contaminated with material from later stratigraphic phases.

\textsuperscript{159} The different area names and initials covered under ‘The Gallery Complex’ section are: Gallery III.3: Gallery Set III.3, Main Street, North Street, NSGH: North Street Gate House, MSGH: Main Street Gate House, SSGH: South Street Gate House, Manor, Hypostyle Hall, BBHT(N)-ST: Big Backhoe Trench North- Side Trench, D17x: 4-D17x, BBNW: Buttress Building Northwest, and WCE: Wall of the Crow East.

\textsuperscript{160} “The Pyramid Age Settlement of the Southern Mount at Giza,” 56.

\textsuperscript{161} Lehner, “The Pyramid Age Settlement of the Southern Mount at Giza,” 41–42.
Figure 4-2: Map of the Gallery Complex area showing the distribution of the stone vessels and the drilling tools. Created by Rebekah Miracle. Permission granted by AERA; © AERA.
Six drilling tools were recovered from the Gallery Complex, three of which are drill capstones, two drill bits, and one drill core. Three tools were found in the Main Street and the street in the Buttress Building North West area, probably dumped from surrounding areas. As for the stone vessels of the Gallery Complex, twenty-five fragments were found across the different locations of the Gallery Complex, as seen in figure 4-2. Bowls are the only vessel class recovered from this area, as well as two body part fragments. Unlike the drilling tools, the majority of stone vessels of the Gallery Complex were located either inside the gallery units or in the Gate House Units to the west. It is noticeable that a relatively high number of jar stoppers and lids, thirteen, were found in the Gallery Complex area, in relation to other areas of the site. The jar stoppers and lids were in some cases paired with a bowl, as seen in Main Street Gate House, North Street Gate House, and Gallery Set III.3.

3. Soccer Field West House Unit 1 [SFWH1] and Soccer Field West Pottery Mound [SFWPM]

The Soccer Field West House Unit 1 lies within the Western Town, west of the Royal Administrative Building and the modern-soccer field. As mentioned earlier in chapter 1, House Unit 1 is large in size, compared to the house units of the Eastern Town. It covers an area of 400 square meters and is comprised of a number of rooms for domestic purposes, as well as a bakery. To the south of House Unit 1 and to the north of House Unit 2 lies a mudbrick structure with an enclosure wall, designated as the Pottery Mound, which is a midden created by “repeated dumping.” The dumped materials in the Pottery Mound were associated with House Unit 1, hence, the finds of the Soccer Field West House Unit 1 and the Soccer Field West Pottery Mound are grouped and discussed together here.

162 Tavares, “Village, Town and Barracks,” 271.
164 Lehner, Kamel, and Tavares, Season 2005, 69.
The Pottery Mound yielded important information about the neighboring houses, as well as about the Western Town, which was acquired by studying the material culture finds recovered from that area. Large number of pottery fragments were the main component of the mound, hence its name, as well as seal impressions.\textsuperscript{165} The high numbers of seal impressions from the Pottery Mound referred to

\textsuperscript{165} Nolan mentioned in his dissertation that the number of seal impressions recovered from the Pottery Mound exceeded the number of seal impressions from any other Old Kingdom site, with the except for Abusir, “Mud Sealings and Fourth Dynasty Administration at Giza,” 20.
important institutions which “belonged to the royal house, the palace, and the Vizier’s office,”\textsuperscript{166} as well to the “highest scribes in the land, ‘Scribes of the Royal Documents’.”\textsuperscript{167}

The Soccer Field West House Unit 1 had no evidence of drilling, yet it contained the second highest concentration of stone vessels from Heit el-Ghurab, following the Royal Administrative Building. Eighteen vessels were found there: seven of which are bowls, three cylinder jars, one miniature vessel, and two unidentifiable fragments, as well as three jar stoppers and two lids. A ‘restricted bowl’ made of diorite was found in House Unit 1, (object number 2786, figure 3-19). The type and material of this bowl example is unusual for the corpus of vessels from Heit el-Ghurab.

Based on the map in figure 4-3, it is clear that stone vessels are concentrated in the southern part of the house and in the Pottery Mound area, with few other examples distributed across the western and middle rooms of the house. Being located in a house of a high official and in the midden associated with the house, the stone vessels of House Unit 1 could have been used for domestic purposes by the residents of the house.

4. Area AA

Area AA lies in the ‘Western Town’, to the west of the Royal Administrative Building and the modern Soccer Field, and to the north-west of the Soccer Field West House 1 and the Pottery Mound. The building is composed of two sections: the so-called ‘The Pedestal Building’, lying in the southwest section of the building, and ‘The Northern Building’, or ‘The AA Building’.\textsuperscript{168} The Pedestal Building is composed of a series of rectangular-shaped pedestals, running north to south, divided by a wall in the center of the building, running in the same direction, creating one row of pedestals on each side of the

\textsuperscript{167} Nolan, “Mud Sealings and Fourth Dynasty Administration at Giza,” 2.
\textsuperscript{168} The AA building and the Pedestal Building are grouped together and are referred to as area AA in the following discussions.
A room with small compartments built over pedestals, referred to as ‘The Storage Magazine’, is located to the south of the room with the two rows of pedestals. Four complete ceramic beer jars were found in situ in open slots between the different compartments of the room, suggesting that the purpose of the room was for storage, hence its name.\textsuperscript{170} The Northern Building, made of mudbrick, lies to the north and to the east of the Pedestal Building. It is made up of a series of rooms, among which are the ‘Oven Room’, the ‘Bin Room’, the ‘Long Room’, the ‘Basin Room’, and the ‘Bakery Room’.\textsuperscript{171} The Pedestal Building along with the different rooms of the Northern Building indicate that “this structure appears to have had an industrial purpose.”\textsuperscript{172}

\textsuperscript{172} Nolan, “Mud Sealings and Fourth Dynasty Administration at Giza,” 16.
The hypothesis that area AA had had an ‘industrial purpose’ is emphasized by the drilling tools found there. Four drilling bits were recovered from area AA, three of which were found in the Northern Building and one in the Pedestal Building, as seen in figure 4-4. It is worth mentioning that the only existing chert drill bits found at Heit el-Ghurab, to date, were excavated from area AA, along with one quartzite figure-of-eight bit. The fourth drilling bit is a figure-of-eight quartzite drill bit. Neither drill capstones nor drill cores were not found in this area. As for the stone vessels, a small number was recovered: three bowl fragments, three body part vessel fragments, and six lids and jar stoppers, as illustrated in the map of figure 4-4.
5. **Soccer Field West House Unit 3 (SFWH3)**

House Unit 3 is located in the Western Town, west of the modern-soccer field, and to the east of House Unit 1. It is smaller in size than House Unit 1, but it has some unique features. The house has a number of rooms, with a court in the center, as depicted in figure 4-5. One room, room F, had evidence of bread baking. Another room, room O, had deposits of granite dust. The southern wall, close to the southeastern corner of the house, was heavily truncated by a large cut in the wall of the house, which contained a series of dumped deposits, rich in travertine. This might be the explanation for the travertine-made artifacts dominating this area. Unlike House Unit 1, where no evidence of drilling existed, drilling tools were recovered from House Unit 3, which had one of the highest number of drilling bits, five, in comparison to the other areas of Heit el-Ghurab. Only one travertine bowl, shaped as bent-sided type, was found in House Unit 3. It is worth noting that all the finds of House Unit 3 were recovered from the dumping deposits, with the exception of one jar stopper and one body part stone vessel which were located at other locations of the house (see figure 4-5 for more details).

---

6. **Eastern Town [ET] and Eastern Town House [ETH]**

The Eastern Town lies on the eastern side of the settlement site, hence its name. As mentioned earlier in chapter 1, the Eastern Town functioned as a separate village. It is composed of small house units, in comparison to the size of House Units 1 and 3 of the Western Town, and has small non-orthogonal streets. According to Lehner, “the complex is a warren of mostly small rooms and
courtyards, much denser than the gallery complex.”¹⁷⁴ For the purpose of this research and for better understanding of the distribution of drilling tools and stone vessels across the site, the material from the Eastern Town House is grouped together with the material from the whole Eastern Town area.¹⁷⁵ Eastern Town House was fully excavated and recently reconstructed by AERA, with only one gneiss body part vessel fragment and a chert lid recovered, as seen in figure 4-6. Other finds of the area are: five bowls, one cylinder jar, and one drilling bit.

¹⁷⁴ “The Pyramid Age Settlement of the Southern Mount at Giza,” 65.
¹⁷⁵ In Appendix 1 and Appendix 2 and on the different maps of the site, the areas covered under the Eastern Town are given the abbreviations ET: Eastern Town, ETH: Eastern Town House, BBE: Buttress Building East, and ZAC: ZAC.
Figure 4-6: Map of the Eastern Town and the Eastern Town House showing the distribution of the stone vessels and the drilling tools. Created by Rebekah Miracle. Permission granted by AERA; © AERA.
7. East of the Galleries [EOG] and Backhoe Trench [BHT]176

East of the Galleries area lies to the west of the Eastern Town and to the north of the Royal Administrative Building, figure 4-7. The Backhoe Trench area lies to the east of Gallery Set III. It has two major stratigraphic phases: the older phase shows evidence of faience production, while the younger phase has evidence of bread baking.177 Two bakeries were excavated to the south of the Backhoe Trench and a series of bakeries to its west. To its east, at the East of the Galleries area, dumping of massive quantities of “speckled, pinkish, burnt, slag-like material [was located] . . . which resembles waste from faience production at other sites of later periods.”178 Superseding the layer of the ‘pink stuff’ is a layer with high numbers of pottery fragments. This stratigraphic phase is identified as being an “industrial scale bread baking”179 phase, since, according to the ceramicist Anna Wodzinska, 70% of the pottery mass was fragments of bread pots.180 Four limestone vessels were located in the East of the Galleries area, one of which is of the unusual bent-sided bowl type. Evidence of drilling activities in the East of the Galleries/Backhoe Trench area is scarce. One drilling bit was recovered from the area, and it is worth noting that it was found on the eastern boarder of the area, closer to the Eastern Town area, as depicted in figure 4-7.

176 The area abbreviations designated to both areas in Appendices 1 and 2, as well as on the different maps of the site are: EOG, BHT, A7 and A7E.
Figure 4-7: Map of the East of the Galleries Area and the Backhoe Trench showing the distribution of the stone vessels and the drilling tools. Created by Rebekah Miracle. Permission granted by AERA; © AERA.
8. Other Areas

The remaining number of stone vessels and drilling tools were scattered in small numbers across different areas of Heit el-Ghurab. Lids, bowls, jars, and one drill capstone were located near the Wall of the Crow, at the northern border of the settlement site. Drill capstones were found in the Western Dump area, west of the Gallery Complex enclosure wall. Lids and jar stoppers were also dispersed across different areas such as the Royal Administrative Building Street, west of the Royal Administrative Building, in the Western Extension area, west of the Gallery Complex, and in the Western Dump area, as seen in figure 4-8.
Figure 4-8: Map of Heit el-Ghurab site showing the distribution of all the drilling tools and stone vessels across the site. Created by Rebekah Miracle. Permission granted by AERA; © AERA.
Chapter 5
Conclusion

I. Statistical Analysis: Correlation between Stone Vessels and Drilling Tools

The numbers of stone vessels and drilling tools of Heit el-Ghurab site were high enough to allow the testing of the correlation between them. Pearson’s product moment ‘r’ was used to test the correlation between the two pairs of grouped areas of the total number of drilling tools and total number of stone vessels, including jar stoppers and lids, listed in table 5-1. The test also generates an ‘r^2’ value, which is the percentage of how much one category is dependent on the other. The grouped areas included in the tests are: the Royal Administrative Building [RAB], the Gallery Complex, area AA and the Pedestal Building, the Soccer Field West House 3 [SFWH3] and the Soccer Field West [SFW], the Eastern Town [ET] and the Eastern Town House [ETH], and the East of the Galleries area [EOG] and the Backhoe Trench [BHT]. The grouped area of the Soccer Field West House Unit 1 and the Pottery Mound was eliminated since it had no evidence of drilling crafts. The value of ‘r’ is either positive or negative and ranges from 1.0 to -1.0. The value of 1.0 is a perfect positive correlation, meaning an increase in one category results in the increase of the other. As for the value of -1.0, which is a perfect negative correlation, means that the increase in one category results in the decrease of the other. A value of 0.0 is lack of correlation, meaning both categories are independent of each other. The values ranging from 0 to 1.0 and from 0 to -1.0 are interpreted differently. For the purpose of this research, a value of greater than 0.6 and less than -0.6 are considered significant correlation.
Table 5-1: Total numbers of stone vessels and drilling tools by grouped areas.

<table>
<thead>
<tr>
<th>Area</th>
<th>Number of Vessels (excluding lids and stops)</th>
<th>Number of Vessels (including lids and stops)</th>
<th>Number of Drilling Tools</th>
<th>Total Number of Drilling tools and Vessels (including lids and stops)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAB</td>
<td>20</td>
<td>28</td>
<td>6</td>
<td>34</td>
</tr>
<tr>
<td>Gallery Complex</td>
<td>12</td>
<td>25</td>
<td>6</td>
<td>31</td>
</tr>
<tr>
<td>SFWH1 and SFWPM</td>
<td>13</td>
<td>18</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>AA and Pedestal Building</td>
<td>6</td>
<td>12</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>SFWH3 and SFW</td>
<td>3</td>
<td>7</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>ET and ETH</td>
<td>7</td>
<td>10</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>EOG and BHT</td>
<td>7</td>
<td>9</td>
<td>1</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 5-2: Correlation results

<table>
<thead>
<tr>
<th></th>
<th>r</th>
<th>r²</th>
</tr>
</thead>
<tbody>
<tr>
<td>All grouped areas</td>
<td>0.573</td>
<td>0.328</td>
</tr>
<tr>
<td>Grouped areas excluding SFWH3 and SFW</td>
<td>0.916</td>
<td>0.839</td>
</tr>
</tbody>
</table>
As presented in table 5-2, the ‘r’ value for testing the correlation of all grouped areas together indicates no significant correlation, with a result of 0.573. This means that the drilling tools and stone vessels of Heit el-Ghurab varied independently of each other. For further investigation and better interpretation of the artifacts, the finds of the grouped area of the Soccer Field West House Unit 3 and the Soccer Field West were eliminated. The results of the test then showed a considerably different result of an ‘r’ value of 0.916, which means a strong correlation between the stone vessels and drilling tools. This is explained as the increase in one category of finds results in the increase of the other, hence the places where drilling tools were found is the same place where stone vessels were manufactured. The value of ‘r²’ of the second test shows that 83% of the existence of one category, the drilling tools (or stone vessels) is explained by the occurrence of stone vessels (or drilling tools). This means that the Soccer Field West House Unit 3 and the Soccer Field West areas are different and require further studying, explained in the following section.

II. Discussion of Finds by Area

The correlation test results, discussed previously, indicate that drilling tools and stone vessels are highly dependent on one another, except for areas of the Soccer Field West House Unit 3 and the Soccer Field West. The interesting aspect about this grouped area is that it has more drilling tools per stone vessels than other areas of the site, as seen in table 5-1. The total number of the drilling tools of the Soccer Field West House Unit 3 and the Soccer Field West areas make up 25% of the total drilling tools. The same percentage of drilling tools is found in the Royal Administrative Building and in the Gallery Complex areas.¹⁸¹ It is expected to find such a high percentage of drilling tools in the Royal

¹⁸¹ Since the Gallery Complex area is comprised of multiple different areas, as mentioned previously, and there is no concentration of drilling tools in any of these specific areas, it is not included in the comparison between the Royal Administrative Building and House Unit 3.
Administrative Building, since it is a place where multiple crafts took place, discussed below. But how is the high percentage of drilling tools in House Unit 3 explained?

As mentioned previously and as depicted in figure 4-5, the concentration of finds from the Soccer Field West House Unit 3 was mostly found in the dumping deposits of travertine fragments, at the south-eastern border of the house unit. This area was heavily truncated by a large cut in the wall of the house, where the entrance to the house is expected to have been. The reason for the location of these deposits here is not yet clear and requires further excavation. One explanation is that the deposits were associated with House Unit 3. Room O, a room in the northern section of the house, contained granite dust deposits. A possible hypothesis is that House Unit 3 had a workshop for stone vessel production. It is not unusual to find workshops in Old Kingdom houses, such as the ones in Hierakonpolis and Elephantine. In Hierakonpolis, drilling bits and sand for abrading stone vessels were found in a room in House 89.182 Also in Elephantine, relatively large stone vessel workshops were found within houses,183 one of which has an exceptionally large area of 600 square-meters.184 Since House Unit 3 was the located in the Western Town of Heit el-Ghurab where elites probably lived, as mentioned in chapter 1, it might have housed a craftsman of a high status, or possibly the overseer of craftsmen.

Comparing House Unit 3 with other similar Old Kingdom houses helps better understand the reason for the high number of drilling tools there. But the reason for the relatively low number of stone vessels from this area is still puzzling. It could indicate that either the vessels were produced in the house but used on other areas of the settlement, or that the official from House Unit 3 stored the drilling tools in the house but the actual drilling took place somewhere else. This contradicts the hypothesis presented previously, unless the vessels were removed from House Unit 3 when it was abandoned.

182 Quibell and Green, Hierakonpolis II, 17–18.
To the northwest of House Unit 3, lies the Soccer Field West House Unit 1 and its associated midden, the Pottery Mound. The finds of these areas contrast with those of House Unit 3, despite the fact that both houses are located in the Western Town and probably housed high officials, as discussed previously. House Unit 1 bore no evidence of drilling tools but had a relatively high number of stone vessel fragments, as listed in table 5-2. The absence of drilling tools could be explained by one of two possibilities: either the drilling tools were taken away when the house was abandoned or the stone vessels that belonged and were used by the high official living in House Unit 1, had been manufactured somewhere else on site.

The stone vessels of House Unit 1 and the Pottery Mound were of various classes and materials, some of which are uncommon to the settlement site, like the bent-sided bowl type. One unusual material of a restricted bowl type from House Unit 1 is diorite, which is the only example of this material from the site. The presence of diorite in House Unit 1 is worth noting, since this material was possibly
imported from Wadi Umm Shegilat in the Eastern Desert,\(^{185}\) indicating the high status of the residents of the house. Another indication that the residents of House Unit 1 were high officials is suggested by the existence of three cylinder jars and five lids and jar stoppers recovered from this area. In his dissertation, John Nolan discusses ‘jar sealings’ as one type of sealings from the Pottery Mound. He mentions that such a type is relatively scarce in the Pottery Mound area, making up only 2.25%, as opposed to 27.44% from the rest of the site. Yet, he also mentions that some of the ‘jar sealings’ could have been classified under the ‘possible containers’ type.\(^{186}\) Although most of the jars he discusses in the dissertation are ceramic jars, possibly seal impressions could have been used on stone jars.\(^{187}\) His discussion, along with the stone vessel finds of House Unit 1 and the Pottery Mound propose a possible hypothesis of stone jars being sealed in or near the area of House Unit 1 and the Pottery Mound.

Moving on to another Western Town area, area AA has a high concentration of drilling tools, making up a total of 17%. Archaeological evidence from area AA indicated it functioned as an industrial place. Therefore, having a high number of drilling tools is expected, as producing stone vessels could have been one of the crafts practiced in this area. Excluding the concentrations in the Western Town and the Royal Administrative Building area, drilling tools are spread across different areas of the site. One point worth mentioning is the location of four drilling tools at the western and northern borders of the East of the Galleries area, as depicted in figure 4-7. Pyrotechnic activities took place at different stratigraphic phases of this area, such as faience production and industrial scale bread baking. According to Denys Stocks, faience production is a possible by-product of drilling activity. The waste powder of drilling stone vessels, particularly that of drilling with tubular copper drills, might have been used for creating faience:

\(^{186}\) Nolan, “Mud Sealings and Fourth Dynasty Administration at Giza,” 86.
\(^{187}\) It is sometimes difficult to distinguish between the seal impressions of highly burnished ceramic fine wares and those of stoneware, Ali Witsell, personal communication.
The experimental faience manufacture indicates that the powders derived from drilling hard limestone and calcite are ideal for making cores, and that the hard stone derived powders (more copper particles) are suitable for blue glazes.\textsuperscript{188}

The recovery of the drilling tools as well as limestone vessels in close proximity to the faience production area could indicate the possibility that both industries were associated with one another on the settlement site.

To the south of the East of the Galleries area and to the west of the Eastern Town is the Royal Administrative Building area, which has the highest number of both drilling tools and stone vessels, of uncommon shapes, types, and materials, figures 5-1 to 5-3. The drilling bits of the Royal Administrative Building varied in shape, from figure-of-eight, conical, and ‘flower’-shaped. Unlike evidence from stone vessel workshops of al-Shaykh Sa‘id/Wadi Zabayda, where no drill cores were excavated,\textsuperscript{189} two out of the three drill cores found in Heit el-Ghurab were from the Royal Administrative Building, suggesting the use of tubular copper drills. Among the unusual finds of the Royal Administrative Building are four miniature bowls, a bowl with false spout, a bowl with open spout, as well as unusual materials, like phyllite, which was probably imported from Wadi Hammamat, in the Eastern Desert.\textsuperscript{190}

Other significant stone vessel materials from Heit el-Ghurab are travertine, granite and gneiss. These materials were quarried from Hatnub,\textsuperscript{191} Aswan,\textsuperscript{192} and the Nubian Desert at the south end of the Third Cataract,\textsuperscript{193} respectively. To import materials from great distances indicates their importance as well as their use in objects for elites who could afford them. Gneiss bowls of similar types to the ones

\textsuperscript{188} Experiments in Egyptian Archaeology, 229.
\textsuperscript{189} The lack of drill cores from al-Shaykh Sa‘id/Wadi Zabayda has led the excavators to believe that tubular drill bits were “less widespread than is commonly believed”, Willems et al., “An Industrial Site at al-Shaykh Sa‘id/Wadi Zabayda,” 10.
\textsuperscript{190} Phyllite is a variation of slate. According to Aston, Harrel, and Shaw, slate was quarried from Wadi Hammamat, “Stone,” 57–58.
\textsuperscript{192} Aston, Harrel, and Shaw, “Stone,” 35.
from Heit el-Ghurab were found in the Mortuary Temple of King Raneferef at Abusir, although they were from the Fifth Dynasty: a carinated bowl\textsuperscript{194} and a convex-sided bowl\textsuperscript{195}.

\textbf{Figure 5-2: Chart illustrating the percentages of stone vessels (including lids and jar stoppers) across the different areas of Heit el-Ghurab.}

\textsuperscript{194} Object number 2785, from the Royal Administrative Building Area, and Vlčková, “The Stone Vessels from the Mortuary Complex of King Raneferef,” 140, pl. 24: 525/I/82–b.

\textsuperscript{195} Object number 3771, from the Main Street area, and Vlčková, “The Stone Vessels from the Mortuary Complex of King Raneferef,” 136, pl. 20: 610/I/82–a.
III. **Old Kingdom Stone Vessel Workshops**

Based on the previous evidence, the locations with possible workshops in Heit el-Ghurab are the Royal Administrative Building, Area AA, Soccer Field West House Unit 3, and East of the Galleries area.

Stone vessel workshops existed during the Early Dynastic Period and the Old Kingdom throughout Egypt. Evidence for stone vessel workshops have been found at Elephantine, Hierakonpolis, al-Shaykh Sa’id/Wadi Zabayda, Tell el-Fara’în- Buto, Tell el-Farkha. Elephantine has stone vessel workshops, dating to the Fourth Dynasty and early Fifth Dynasty, with drilling tools of the same shape and material as the workshops of Heit el-Ghurab. An Old Kingdom house unit, House 89, excavated at

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199 Details of similar drilling tools are discussed in chapter 2.
Hierakonpolis, had drilling tools and stone vessel fragments. In one of the rooms of the house, abrasive sand was found near the drilling tools, suggesting that it was used for polishing the stone vessels.  

Unlike the quartzite drilling tools of Heit el-Ghurab, drilling bits of sandstone were found in House 89.

Al-Shaykh Sa‘id/Wadi Zabayda is a site located close to Deir el-Bersha, with remains dating to the Old Kingdom, early Fourth Dynasty; the New Kingdom; and the Third Intermediate Period. Evidence of quarrying and travertine stone vessel production was found on site, such as drilling toolkits. It is possible that the vessels were produced on site and later shipped to other areas, like to Giza and possibly to Saqqara. On the other hand, the vessels manufactured in Heit el-Ghurab may have been used either on site or in near vicinity of the site, as discussed in the following section. Tell el-Fara‘in and Tell el-Farkha, dating to the Early Dynastic-Early Old Kingdom Periods, are located in the Delta region and had evidence of stone vessel workshops. Drilling tools from both sites resemble the drill toolkit of Heit el-Ghurab.

IV. Explanations for the Production of Stone Vessels at Heit el-Ghurab

The evidence clearly indicates that stone vessel workshops existed in Heit el-Ghurab. But why were such finely worked artifacts produced on a pyramid builders’ settlement site? A few possibilities exist. One is that they were manufactured to be used by the high officials living in the settlement. This hypothesis is supported by the existence of a high number of stone vessels at the Soccer Field West House Unit 1, discussed previously. Stone vessels could have also been produced for official temple offerings, such as in the Valley Temples of the pyramids of Kings Khafre and Menkaure. Reisner

200 Quibell and Green, *Hierakonpolis II*, 17–19.
202 Willems et al., “An Industrial Site at al-Shaykh Sa‘id/Wadi Zabayda,” 293–331. According to the authors of the article, the drilling toolkit dates to the Old Kingdom, judging from the shapes of the tools, yet none of the tools were found in situ. The toolkit was found in the New Kingdom and the Third Intermediate Period stratigraphic phases. Their assumption is that the toolkit was reused for the later time periods.
204 Drilling tool parallels are discussed in chapter 2.
discusses in great detail the different stone vessel classes found at the Valley Temple of King Menkaure. Vessels of similar shape and material were found in both King Menkaure’s Valley Temple and in Heit el-Ghurab, such as: a diorite restricted shaped bowl, a travertine cylinder jar, and a limestone convex-sided bowl, among others. Such evidence supports the idea that stone vessels of King Menkaure’s Valley Temple were produced on the settlement site. This interpretation is also backed up by Hratch Papazian. In his dissertation, he mentions that, when visiting a sacred place, such as the Old Kingdom Valley Temples, the ancient Egyptians used “to carry offerings and votive objects, which were most often manufactured at or near the temple and then acquired by visitors.” That stone vessels were considered part of the offerings in tombs, as well as temples, is evident from the Predynastic Period and later, suggesting another possibility for producing stone vessels on site: to be placed in burials, either as offerings or as burial equipment. Cemetery 4000, located at the Western Field at Giza, west of the pyramid of King Khufu, has examples of stone vessels of similar class and material as the ones found in Heit el-Ghurab. In grave 4530, limestone bent-sided bowls were among the tomb finds, paralleled with three limestone bent-sided bowls from Heit el-Ghurab. It is worth noting that bent-sided bowls are an uncommon type of bowls; it might be possible that this type is limited to the Giza Plateau area.

Miniature vessels are among the unique stone vessel classes found at Heit el-Ghurab. They were usually produced imitating the shapes of actual utilitarian vessels and were found mainly in burials, as offerings or burial equipment from the early Fourth Dynasty, or in foundation deposits. From Heit

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206 Object number 2786, from the Soccer Field West House Unit 1.
207 Object number 3265, from the Royal Administrative Building.
208 Object number 1773, from Buttress Building North West.
212 Object numbers 1569, 1689, and 3857, from the Royal Administrative Building, the Western Roadway [WRW], and the East of the Galleries area, respectively.
el-Ghurab, four out of the seven miniature vessel examples were recovered from the Royal Administrative Building, suggesting that these vessels were probably produced in the workshops of this area. Travertine examples of similar shapes were found in the Valley Temple of King Menkaure\textsuperscript{215} and in tomb G7440 at Giza, now in the Museum of Fine Arts, Boston.\textsuperscript{216}

Over eighty-five stone vessel fragments were excavated from Heit el-Ghurab, in addition to thirty-four lids, eighteen jar stoppers, and thirty-three drilling tools. These finds indicate the existence of stone vessel workshops in the settlement site, like other Old Kingdom workshops at different locations, such as Hierakonpolis, Elephantine, and al-Shaykh Sa’id/Wadi Zabayda. They were produced on site either for domestic use, for offerings in temples, such as the Valley Temple of King Menkaure, and/or to be placed in tombs as part of the burial equipment. One can understand more about the status of people living on site from the stone vessel materials, since some stones like travertine, granite, and gneiss could only be imported by wealthy people who could afford it.

Heit el-Ghurab is a unique Old Kingdom site in its size, variety of material culture, various functions, and the detail to which it has been excavated. One can speculate from the evidence that the site might have functioned as a housing place for pyramid builders, craftsmen, as well as a production site, serving the Giza Plateau. It is a place where minor production of artifacts, such as metalworking, weaving,\textsuperscript{217} and faience production, associated with equipping the tombs in the cemetery was carried out, thus making this a multi-purpose site. Craftsmen working there might have been producing material not just for the kings, but also for the officials and elites who could afford to buy the products, as well as afford to be buried in close proximity to the kings. One can also hypothesize from the evidence that the craftsmen working on site were part of an overall state economy, like that of the New Kingdom site of

\textsuperscript{214} Foundation deposits are caches of votive offerings found under temples, pyramids, tombs, forts, or town wall, among others, Weinstein, “Foundation Deposits,” 559.
\textsuperscript{215} Reisner, \textit{Mycerinus}, 184.
\textsuperscript{216} Lacovara, “No. 7. Set of Eighty Model Vessels,” 77–78.
Deir el-Medineh. Thus, although the main purpose of Heit el-Ghurab was to house the pyramid builders, it seems that analyzing the evidence of material remains widens the perspective of the site’s functional interpretation.
### Appendix 1: List of Stone Vessels of Heit el-Ghurab

<table>
<thead>
<tr>
<th>Object Number</th>
<th>Area</th>
<th>Feature</th>
<th>Class</th>
<th>Type</th>
<th>Material</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1077</td>
<td></td>
<td></td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Granite</td>
<td>outer Diam 18 cm, Th 0.5, approx 4% remaining, max H 2.7, fragment W 3.2</td>
</tr>
<tr>
<td>1114</td>
<td>D17x</td>
<td>2075</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Limestone</td>
<td>Diam 20 cm, approx 12% remaining, H 4.1, rim Th 2.43, body Th 2.09, rim W 7.44, body W 5.45</td>
</tr>
<tr>
<td>1115</td>
<td>EOG</td>
<td>2436</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Limestone</td>
<td>Diam 15 cm, approx 14% remaining, H 5.1, rim Th 2.4, body Th 2.2, rim W 6.4, body W approx 4.5</td>
</tr>
<tr>
<td>1240</td>
<td>EOG</td>
<td>20318</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Limestone</td>
<td>Outer diam 15 cm, approx 10% remaining, H 4.3, rim Th 1.1, max body Th 2.1, rim W 4.6, body W 3.5</td>
</tr>
<tr>
<td>1569</td>
<td>RAB</td>
<td>5440</td>
<td>Bowl</td>
<td>Bent-sided bowl</td>
<td>Limestone</td>
<td>Outer diam 8 cm, approx 10% remaining, max H 2.9, rim Th 0.7, body Th 0.4, rim W 2.3, body max W 2.78</td>
</tr>
<tr>
<td>1689</td>
<td>WRW</td>
<td>22045</td>
<td>Bowl</td>
<td>Bent-sided bowl</td>
<td>Limestone</td>
<td>Diam 10.5 cm, approx 36% remaining, H 4.4 cm, rim Th 1.16, body/base Th 1.5, rim W 9.61</td>
</tr>
<tr>
<td>1740</td>
<td>SFWPM</td>
<td>21557</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Limestone</td>
<td>Diam 11 cm, approx 30% remaining, rim Th 0.8, body Th 1.25, base Th 1.33, rim W 7.94, body W 7.44, base W 2.42</td>
</tr>
<tr>
<td>1754</td>
<td>SFWPM</td>
<td>21557</td>
<td>Bowl</td>
<td>Vertical-sided bowl</td>
<td>Limestone</td>
<td>Diam 9 cm, approx 32% remaining, H 5.9, rim Th 1.5, body Th 1.82, base Th 2.28, rim W 8.21, body W 8.32,</td>
</tr>
<tr>
<td>Object Number</td>
<td>Area</td>
<td>Feature</td>
<td>Class</td>
<td>Type</td>
<td>Material</td>
<td>Dimensions</td>
</tr>
<tr>
<td>---------------</td>
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<td>----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1773</td>
<td>BBNW</td>
<td>21767</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Limestone</td>
<td>Outer diam approx 7 cm, approx 10% remaining, rim Th 0.3, body Th 0.7, max H 1.4, rim W 2.1, body W 1.9</td>
</tr>
<tr>
<td>1912</td>
<td>SFWPM</td>
<td>21557</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Limestone</td>
<td>Diam 11 cm, approx 14% remaining, H 2.16, rim Th 0.4, body Th 0.75, rim W 5.22, body min W 2.16</td>
</tr>
<tr>
<td>2001a-140</td>
<td>WES</td>
<td>3995</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Limestone</td>
<td>Diam 16 cm, rim Th 0.8, body Th 1.2.</td>
</tr>
<tr>
<td>2047</td>
<td>WCN</td>
<td>7600</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Limestone</td>
<td>Diam 26 cm, approx 36% remaining, H 8.63, rim W 24 cm, body W 16, base W 9, rim Th 0.8, body Th 1.25, base Th 8</td>
</tr>
<tr>
<td>2288</td>
<td>SFWH3</td>
<td>24619</td>
<td>Bowl</td>
<td>Bent-sided bowl</td>
<td>Travertine</td>
<td>Diam 8 cm, max H 3.0 cm, min H 2, Th of rim 0.3, Th of body 0.5, approx 18% remaining, rim W 3.86, body W 3.7</td>
</tr>
<tr>
<td>2422</td>
<td>SFWH1</td>
<td>25429</td>
<td>Bowl</td>
<td>Vertical-sided bowl</td>
<td>Limestone</td>
<td>App Diam of rim 32 cm, H 4.15, rim W 7.44, body W approx 4.86, max rim Th 1.82, min rim Th 1.21, body Th 3.5</td>
</tr>
<tr>
<td>2783</td>
<td>RAB</td>
<td>27385</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Limestone</td>
<td>Diam 11 cm, approx 50% remaining, H 6, rim Th 1.2, min body Th 2.1, max body Th 2.7, base Th 2.16, Inner depth 3.5</td>
</tr>
<tr>
<td>2784</td>
<td>SFWH1</td>
<td>27159</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Limestone</td>
<td>Rim Diam 11 cm, approx 17%, H 5, rim Th 2, base Th 3.3, rim W 5.6, base average W 2.66, inner depth 2.13</td>
</tr>
<tr>
<td>2785</td>
<td>RAB</td>
<td>28579</td>
<td>Bowl</td>
<td>Carinated</td>
<td>Gneiss</td>
<td>Rim Diam 14 cm,</td>
</tr>
<tr>
<td>Object Number</td>
<td>Area</td>
<td>Feature</td>
<td>Class</td>
<td>Type</td>
<td>Material</td>
<td>Dimensions</td>
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<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>2786</td>
<td>SFWH1</td>
<td>27157</td>
<td>Bowl</td>
<td>Restricted-bowl</td>
<td>Diorite</td>
<td>Diam 13 cm, approx 6% remaining of the rim, max H: 3.5 cm, rim W 2.6, shoulder W 3.48, body W 4, rim Th 7.16, shoulder Th 7, body Th 9</td>
</tr>
<tr>
<td>2788</td>
<td>SFWH1</td>
<td>1659</td>
<td>Cylinder Jar</td>
<td>Cylinder Jar</td>
<td>Limestone</td>
<td>Diam 10.5 cm, approx 56% remaining, max H 2.7, rim min Th 2.7, rim max Th 2.9, body min Th 0.8, body max Th 1.1</td>
</tr>
<tr>
<td>2789</td>
<td>AA</td>
<td>28035</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Limestone</td>
<td>Outer Diam of 6.7 cm, approx inner diam 4.52, inner depth 1.68, max H 3.06, base Th 1.65, body Th 1.3</td>
</tr>
<tr>
<td>2790</td>
<td>RAB</td>
<td>28586</td>
<td>Bowl</td>
<td>Vertical-sided bowl</td>
<td>Limestone</td>
<td>Diam 10 cm, approx 25% remaining, H 4.9, rim W 7.1, rim Th 1.43, body W not possible, body Th 2.95</td>
</tr>
<tr>
<td>2791</td>
<td>RAB</td>
<td>28586</td>
<td>Bowl</td>
<td>Vertical-sided bowl</td>
<td>Limestone</td>
<td>Diam 9 cm, approx 25%, H 5.65, rim Th 0.57, body Th 1.37, base Th 0.47, rim W 6.66, body Th 6.3</td>
</tr>
<tr>
<td>2792</td>
<td>RAB</td>
<td>28534</td>
<td>Miniature/Model bowl</td>
<td>Miniature vessel</td>
<td>Limestone</td>
<td>D 4.5 cm, approx 37%, H: 3.1, rim Th 0.88, body Th 0.98, base Th 1.3, rim W 4.08, body W 3.52</td>
</tr>
<tr>
<td>2795</td>
<td>SFWH1</td>
<td>25081</td>
<td>Bowl</td>
<td>Straight-sided bowl</td>
<td>Travertine</td>
<td>Approx diam 40 cm, H 1.93, rim Th 0.5, body Th 0.9, rim W 2.8, body W 0.7</td>
</tr>
<tr>
<td>2796</td>
<td>RAB</td>
<td>27519</td>
<td>Bowl</td>
<td>Open-</td>
<td>Travertine</td>
<td>Outer diam 9 cm,</td>
</tr>
<tr>
<td>Object Number</td>
<td>Area</td>
<td>Feature</td>
<td>Class</td>
<td>Type</td>
<td>Material</td>
<td>Dimensions</td>
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<tr>
<td>2798</td>
<td>SFWH1</td>
<td>27159</td>
<td>Cylinder Jar</td>
<td>Cylinder Jar</td>
<td>Limestone</td>
<td>Diam 9 cm, approx 12% remaining, H 2.1, rim W 3.45, body W 2.84, rim Th 4.84, body Th 3.27</td>
</tr>
<tr>
<td>2799</td>
<td>WCN/T2 ext</td>
<td>25680</td>
<td>Cylinder Jar</td>
<td>Cylinder Jar</td>
<td>Travertine</td>
<td>H 25 cm, rim Diam 14, base Diam 11, Depth 22.7, rim Th 1.94.</td>
</tr>
<tr>
<td>2841</td>
<td>SFWH1</td>
<td>25052</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Limestone</td>
<td>Diam 12 cm, approx 31% remaining, max 4.76, H rim W 9.94, body W approx 8.87, rim max Th 1.8, rim min Th 1.4, body Th 2.2 cm</td>
</tr>
<tr>
<td>2843</td>
<td>RAB</td>
<td>25363</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Limestone</td>
<td>Diam 10.3 cm, approx 75%, H 6, internal depth 3.26, rim Th 1.2, base Th 2.55</td>
</tr>
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<td>2844</td>
<td>RAB</td>
<td>25353</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Travertine</td>
<td>Diam of upper/rim part 11 cm, approx 18% remaining from top part, H 3.7, base Th. 0.8, body Th 1.53, top/rim Th 1.13, base W 3.7, body W 6</td>
</tr>
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<td>2860</td>
<td>SFWH1</td>
<td>25087</td>
<td>Cylinder Jar</td>
<td>Cylinder Jar</td>
<td>Travertine</td>
<td>Diam 8 cm, approx 6% remaining, H 1.22, rim W 1.7, body W 0.8, rim Th 0.8, body Th 0.5</td>
</tr>
<tr>
<td>2963</td>
<td>RAB</td>
<td>28608</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Limestone</td>
<td>Diam 10 cm, approx 9% remaining, H 2.9, rim W 2.6, body W 2.7, rim Th 0.72, shoulder Th 0.83, body Th 0.66.</td>
</tr>
<tr>
<td>2995</td>
<td>BBE</td>
<td>5838</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Limestone</td>
<td>Diam 9 cm, approx 8% remaining, max H 2.65, rim and spout Th 0.2, body Th 0.5, rim W. 2.44, body W 2.98, spout L 0.98, spout W 1.1, spout depth is almost 0.36</td>
</tr>
<tr>
<td>Object Number</td>
<td>Area</td>
<td>Feature</td>
<td>Class</td>
<td>Type</td>
<td>Material</td>
<td>Dimensions</td>
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<tr>
<td>2999</td>
<td>RAB</td>
<td>5621</td>
<td>Miniature/Model bowl</td>
<td>Miniature vessel</td>
<td>Limestone</td>
<td>Diam 10.5 cm, approx 46% remaining, H 4.53, depth inside bowl 2.19, rim Th 1, base Th 2.28</td>
</tr>
<tr>
<td>3001</td>
<td>BBNW</td>
<td>5452</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Limestone</td>
<td>Approx Diam 10 cm, approx 21% remaining, H 7.66, rim Th 2, body Th 2.15, rim and body W 6.4</td>
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<tr>
<td>3006</td>
<td>RAB</td>
<td>7168</td>
<td>Bowl</td>
<td>Vertical-sided bowl</td>
<td>Gneiss</td>
<td>Diam 11 cm, H 4.3, Inner Diam 7.6, Inner depth 2, rim Th 2.06, base Th 2.34, body Th 2.7</td>
</tr>
<tr>
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<td>BBNW</td>
<td>5456</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Limestone</td>
<td>Diam of rim appx 12 cm, approx 12% remaining, H 6.93, rim Th 1.4, body Th 2.55, rim W 4.25, approx body W 3.43</td>
</tr>
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<td>3265</td>
<td>RAB</td>
<td>5440</td>
<td>Cylinder Jar</td>
<td>Cylinder Jar</td>
<td>Travertine</td>
<td>Diam 11 cm, approx 13% remaining, H 7.2, rim W 4.55, body W 3.42, rim Th 2.2, min body Th 0.7, max body Th 1.1</td>
</tr>
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<td>3281</td>
<td>RAB</td>
<td>7168</td>
<td>Miniature/Model bowl</td>
<td>Miniature vessel</td>
<td>Gneiss</td>
<td>shoulder W (max) 2.96 cm, rim W 1.9, Th 0.49, H 0.20, Outer Diam 4 cm, approx 18% remaining,</td>
</tr>
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<td>5436</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Phyllite</td>
<td>Diam of rim 24 cm, about 5% remaining, max H 4.5, rim Th 0.38, body Th 0.47, rim W 3.66, body max W 6.37</td>
</tr>
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<td>3507</td>
<td>RAB</td>
<td>27508</td>
<td>Miniature/Model bowl</td>
<td>Miniature vessel</td>
<td>Limestone</td>
<td>Diam 3 cm, H 2.2, approx 19% remaining, rim W 1.96, body W 1.72, rim</td>
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<tr>
<td>3563</td>
<td>SWI</td>
<td>7600</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Limestone</td>
<td>Diam 12.2 cm, Th 1.8, max depth 2.2</td>
</tr>
<tr>
<td>3771</td>
<td>Main Street</td>
<td>3096</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Gneiss</td>
<td>Outer diam 26 cm, rim Th 0.5, body Th 0.8, max H 6.7, approx 10% remaining, rim W 8.3, body min W 1.4</td>
</tr>
<tr>
<td>3776</td>
<td>WCS</td>
<td>3321</td>
<td>Cylinder Jar</td>
<td>Cylinder Jar</td>
<td>Travertine</td>
<td>Diam 8 cm, approx 24% remaining, base W 2.1, H 4.1</td>
</tr>
<tr>
<td>3777</td>
<td>WES</td>
<td>2742</td>
<td>Miniature/Model jar</td>
<td>Miniature vessel</td>
<td>Limestone</td>
<td>max Diam 4.1 cm, min Diam 1.8, Rim L 2.8, W 2.6, ht 7.7cm, int 1.4 cm</td>
</tr>
<tr>
<td>3779</td>
<td>7600</td>
<td>Cylinder Jar</td>
<td>Cylinder Jar</td>
<td>Travertine</td>
<td>Travertine</td>
<td>Outer Diam 12 cm, H 6.1 cm, rim Th 1.1, min Th 0.9, approx 11% remaining, rim W 3, body min W 1.48</td>
</tr>
<tr>
<td>3783</td>
<td>AA</td>
<td>8210</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Gneiss</td>
<td>Outer diam 24 cm, approx 10% remaining, max H 2.4, rim Th 0.4, max Th 0.7, Shoulder Th 1, W 8 cm.</td>
</tr>
<tr>
<td>3785</td>
<td>Gallery III.3</td>
<td>7600</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Gneiss</td>
<td>Outer Diam 26 cm, approx 6% remaining, H 3.62, rim Th 0.67, body Th 0.77, max W (rim) 4.74, min W (body) 1 cm</td>
</tr>
<tr>
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<td>WCS/WCG</td>
<td>3748</td>
<td>Bowl</td>
<td>Straight-sided bowl</td>
<td>Limestone</td>
<td>H 3.58, rim W 4.5, body W (min) 1.7, rim Th 0.9, body Th 1.2</td>
</tr>
<tr>
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<td>28012</td>
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<td>Limestone</td>
<td>Diam 9 cm, approx 18% remaining, max H 3.4, rim Th 0.5, base Th 0.83, body Th 0.7, rim W 5.55, body W 5, base W 1.5</td>
</tr>
<tr>
<td>3799</td>
<td>ET</td>
<td>7600</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Gneiss</td>
<td>Diam approx 9cm, approx 6% remaining of rim, H 3.5, rim Th 0.44, body Th 0.9, rim</td>
</tr>
<tr>
<td>Object Number</td>
<td>Area</td>
<td>Feature</td>
<td>Class</td>
<td>Type</td>
<td>Material</td>
<td>Dimensions</td>
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<td>BBE</td>
<td>5728</td>
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<td>Limestone</td>
<td>W 1.8, body max W 4.3</td>
</tr>
<tr>
<td>3817</td>
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<td>10</td>
<td>Miniature/Model bowl</td>
<td>Miniature vessel</td>
<td>Limestone</td>
<td>External Diam 8.3 x 7.2 cm, Internal diam 6 x 5.42, max H 3.57, approx Th of rim 1, inner depth 2.44,</td>
</tr>
<tr>
<td>3826</td>
<td>Hypostyle Hall</td>
<td>1824</td>
<td>Bowl</td>
<td>Open-spouted bowl</td>
<td>Limestone</td>
<td>Diam 10.6 cm, approx 75% remaining, H 4.5, Inner depth 2.6, rim Th 1.4, base Th 2.06, spout L 1.8, W 1.9, depth 0.58</td>
</tr>
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<td>A7</td>
<td>19</td>
<td>Bowl</td>
<td>Vertical-sided bowl</td>
<td>Limestone</td>
<td>Diam of base +/- 15 cm, H 4.5, L10.5 cm of piece, body Th 1.6, base Th 2</td>
</tr>
<tr>
<td>3830</td>
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<td>3274</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Limestone</td>
<td>approx Diam 17 cm, approx 10% remains, max H 5.64, rim Th 1, body Th 1.46, rim W 5.34, body W approx 4.87</td>
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<td>3235</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Limestone</td>
<td>Diam 13 cm, approx 37% remaining, H 4.04, rim Th 1, body Th 1.48, rim W 11.7 (of the 2 fragments)</td>
</tr>
<tr>
<td>3834</td>
<td>MSGH</td>
<td>2331</td>
<td>Bowl</td>
<td>Bent-sided bowl</td>
<td>Limestone</td>
<td>Diam 11.2-10.3 cm, max H 5.22, rim Th 2.38</td>
</tr>
<tr>
<td>3835</td>
<td>ZAC</td>
<td>7290</td>
<td>Bowl</td>
<td>Convex-sided bowl</td>
<td>Limestone</td>
<td>Diam 11 cm, approx 20% remaining, H 3.7, rim Th 0.94, body Th 1.33, rim W 6.55, average body W 5.1</td>
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<td>Limestone</td>
<td>Diam 13 cm, approx 75% remaining, H 5, rim Th 1.48, base Th</td>
</tr>
<tr>
<td>Object Number</td>
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<td>Class</td>
<td>Type</td>
<td>Material</td>
<td>Dimensions</td>
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<td>3437</td>
<td>Bowl</td>
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<td>Limestone</td>
<td>L 7.5 cm, W 5.5, Th 1.65</td>
</tr>
<tr>
<td>3856</td>
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<td>3274</td>
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<td>Limestone</td>
<td>Diam 13 cm, approx 18% remaining, H 4.11, rim Th 1 cm, body Th 1.54, rim W 7, body average W 5.22</td>
</tr>
<tr>
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<td>822</td>
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<td>Limestone</td>
<td>Interior diam 5 cm, approx 16% remaining, H 4.15, min W 2.72, max W 3.37, Th 1</td>
</tr>
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<td>Cylinder Jar</td>
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<td>Travertine</td>
<td>Diam 6 cm, approx 16%, max H 4.04, rim Th 0.9, body Th 0.32</td>
</tr>
<tr>
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<td>Travertine</td>
<td>Th 0.71 cm, Diam 0.90, H 0.63, rim Th 1.01</td>
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<tr>
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