

SEALS AND SEALING PRACTICES IN EARLY
ADMINISTRATION IN SOUTHWESTERN ASIA
AND EGYPT DURING THE FOURTH TO THIRD
MILLENNIUM BCE

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UCL

I, Tatjana Persephone Beuthe, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Abstract

Egypt and southwestern Asia developed into societies with hierarchical organization during the 4th millennium BCE. Cylinder seals first came into use as administrative devices in these regions during this period. By examining how cylinder seals were used in both regions in the 4th to 3rd millennium, this thesis investigates how cultural and administrative practices related to cylinder sealing first emerged and developed in these regions. Changes in seal use over time in southwestern Asia and Egypt are also explored, taking into account the emergence of stamp seal use in Egypt in the 3rd millennium. Fourth millennium countersealing practices (the practice of impressing more than one seal on a piece of clay used for administrative purposes) in both regions are also scrutinized as a means of examining the development of seal use in southwestern Asia and Egypt. Previous studies of early cylinder seals from these regions have focused on seal inscriptions or the iconography of the seals. Instead, this thesis analyses locations where seals and impressions were found (i.e. settlements, tombs), to investigate how both southwestern Asia and Egypt employed cylinder seals as well as stamp seals, and seal impressions. Administrative practices employing these devices are examined along with the unique cultural perceptions of these artefacts at each site. This evidence is used to examine how these two complex societies developed differently during the 4th to 3rd millennium.

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Chapter 1

Introduction

1.1 Research objectives

Egypt and Uruk/late Chalcolithic-era southwestern Asia are rare examples of early civilizations that developed in close proximity to each other in the 4th millennium BCE. These civilizations evolved into distinct stratified complex societies. Southwestern Asian organization was based around city-states, while Egypt became a ‘territorial’¹ state. Southwestern Asian and Egyptian civilizations both developed complex administrative systems that utilized cylinder seals (Frankfort 1939). They may have been the earliest archaeological cultures to employ the same administrative tool during the period of their concurrent development into states². Consequently, performing comparative quantitative analyses of the seals and impressions used in southwestern Asia and Egypt presents a unique opportunity to study the early development of two distinct, proximate, complex societies from a new perspective. Administration was an essential element of early complex societies in southwestern Asia and Egypt. The use of writing in administration in both regions was likely restricted to a small literate class. However, administration implicating seals did not necessarily require literacy from individuals participating in the systems (Smith 2001, 192; Bussmann 2011, 18). By examining how seals were used in administrative systems, this study sheds new light on the contributions of potentially non- or partially literate individuals to the development of administration in early complex societies.

The present study focuses on the earliest 4th millennium cylinder seals and seal impressions in both Egypt and southwestern Asia. The objective is to examine how cylinder seals were employed at the time when they were first developed. Material from the 3rd millennium is also included to compare early use patterns of cylinder

¹A centralized state that controlled different regions within a large territory (Trigger 1993, 11; Ciałowicz 2001, 230).

²Cylinder seals and a few stamp seals were likely first imported to Egypt from southwestern Asia in the 4th millennium, and were subsequently adopted and adapted as an administrative tool (Guyot 2004, 88).

seals with later trends. The incidence of stamp seal use alongside cylinder seals is noted where it appears in the data under study. This data is analysed to answer the questions: How was seal-based administration developed in southwestern Asia and Egypt during the 4th–3rd millennium BCE, and how were cylinder seals integrated into society? How complex were early seal-based administrative systems, and were they controlled by elites in southwestern Asia and Egypt?

The initial adoption of cylinder sealing technology likely took place over a protracted period of time (Rogers 2003, 11). Consequently, there is less data available on ling technology (Rogers 2003, 11), there is less data available from early southwestern Asia and Egypt than there is for later periods. However, the data on seals and seal impressions provides an invaluable look at the early development of the only administrative technology in continuous use throughout ancient times in these regions.

This study examines evidence from Egypt and contiguous areas of Nubia that have sites containing evidence for Egyptian administrative activity. The southwestern Asian evidence examined includes material from southern Iraq and southwest Iran, sometimes referred to as ‘Greater Mesopotamia’, as well as settlements in Eastern Syria and Northern Iraq that show evidence for cylinder seal use.

The earliest administrative systems employing cylinder seals in southwestern Asia and Egypt have never been subjected to an in-depth comparative analysis (see Section 1.3). This thesis endeavours to establish how these systems functioned and how they differed from each other by examining the appearance and context of seals and sealings in both regions during the 4th millennium BCE. An in-depth study will demonstrate how the social changes in this period are reflected in the implementation of early cylinder seals in administration in southwestern Asia and Egypt. Material from the 3rd millennium will also be examined to determine how cylinder seal use trends may have continued, changed, or fallen out of use over time after their introduction in the 4th millennium BCE. This study will focus mainly on cylinder seals, since this seal type came into use in both regions at the time when stratified complex societies first emerged.

1.2 Seals and Sealings: A Definition of Terms

A seal is a small object made of stone, wood, ivory, bone, or clay. Pictures, writing, or a combination of both are carved on the surface of seals. They are used to make impressions on a soft surface (generally clay) to label and seal an object. Seals were employed for this purpose from circa the 7th millennium BCE onward (Duistermaat 2012, 8).

The word ‘seal’ primarily refers to cylinder seals in the context of this study, but this term is also employed for stamp seals when these are examined. Cylinder

seals and stamp seals are explicitly referred to when it is important to differentiate between the two.

The word ‘sealing’ is frequently used in scholarly literature to refer to any clay container closure, which may or may not be impressed with a seal impression³. In this thesis, the word ‘sealing’ is used to refer to any piece of clay marked with a seal impression, whether attached to a container, door, or existing as a separate object (e.g. clay balls, tablets, and bullae from southwestern Asia). Conversely, ‘seal impression’ refers exclusively to the impression left behind by a seal on a clay base. The pictures/words carved on individual seals are referred to as ‘seal images’. Contemporary impressions made by rolling or stamping ancient seals are occasionally used as illustrations in this study, but these are never referred to as sealings, since they are modern impressions made to illustrate the motifs inscribed on the ancient seals⁴.

The affordances (Knappett 2004, 45–46) of seals are related to their administrative use and display as a prestige object. The prestige of seals can be derived from the authority they convey, the images and/or inscriptions incised on them, or the material they are made of. Seals may also have served amuletic purposes. Chapter 2 discusses the difficulty of disentangling these possible affordances from one another when dealing with seals deposited in graves.

The affordances of sealings are also administrative and display related. When employed in an administrative context, sealings are used to guarantee the contents of a vessel or document (Collon 2005, 15). They are also used to indicate the participation of an individual or collective in a transaction (Collon 2005, 113; Pittman 2013, 325). When employed for purposes of display, sealings indicate the prestigious origin of a sealed object or document (Wengrow 2008, 28). Several or all of these purposes can be embodied within a single sealing.

The term ‘seal-based administration’ refers to all sealing practices for which evidence can be found in settlement sites. For example, door sealings, jar sealings, and bag sealings can all be excavated from settlement sites (Delougaz and Kantor 1996a,b). The individuals performing actions related to seal-based administration may have been of any gender, sex, or profession. However, in the material examined here, the class of individuals using each seal is frequently not archaeologically definable. Thus, all individuals performing sealing actions are referred to as ‘administrators’ or ‘seal-bearers’ in the present text. Aspects of sealing practice within seal-based administration, such as the use of certain seals to only seal vessels, are discussed in the following chapters.

³The term sealing has been misused in texts to refer to seals (Vlčková 2006, 220). It is therefore important to clearly define these two types of artefacts.

⁴Modern impressions are often mistakenly referred to as ‘seal impressions’ or ‘sealings’ in publications (Hill 2010, 336, 347; Regulski 2010a, 39; Müller 2012, 20).

1.3 Administration and sealing: overview of previous research

1.3.1 Administrative devices in early Southwestern Asia

Stamp seals appear to have been used for administrative purposes to record ownership of sealed goods in southwestern Asia from the 7th millennium BCE onward (Duistermaat 2012, 8). With the development of complex stratified societies in southwestern Asia in the 4th millennium BCE, uninscribed seals were used in southwestern Asian administrative systems that apparently surpassed the complexity of earlier sealing practices (Frangipane 2007b)⁵. The cylinder seal seems to have been developed in concurrence with clay administrative recording devices within the ‘Uruk culture’ (Pittman 2013, 324–325). The influence of this culture spread throughout much of southwestern Asia during the 4th millennium. The clay administrative recording devices employed by the Uruk culture include:

- Clay tokens (see Figure A.1) that likely symbolized quantities of goods (Englund 1998, 214).
- Clay balls (see Figure A.2) impressed with seals that were often found to contain tokens and were occasionally also impressed with number signs on their surface. These objects have been interpreted as administrative artefacts, with the tokens functioning as a type of numbering system (Schmandt-Besserat 1992, 112). It has been suggested that these balls signified administrative transactions. In this theory, the seal impressions identified individuals or authorities that were responsible for the transaction (Pollock 1999, 158).
- Clay ovoid objects impressed with cylinder seals and frequently designated as ‘bullae’ (see Figure A.108). These objects can be solid or have string holes, indicating they were shaped around a string (Delougaz and Kantor 1996a, 126; Delougaz and Kantor 1996b, Plate 33, H). Numerical markings can occur on bullae, indicating they were likely also used as administrative records (Amiet 1972b, 97, no. 599; Amiet 1972a, Pl. 75; Rittig 2014, 348).
- Flat rectangular or ovoidal clay tablets inscribed with numerals and/or early cuneiform words (see Figure A.3). Some of these tablets were also sealed with cylinder seals (Le Brun and Vallat 1978, 30). Previous studies have examined these administrative devices to determine what types of goods were recorded and how the numbering systems utilized may have functioned (Green *et al.* 1987; Englund *et al.* 1993; Englund and Boehmer 1994; Englund *et al.* 2001,

⁵Inscriptions on seals only became common near the end of the 3rd millennium BCE (Pittman 2013, 338).

2005). Some theories on early city economies in 4th millennium southwestern Asia have been based on the analysis of these tablets (Pollock 1999, 93).

Sealed clay ball-based, bulla-based, and uninscribed tablet-based administration may have been in simultaneous use in southwestern Asia (Boehmer 1999, 120–121). In the 3rd millennium, the use of sealed clay balls, bullae, and tablets as administrative tools may have been deprecated in favour of a system where the use of unsealed written tablets and seals on sealings was segregated (Matthews 1993, 26–27). Consequently, the study of cylinder seal use in 4th millennium southwestern Asia is also the study of how cylinder seals were utilized in tandem with ball, token, and tablet-based administrative systems. Thus, the present examination scrutinizes cylinder seal use in 4th millennium southwestern Asia to determine how administrative systems evolved within early complex societies in the region.

1.3.2 Focus and issues in current sigillographic studies of early southwestern Asian material

An art-historical chronology of early southwestern Asian seal imagery was established by Frankfort (1939) and Porada (1947). This chronology was further developed by Amiet (1980, 13, 121). His study ranged from the earliest appearance of seals in southwestern Asia in the late 7th millennium BCE (Woods 2010b, 51) to the end of the Ur III period circa the 2nd millennium BCE (Woods 2010a, 34). Amiet's study focuses on the composition and style of glyptic images. It also makes frequent use of later textual sources in an attempt to provide explanations for the iconography of early seals. He divides the different seals attributed to a particular era into categories according to their subject matter, style, and region of origin. Some reference is also made to the manufacturing techniques possibly used to produce a particular style. This method of classification has persisted in more recent studies (Matthews 1993; Pittman 2001; Keel-Leu and Teissier 2004; Frangipane 2007a, 252, 254), although seals have also been classified according to their method of manufacture (Nissen 1988, 78; Pittman 2001).

Attempts have also been made to determine the possible meaning of early cylinder seal glyptic. Due to the use of cylinder seals in early administrative systems, most scholars reason that imagery found on diverse seal impressions must be related in some way to the functioning of these administrative systems. Many of these studies have focused on the 'Uruk-style' figurative seals found in southwestern Asia. Nissen (1977) was one of the first to formulate a theory with regard to this relationship. He postulated that large cylinder seals with detailed imagery would have belonged to prominent individuals (see Figure 1.1), while schematic seals would have been intended for more general institutional use (see Figure 1.2).

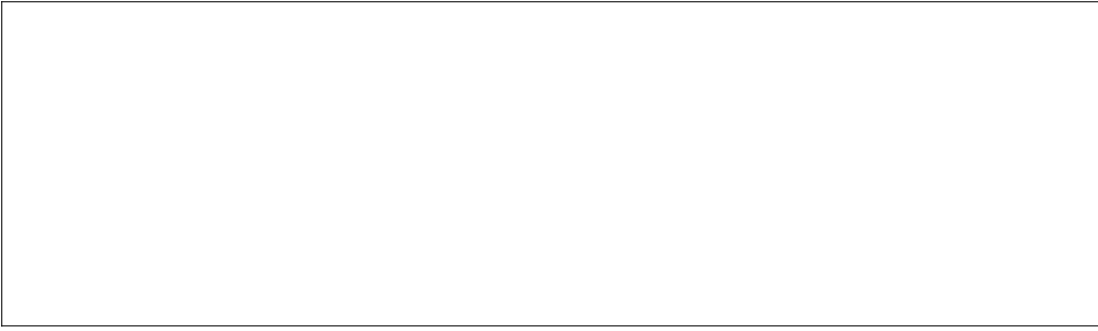


Figure 1.1: Reconstruction of large ‘figurative’ seal from Uruk, Iraq, from tablets W 19410,6 and W 19410,12. From Englund *et al.* (2001, Tafel 95).

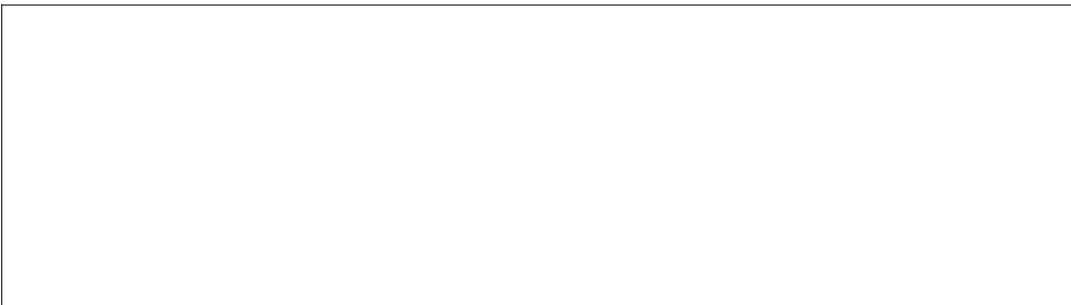


Figure 1.2: Stone ‘schematic’ cylinder seal from Jemdet Nasr, Iraq, circa 3000 BCE. From Matthews (2002, Figure 6).

Nissen (1977, 19–20) considered the complex and highly variable compositions on large seals as possible visual identifiers linked to a highly placed individual in charge of an institution. He reasoned that only an individual of this status would be wealthy enough to commission such a complex design for themselves (Nissen 1977, 20). In his opinion, the more abstract seals were simpler, easier to manufacture, and showed much less variation in their motifs, indicating that these motifs referred to collectives. Consequently, a seal of this type could theoretically have been used by several different members of a collective when acting as group representatives (Nissen 1977, 19). This theory has since been devalued by Pittman (1994b, 179), who suggests the high degree of variation present in large seals would likely not convey individual identity, since the permutations of individual seal designs would have been too numerous to be memorized as ‘names’. Brandes (1979) posited that figurative seals from Uruk were used to indicate the season or festive occasion when goods were received and sealed as part of a putative early temple administration system (Brandes 1979, 98–100). Pittman (1994b, 191) generalizes this theory and states that seals could be considered designators of the occasion on which goods were sealed. Collon refuted this theory, stating that the variations found within each category of seal iconography are too small to have served as a visual marker of seasons (Collon 1982, 178). Brandes also suggested an alternative theory, centring on the slight variations found within a group of seal impressions depicting the same type of scene. In his opinion, these variations signalled the sealed goods had come from different

regions (Brandes 1979, 100). Dittmann (1986, 336) subsequently theorized that seal impressions from Susa with detailed motifs varied according to the rank of the individual possessing the seal. Helgestad (2010) has proposed that larger figurative Uruk-style seals were ‘secondary-agents’ that served to disseminate elite ideology to the individuals that employed and viewed them. Finally, Pittman (2013, 325) has proposed that seals could have been used to convey information on ‘economic units’, to identify the institutions responsible for sending or receiving the goods being sealed, or as designators of the occasion on which goods were sealed. In her 2001 article, Pittman has taken a broader approach to examine the glyptic not only of larger Uruk-style cylinder seals, but also of smaller non-figurative seals and stamp seals utilized elsewhere in southwestern Asia. In her study, she concludes that at least two administrative systems employing different types of seal iconography developed within southwestern Asia. According to Pittman’s analysis, sites utilizing the northern system in the 4th millennium BCE partially adopted and adapted the more complex southern system, which employed cylinder seals (Pittman 2001, 419, 442). Previously, Pittman (1994a) also used a contextual and semiotic approach to analyse non-figurative seals. She concluded that the ‘Glazed Steatite Glyptic style’ contained elements that possibly conveyed different ‘messages’ to the viewer in a non-verbal fashion.

These theories all focus primarily on cataloguing motifs found on sealings and seals from known excavated sites. They also frequently focus on figurative Uruk-style cylinder seals, said to belong to administrative systems controlled by elites. The large bodies of material from southern sites such as Uruk and Susa are often investigated by these studies. However, another approach that places more importance on the sealed object has recently been developed. By cataloguing the motifs of seals impressed on sealings of containers, doors, and early notational tablets, scholars have attempted to determine if certain seal motifs were stamped on specific types of goods (Matthews 1993; Martin and Matthews 1993; Frangipane 2007a). Efforts have also been made to establish if the findspots of seal impressions can be correlated with the imagery depicted on them (Stein 2001, 297; Frangipane 2007a). Both of these approaches are used to determine the workings of the administrative system putatively controlling the goods being sealed (Frangipane 2007a, 15). The majority of these examinations have concentrated on material from a few more recently excavated sites like Arslantepe or less studied archival material from sites like Jemdet Nasr. Such in-depth studies of 4th millennium material also frequently focus on sites peripheral to the Uruk culture located in Northern Iraq or Syria. These settlements appear to have primarily used stamp seals and not cylinder seals for administration (Rothman 2002; Reichel 2002; Frangipane and Pittman 2007). By contrast, the studies of 3rd millennium material have focused on sealing evidence from the Mesopotamian heartland in southern Iraq–Iran (Zettler 1987; Charvát 1988; Matthews 1991, 1993; Martin and

Matthews 1993; Zettler 2007a,b), with the exception of the northern Iraq site of Nineveh (Charvát 2005).

1.3.3 Administrative devices in early Egypt

The only administrative technology that may predate the importation of the cylinder seal into Egypt during the Naqada IIC–D period circa 3600–3350 BCE (Hendrickx 2006, 92) are incised potmarks (van den Brink 2011, 1007). The advent of the cylinder seal as an imported administrative technology from Uruk-era southwestern Asia coincides with appearance of social hierarchy and increasing social complexity in the region during Naqada II. From Naqada III onward, emergent elites appear to have monopolized the use of rich goods for the purposes of burial display (Wengrow 2006, 40, 166). However, seals were apparently not considered ‘rich’ grave goods (see Chapter 2), unlike the sealed containers found in prestigious burials (see Chapter 3). The earliest seals and impressions found in Egypt are purely figurative or bear abstract patterns (Hartung 1998). Cylinder seals were one of the few identifiable cultural elements that were imported into Egypt from southwestern Asia. However, this does not imply that Egypt was culturally subservient to southwestern Asia (Guyot 2004, 86). On the contrary, Egyptians soon began to develop their own unique seal designs (Honoré 2007, 43). Stamp seals, though common in southwestern Asia, are only rarely evidenced in early Egypt prior to the 3rd millennium Old Kingdom period. Only three incidences of early stamp seals or impressions have been found to date. These three artefacts are: the Nag el-Deir grave N7501 seal, the Haraga seal from grave 470 (Payne 1993, 203), and a seal impression from Abydos tomb U-134. Potmarks painted in ink are also attested from this period onward (Regulski 2008, 990).

Circa 3350–3150 BCE (Hendrickx 2006, 92), tags of wood or animal bone/ivory possibly inscribed with early hieroglyphs (Dreyer 1998; Kahl 2003; Baines 2004, Regulski 2008) begin to surface as labels that were likely attached to grave goods in elite burials.

The development of a central pharaonic ruling institution in Egypt circa 3150–2593 BCE (Hendrickx 2006, 92; Hornung *et al.* 2006, 491) also ushered in the use of hieroglyphs on seals at the end of the 4th millennium. Inscriptions on carved stone, rock graffitos, and stone vessels also appear during this period (Regulski 2008, 26, 40, 45). Seal impressions that probably sealed scrolls have been discovered in archaeological contexts dated to the Early Dynastic period (Pätznick 2005, catalogue no. 079). However, none of the written papyri they were likely attached to have been discovered to date. Written administrative papyri are only attested in archaeological contexts dated from the Old Kingdom onward (Tallet and Marouard 2014, 8). Aside from the use of seal impressions to close scrolls, seal technology does not appear to have intersected with inscribed clay tablets the way it did in southwestern Asia.

The act of stamping or rolling a seal over a surface to produce an image can convey a powerful message. A seal owner is capable of mechanically replicating imagery on clay or other appropriate media (Wengrow 2008, 12–13). Recognizable images that were reproduced on seals, seal impressions, carvings, and paintings, were likely an important element of royal power in Egypt, as they could be employed to visually represent the authority of the ruler in different regions (Leprohon 2014, 309). Seal impressions also appear to have served as indicators of the provenance and quality of sealed goods (Wengrow 2008, 20). However, seals with non-royal imagery could also have been used by local authorities for administrative purposes (Bussmann 2011, 18). The degree to which such local administrators were subject to a central pharaonic administrative system may have varied over both space and time (Garcia 2013, 3, 9).

1.3.4 Focus and issues in current sigillographic studies of early Egyptian material

In the latter half of the 20th century, Boehmer (1974) endeavoured to establish chronological and iconographic parallels between the earliest seals found in Egypt and seals found in southwestern Asia, following a precedent set by Frankfort (1939, 292–300). He came to the conclusion that the iconographic influences on the earliest Egyptian seals emanated from Elam (Boehmer 1974, 514) in the late Uruk period. This was corroborated by Podzorski (1988, 268). Recently Honoré (2007, 41) has emphasized that the motifs in question likely originated from Susa in the Elamite region during the earlier Middle Uruk period.

Kaplony (1963a) classified early Egyptian cylinder seals and seal impressions, stating they formed a rich body of evidence for the study of the evolution of hieroglyphs in Egypt (Kaplony 1963a, 3). He classified his appendix of seals according to the type of decoration found on anepigraphic seals, or according to the arrangement of hieroglyphic signs. The seal classification of Kaplony has since been refuted by Kahl (1994, 4) in favour of his own hieroglyphic-based classifying system.

As a result of the early adoption of hieroglyphic writing on seals in Egypt, any attempt to decipher the administrative significance of seals has tended to rest on the interpretation of the inscriptions. These inscriptions are frequently said to refer to individuals, official titulary, and pharaonic administrative institutions (Kaplony 1963a; Kahl 1994; Pätznick 2005; Regulski 2010a; Müller 2012; Engel 2013). Interpretations of seals and impressions that predate hieroglyphs rely primarily on iconographic interpretation. Parallels are also made with later motifs and hieroglyphs, as can be seen in the analyses of the Nubian seals and sealings with regard to the Qustul material, a seal from Helwan, and the sealings from Naqada III era burials at Cemetery U in Abydos (Williams 1986, 157–158, 167–171; Köhler 1999; Hartung 2001, 234–235). Anepigraphic seal motifs occurring in subsequent eras when hieroglyphs had come

into use tend to be overlooked (Pätznick 2005; Nolan 2010). Few studies take into account the find context of the seals and sealings.

Attempts have been made to compare the motifs found on anepigraphic seals at Egyptian sites. Hartung (2001) endeavours to place the motifs on sealings from Tomb U-j at Abydos within a wider context by comparing their iconography with previously uncovered Egyptian-style sealings and seals from Egypt, Nubia, and the Levant. Hill (2004) also classifies seal impressions from Cemetery U and the Egyptian outpost of 'En Besor in the Levant according to their motifs. She compares material from Cemetery U to the 'En Besor seal impressions, as well as drawing comparisons with Nubian seals and impressions. Occasional references are made to Predynastic motifs on other seals as well as prestigious early Egyptian objects. Consequently, her work can be said to follow the precedent established by Boehmer (1974) and Hartung (2001). Thus, the general tendency to focus on the seals with writing on them has only recently been mitigated by work on earlier anepigraphic seals from Egypt.

Until recently, early Egyptian seals and seal impressions were recovered mainly in burial contexts. Consequently, analyses of administrative practices involving seals concentrated primarily on artefacts from tombs. Re-investigations of old excavated material and excavations of the settlements of Elephantine (Pätznick 2005), Hierakonpolis (Bussmann 2011, 2013, 2014a,b), Naqada South Town (DiMaria 2007), Tell el Farkha (Kołodziejczyk 2012), Buto (Faltings *et al.* 2000), and Mendes (Redford 2010) have begun to rectify this bias.

The first attempt at an administrative study based on seal impressions was undertaken by Kaplony (1963a, 58–59), who proposed three different theories regarding how sealed tomb goods may have been provided for a pharaonic burial. More recently, Hartung (2001, 231–232) has theorized that the seals on the U Cemetery material were related to administrators who were authorized to verify and seal goods that were then deposited in tombs. Müller (2012) has also theorized that the increase and subsequent decrease in different seal motifs found on funerary objects over the course of Dynasty 1 is indicative of the widening and subsequent shrinking of the administrative apparatus responsible for supplying sealed containers for elite pharaonic burials. Engel (2013, 26–36) has also traced the appearance and disappearance of various apparent pharaonic administrative bodies in the Early Dynastic through their appearance on seal inscriptions as well as other early inscribed material. The only notable study of sealings found in early settlements to date was conducted by Pätznick (2005). By analysing widely distributed seal impressions from a settlement, he attempted to distinguish manufacturing and administrative areas by reading the titulary on seals inscribed with hieroglyphs.

Studies of early Egyptian seals frequently contain sealing classifications. Emery (1939, 19–20) classified sealings in terms of the type of goods they were likely attached to. This classification was further elaborated on by Emery's collaborator Klaasens

(1958, 61–62). Kaplony (1963a, 49–54) also proposed a classification based on these previous systems. In recent years, several scholars have built on this work and elaborated new sealing type classifications (Engel and Müller 2000; Pätznick 2005; Nolan 2010). However, it is only recently that sealing types have been taken into account in addition to the motifs on the seal impressions, in analyses conducted by Regulski (2009a) and Regulski and Kahl (2010). A thorough analysis of Egyptian seal impressions that considers motifs and sealing types has not yet been conducted.

1.3.5 Issues with analyses of sealing practices in early stratified societies of southwestern Asia and Egypt

The biases inherent in many previous studies of sealings preclude the development of a balanced overview of early administrative systems in southwestern Asia and Egypt. Seminal southwestern Asian regional studies such as those performed by Amiet (1980) tend to contain an iconographic bias. This bias is frequently imposed on later studies, and consequently forms an impediment to a thorough analytical overview of older excavated material. Paleographic and epigraphic studies of early Egyptian seals and sealings contain a similar bias (Kaplony 1963a; Kahl 1994; Regulski 2010a). Written signs came into regular use on Egyptian seals much earlier than in southwestern Asia⁶. Thus any attempt to decipher the administrative significance of Egyptian seals has tended to rest on the interpretation of inscriptions (Kaplony 1963a; Kahl 1994; Regulski 2010a). Iconographic interpretation is employed for seals and impressions that predate hieroglyphs (Boehmer 1974; Hartung 2001; Hill 2004).

Some more recent archaeological studies of early southwestern Asian material take into account the physical properties, use patterns, as well as the iconography of seals and sealings from a specific site (Matthews 1993; Reichel 2002; Frangipane 2007a). However, to date, no study has been conducted to investigate and compare how the practical aspects of sealing functioned within both early complex stratified societies, and whether southwestern Asia and Egypt differed significantly in their employment of seals. These regions may have been the only early civilizations to share the use of a specific administrative device. As a result, cylinder seals and their impressions represent an ideal artefactual body of evidence through which the different administrative systems of both regions can be compared.

⁶The first written signs appeared on seals in Egypt circa 3300–3100 BCE (Wengrow 2006, 276; Regulski 2010a, 36), and in southwestern Asia circa 3100–2900 BCE (Pittman 2013, 329). Writing remained in use on Egyptian seals from that time onward (Newberry 1906, 48, 77), but the regular use of inscriptions on southwestern Asian seals did not occur until the Mesopotamian ED II period circa 2600 BCE (Pittman 2013, 331).

1.4 Theories on complex societies

Egypt and Southwestern Asia became highly stratified societies with elite classes in the 4th–3rd millennium BCE. The reasons for this change remain archaeologically obscure. The question of how and why such a great shift in social organization occurred continues to influence the direction of archaeological research on these regions.

Complex societies developed along different evolutionary trajectories in southwestern Asia and Egypt. This was likely due to both cultural and environmental factors. Similarly, seals were utilized in both regions, but may have been employed in different ways. This thesis will help to clarify how complex societies developed in southwestern Asia and Egypt, by examining how seal-based administration was developed and employed in both regions, and how the seals and sealed products may have been perceived in both societies.

1.5 Theories on southwestern Asian state formation

1.5.1 Current theories

One current theory on the origin of state level society in southwestern Asia has been elaborated by Algaze (2001). He speculates that environmental instability in southern Iraq engendered a social climate that encouraged martial conflict as well as competition between societies (Algaze 2001, 32–34). He also highlights the importance of competition for prestige trade goods between elites of different settlements as an important factor leading to the establishment of cities (Algaze 2008, 65).

Algaze theorized that the spread of urban culture into the Syrian/Anatolian region took place due to hegemonic control and colonization of these regions by people from the Uruk heartland in southwestern Iran/southern Iraq (Pittman 2001, 427). In Algaze's theory, the elite demand for prestigious goods, and the general need for raw materials that could only be obtained outside the central plain of southern Iraq, may have been an important factor leading to the 'colonization' of outlying regions (Algaze 2001, 37).

However, further research has shown that complex societies evolved in Northern Iraq, Eastern Syria, and Eastern Anatolia with little significant cultural input from the Urukian heartland (Stein 1999; Rothman 2002; Frangipane 2007a). Thus it has been argued that the spread of social organization based on the Urukian model varied greatly depending on the attitudes of indigenous populations toward the Urukian culture (Stein 1999). The main elements of Urukian culture adopted to varying degrees in other cultural regions consisted of standardized pottery vessel forms, lithic tool forms, cylinder seals, and characteristic forms of monumental

architecture (Stein 1999, 144–145, 166). The complex societies located in Northern Iraq, the Syrian/Anatolian region, and southwestern Iran were likely not affected by the climatic problems of southern Iraq (Pollock 1999, 35–36). Consequently, climate change was not necessarily a factor that led to the emergence of urban centres in these regions.

1.5.2 Factors leading to state formation in southwestern Asia

An examination of the cultural and geographic circumstances held in common by people living throughout southwestern Asia in the 4th millennium BCE may provide more conclusive evidence on how and why complex social organization emerged in the region.

When stratified complex societies emerged in southwestern Asia, agriculturalists had already been living in permanent settlements in the area for at least 1000 years (Pollock 1999, 5). Thus local populations may have placed more importance on the settlement they lived in, as opposed to more nomadic populations, who would not have possessed this sedentary mindset.

Large settlements appear to have become nodes for trade and commerce (Pollock 1999, 94) due likely in part to their advantageous locations near rivers that could be used as trade routes (Flannery and Marcus 2012, 449). The most optimal trade routes are not easily changed (Pollock 1999, 43) since terrain and geography dictate their trajectory. Consequently, remaining in the same location may have also been beneficial to those seeking to profit from the commercial transactions taking place at these locations.

Security in numbers was likely a well known principle in this period, and could have led to the agglomeration of larger populations in settlements over time (Adams 1962, 114; Pollock 1999, 47). Climatic changes that rendered certain areas less suitable for agriculture may also have caused people to settle in other towns, thus contributing to the growth of some communities at the expense of others (Pollock 1999, 71).

Most communities that developed state-level administration in southwestern Asia were located near a river (Flannery and Marcus 2012, 449), that could have been used as a transportation route. However, significant natural barriers to the movement of individuals also existed (Postgate 1994, 6–11). Consequently, political unification of these territories may have been unfeasible. Thus geographic barriers could have contributed to the formation of city-states in southwestern Asia, rather than a territorial state.

Although ‘Urukian’ forms of vessels, architecture, and cylinder seals were not universally adopted by southwestern Asian communities, they characterized the culture of many better known ancient cities in Syria, Iraq, and Iran. It is not known why a cylindrical seal form was adopted at a time when stamp seals were already in

use throughout southwestern Asia (Pittman 2001, 419; Rothman 2001, 7). However, the cylindrical seal form was introduced in the mid 4th millennium BCE during the period of state formation and remained prevalent in the region for much of its history (Brisch 2013, 115; Pittman 2013, 324, 338). As an essential element of state society in southwestern Asia, seal impressions serve as indicators of the administrative and social complexity achieved by early city states.

Temples are frequently present in Uruk culture settlements, but royal or elite residences are apparently not found at such sites. Elite display of prestigious goods and materials in Uruk society is therefore theorized to have been restricted to temples (Charvát 2002, 142–143). However, very few Uruk-era burial sites have been found to date (Charvát 2002, 151); (McMahon *et al.* 2007, 158). Egyptian sites of all eras also frequently pose a similar problem with regard to the location of the royal residences (Stadelmann 2001). Thus, elite display practices of Uruk-era leaders may have been restricted to burial arrangements or elite residences located at sites yet to be uncovered.

1.6 Theories on Egyptian state formation

1.6.1 Current theories

Prior to the establishment of an Egyptian state, the population of Egypt appears to have consisted mostly of small riverbank villages. Over time, the rank of tribal leaders in Upper Egyptian villages appears to have grown as they sought to obtain more prestige (Ciałowicz 2001, 91). Peer-polity trade, and competition for access to prestigious trade goods and materials in southern Egypt (Köhler 2008a, 533–534) may have led to the formation of large chiefdoms that eventually became small states (Adams 1995, 80). The river Nile likely facilitated such transactions (Köhler 2008a, 532). It has been suggested (Wengrow 2006, 75) that elite demand for trade goods and inter-settlement competition may have been prime motivators for the development of civilization in Egypt. This hypothesis is similar to Algaze’s theory (2008) on the development of states in southwestern Asia. However, elite display in Egypt appears to have focussed on burials of local prominent individuals, in contrast to the temple-based displays of southwestern Asia (Wengrow 2006, 40, 166).

Concurrently, the southern Egyptian Naqada material culture, consisting primarily of characteristic pottery types, stone tool forms, and cosmetic palettes (Shaw 2000, 50–51), expanded into the Delta region (Ciałowicz 2008, 502). The unification of the cultures of Upper and Lower Egypt is considered a precursor to the formation of a territorial state in Egypt (Wengrow 2006, 89).

Köhler’s theory (Köhler 2008a, 535) suggests that the monolithic ‘territorial’ state of Egypt was established later than the conventional date of ca. 3350 BCE (Hendrickx

2006, 92), and was fully formed in Dynasty 1, at around 3150 BCE (Hendrickx 2006, 92; Hornung *et al.* 2006, 490). She theorizes that state formation took place via a two-stage process in Egypt. In the first stage, competing polities with complex organization emerged (Kemp 1989, 35). In the second stage, these polities would have been united into the monolithic Egyptian state (Köhler 2008a, 536).

Egypt formed a territorial state instead of developing various city states within its territory. However, factors that may have contributed to the rise of southwestern Asian city states are also cited as primary factors leading to the development of the Egyptian territorial state. An examination of the cultural and geographic circumstances that shaped the development of complex society in Egypt can provide more conclusive evidence on how and why a territorial and not a city-based state emerged in the region.

1.6.2 Factors leading to state formation in Egypt

Examining the unique cultural and geographical circumstances of Egypt may provide better evidence for the causes underlying the emergence of complex social organization in the region. Southwestern Asia was the first region to develop sedentary farming societies in the 6th millennium BCE (Pollock 1999, 5). By contrast, Egypt only appears to have adopted agriculture after importing and adapting southwestern Asian (Wenke *et al.* 1988, 29–30) and Levantine (Wengrow 2006, 159) crops and farming methods in the 4th millennium BCE. Conversely, mobile animal husbandry was adopted at least two millennia earlier in Egypt (Wengrow 2006, 26). The Egyptians appear to have remained at least partly nomadic until the 4th millennium (Wengrow 2006, 63). Thus, the Egyptians may have preferred to cluster in smaller settlements (Finkelstein 1995, 99) rather than forming larger communities. Consequently, Egypt has been characterized as a ‘civilization without cities’ for much of its history (Wilson 1960).

Some Upper Egyptian settlements were enlarged and enhanced with cult structures from the Naqada II period onward circa 3500 BCE (Shaw 2000, 479). However, these communities were likely developed to convey the prestige of local leaders and deities (Hoffman 1982a, 132). Alternatively, settlements may also have grown due to the sedentary manufacturing industries located within them (Hoffman *et al.* 1986, 181, 185). Thus the essentially tribal nature of these scattered settlements (Ciałowicz 2001, 91) may have resulted in local populations that were more attached to their tribal leaders than the land they lived on. Egyptian ‘villagers’ may not have been attached to a particular location, since agriculture was a relatively new concept in Egypt. The frequently shifting course of the river Nile may also have precluded any attachment to a settlement. Later settlements are known to have relocated in response to movements of the Nile (Jeffreys 2008). The same process likely occurred in earlier periods of Egyptian history. Thus, Egyptians were probably less attached to their place of residence than southwestern Asians during the 4th millennium BCE.

A shared culture with similar burial rites, material culture, and dietary practices (Wengrow 2006, 89) appears to have gradually developed and spread throughout Egypt in the Naqada II-III periods, circa 3600–3350 BCE (Hendrickx 2006, 92). The ‘Naqada culture’ is frequently posited to have spread from southern to northern Egypt (Ciałowicz 2008, 502). This theory has been disputed by Köhler (2008a, 532), who speculates that a shared culture developed in both regions. This shared culture (Shaw 2000, 479) and the aforementioned lack of territorial attachment may have been important factors contributing to the creation of a territorial rather than a city based state in Egypt.

Egypt also had a significant geographic advantage that southwestern Asia lacked: a single major river that acted as the principle transportation artery (Köhler 2008a, 532). Boats are an efficient method of transportation likely known to the Egyptians since the time of the Badarian culture (Merriman 2011, 11) circa 4000 BCE or earlier (Hendrickx 2006, 92). Boat transportation may have facilitated the inspection and control of settlements (Vinson 1994, 7). This could have enabled the Egyptians to administer larger areas than the southwestern Asians.

The Naqada culture is frequently thought to have spread northwards as the inhabitants of southern Egypt subjugated the Delta. A general lack of evidence for such strife does not necessarily support this theory (Köhler 2008a, 532). However, conflict between different regions and polities within Egypt should not be ruled out as an important engine of change in cultural and social organization in Egypt prior to state formation (Hoffman 1982b, 144). Alliances between different polities that eventually united their territories likely also occurred. The unification of the country under a single state may have been encouraged by these practices (Hassan 1988, 173).

The late pre-state and early state formation era of Egypt (Naqada III–Dynasty 1, 3350–2730 BCE (Hendrickx 2006, 92; Hornung *et al.* 2006, 490)) was accompanied by the use and re-purposing of iconographic motifs, architectural elements, and cylinder seals from state-level southwestern Asia⁷. Of these cultural elements, both cylinder seals and architectural forms have been interpreted as symbols of Urukian state-level culture (Stein 1999, 166). This thesis examines the degree to which cylinder seals may have been co-opted by elites to build the ideology of the pharaonic state (Guyot 2004, 97).

Cylinder seals appear to have been an essential administrative tool appropriated for use in Egypt during the period when state level social organization emerged (Guyot 2004, 89). Additionally, cylinder seals were the only imported element that continued to be used in Egypt long after imported artistic motifs and architectural forms ceased to be in widespread use (Collon 2005, 140). By examining seals and sealings

⁷Two of these three of these borrowed cultural elements (motifs and cylinder seals) are posited to have been imported as status symbols during the Naqada II period (Guyot 2004, 86–88).

from Egypt and comparing this evidence to sealing practices from southwestern Asia, this thesis determines how early administration may have functioned in both regions. Thus a clearer picture of the development of complex society in both regions will emerge through the examination of administration, which was and remains an essential element of state level social organization.

1.7 Examining administration through cylinder seals: A new approach

During the 4th and 3rd millennium BCE, seals were widely used throughout southwestern Asia and Egypt in comparison to more elite administrative practices such as writing. Thus, sealing practices were likely the most socially and geographically widespread form of administrative behaviour during the period of the formation of complex stratified societies. By examining the different ways cylinder seals were utilized in this crucial period, it becomes possible to trace how seal-based administrative systems were developed by early complex cultures in both regions. Seals were omnipresent in southwestern Asia and Egypt from the 4th millennium onward as a method of guaranteeing the contents of a sealed object and identifying those responsible for sealing it (Collon 2005, 15). Today, seals continue to be used for these purposes.

This thesis traces the initial development of the cylinder seal as an essential administrative tool in two of the earliest complex societies. Large quantities of cylinder seal impression and seal data recovered from 4th and 3rd millennium sites are analysed from a material-based perspective rather than an iconographic perspective. An analysis of this type has not been previously attempted. The subsequent transition to and use of stamp seals in Egypt during the 3rd millennium is also discussed where relevant. By performing this analysis, the present thesis seeks to answer the following questions:

- How was seal-based administration developed in southwestern Asia and Egypt during the 4th–3rd millennium BCE, and how were cylinder seals integrated into society?
- How complex were early seal-based administrative systems, and were they controlled by elites in southwestern Asia and Egypt?

These questions form the central basis of this thesis. The following are the secondary issues arising from these questions. The section(s) in which they are discussed is noted at the end of each question.

- What evidence do Egyptian seal-containing burials from the 4th to 3rd millennium BCE provide concerning the status of the individual buried with the

seal(s)? For example: how large were seal-containing tombs in comparison to other tombs in the same cemetery? (Chapter 2)

- What evidence do Egyptian seal impression-containing burials from the 4th to 3rd millennium BCE provide concerning the status of the individual buried with the seal impression(s)? For example: how large were seal impression-containing tombs in comparison to other tombs in the same cemetery? (Chapter 2)
- What different types of administrative practices can be discerned when examining and comparing seal impressions found on sealings in a settlement of southwestern Asia and a settlement in Egypt during the 4th millennium BCE? (Chapter 4)
- What different types of administrative practices can be discerned when examining and comparing seal impressions found on sealings in a settlement of southwestern Asia and a settlement in Egypt during the 3rd millennium BCE? (Chapter 5)
- What types of counter-sealing practices were present in southwestern Asia and Egypt during the 4th millennium BCE? How did the implementation of these practices differ? (Chapter 6)

This thesis presents a more comprehensive approach to the study of early seal impressions by analysing the find contexts of seals and impressions instead of concentrating on inscriptions. By tracing how seal-based administration, functioned and evolved in the era of state formation in southwestern Asia and Egypt, the present analysis implements a new approach. By comparing and contrasting how seals were utilized in both regions, a clearer picture emerges of how early administration, and by extension early complex society, was developed by illiterate and literate individuals.

1.8 Datasets

To effectively examine and subsequently compare southwestern Asian and Egyptian administrative practices in the 4th to 3rd millennium BCE, a large dataset of material from this era is assembled. Circa 103 Egyptian tombs found to contain seals (see Table 1.1) and 120 Egyptian tombs found to contain seal impressions (see Table 1.2) are examined in Chapter 2 and 3 respectively. Evidence from Table 1.2 is also examined in Chapter 6. Graves and other sites only studied in Chapter 6 are listed in Table 1.3.

Circa 672 sealings from 13 southwestern Asian settlements, and 572 sealings from 10 Egyptian settlements (see Tables 1.4 and 1.5) are examined in Chapters 4, 5, and 6. Chapter 5 also reviews evidence from the southwestern Asian sites of Tepe Gawra and Arslantepe, but material from these sites is not subject to close study and therefore not included in Table 1.4. All site areas given here are approximate and based on available site documentation.

Table 1.1: Egyptian cemeteries found to contain burials with seals examined in Chapter 2.

Egypt & influenced contiguous regions	# of burials		Site	Source
	W. seals	Total	size (ha)	
Nag el-Deir 7000	2	590	0.23	Lythgoe and Dunham 1965
Matmar	1	74	9.5	Brunton 1948
Deir el-Ballas, Lythgoe cemetery	1	ca. 250	NA	Podzorski 1988
Haraga cemetery H	1	26	NA	Engelbach 1923
Faras	2	117	0.42	Griffith 1921; Griffith Institute 2016
Gezira Dabarosa, Cemetery 6-G-18	1	20	0.36	Nordström 2014
Qustul Cemetery L	1	33	0.26	Williams 1986
Qustul Cemetery W	1	34	0.48	Williams 1989
Saras West Cemetery 11-H-6	1	47	0.0629	Mills and Nordström 1966, David Edwards, Pers. Comm.
el Amra	1	ca. 400	15	Randall-MacIver and Mace 1902
Naqada main cemetery	1	2000	NA	Petrie Museum 1999
Abu Simbel Cemetery 215	1	123	0.9	Emery and Kirwan 1935
Helwan	2	10258	151.8	Saad 1951; Köhler 1999
Nag el-Deir 1500, 3000	6	114	36	Reisner 1908
Abydos Aha subsidiary burials	3	36	0.026	Amélineau 1904; Petrie 1925; Dreyer <i>et al.</i> 1990
Abydos Djer subsidiary burials	2	317	0.27	Amélineau 1904; Petrie 1925; Dreyer <i>et al.</i> 1990
Abydos Djer valley subsidiary burials	4	68	0.98	Amélineau 1904; Petrie 1925; Dreyer <i>et al.</i> 1990
Abusir, Bonnet cemetery	1	66	0.4118	Bonnet 1928
Saqqara mastaba 3500 subsidiary burials	2	4	NA	Emery 1958
Elkab	1	103	NA	Quibell 1898
Nag el-Deir 500–900	15	217	2.29	Reisner 1932
Qaw	19	485	NA	Brunton 1927; Seidlmayer 1990
el-Mustagidda	9	68	NA	Brunton 1937
Matmar	11	87	NA	Brunton 1948
Saqqara Cemetery M	2	112	NA	Jéquier 1929
Balat, cemetery inside mastaba of Medou-Nefer	1	5	0.075	Valloggia and Henein 1986a,b
Balat, cemetery inside mastaba of Ima-Pepy	1	5	0.12	Minault-Gout <i>et al.</i> 1992
Balat, cemetery inside mastaba of Khentika	1	4	0.047	Castel <i>et al.</i> 2001a,b
Balat, cemetery inside mastaba of Ima-Pepy/Ima-Meryre	5	23	0.1	Valloggia 1998a,b
Balat, cemetery outside the mastaba of Khentika	6	25	0.22	Castel and Pantalacci 2005

Table 1.2: Egyptian cemeteries found to contain burials with seal impressions examined in Chapter 3. Sealings from many of these graves are also investigated in Chapter 6.

Egypt & influenced contiguous regions	# of burials		Site size (ha)	Source
	W. sealings	Total		
Abydos Cemetery U	20	63	3.25	Dreyer <i>et al.</i> 1993, 1996, 2000, 2003;
Hierakonpolis cemetery HK6	1	43	1.44	Hierakonpolis Expedition 2015
Ashkeit 308	1	36	0.14	Nordström 1972
Ashkeit 332	1	28	0.45	Nordström 1972
Tell el-Farkha	3	51	0.005	Dębowska-Ludwin 2009, 2012
Tarkhan	3	2115	NA	Petrie <i>et al.</i> 1913; Petrie 1914a
Abydos Cemetery B	13	15	5.84	Petrie 1900; Kaiser and Dreyer 1982; Dreyer <i>et al.</i> 1990
Helwan	5	10258	151.8	Saad 1951; Köhler 1999; Köhler <i>et al.</i> 2014
Abu Rawash Cemetery 400	1	113	0.22	Klasens 1959
Abu Rawash cemetery M	1	28	1.5	Kaplony 1963a; Tristant 2008
Abydos Djer subsidiary burials	7	317	0.27	Amélineau 1904
Abydos, Aha III valley enclosure	1	3	0.038	Bestock 2009
Abusir, Radwan cemetery	1	117	2.46	Radwan 2000
Giza mastaba V (1 tomb)	1	1	0.04	Daressy 1905; Petrie 1907
Saqqara	21	NA	35.16	Quibell 1923; Emery 1938, 1949, 1954, 1958
Saqqara mastaba 3504 subsidiary burials	1	62	NA	Emery 1954
Saqqara mastaba 3506 subsidiary burials	3	10	NA	Emery 1958
Saqqara subsidiary cemetery of Den	4	231	NA	Macramallah 1940
Saqqara grave of Hotepsekhemwy (1 tomb)	1	1	0.12	Kaplony 1963a; Lacher-Raschdorff 2014
Saqqara, grave of Ninetjer (1 tomb)	1	1	0.092	Regulski and Kahl 2010; Lacher-Raschdorff 2014
Nag el-Deir 1500, 3000	2	114	36	Reisner 1908; Lythgoe and Dunham 1965
el-Kubaniya South	1	616	3.92	Junker 1919
Turah el-Asmant	1	200+	NA	el Sadeek and Murphy 1983
Beit Khallaf	5	5	NA	Garstang and Sethe 1903
Giza, Cemetery G 2100	1	204	NA	Reisner 1942; Reisner and Smith 1955; Giza Archives 2014
Giza, Cemetery G 4000	8	332	NA	Reisner 1942; Reisner and Smith 1955; Giza Archives 2014
Giza, Cemetery G 1000	1	NA	NA	Reisner 1942; Reisner and Smith 1955; Giza Archives 2014
Giza, Cemetery G 2300	2	NA	NA	Reisner 1942; Reisner and Smith 1955; Giza Archives 2014
Giza, Cemetery G 5000	4	NA	NA	Reisner 1942; Reisner and Smith 1955; Giza Archives 2014
Giza, Cemetery G 7000	5	NA	NA	Reisner 1942; Reisner and Smith 1955; Giza Archives 2014
Giza, Cemetery G, mastaba 1457 (1 tomb)	1	1	0.02058	Reisner 1942; Reisner and Smith 1955; Giza Archives 2014
Abusir	2	NA	NA	Verner <i>et al.</i> 2002; Bárta <i>et al.</i> 2009

Table 1.3: Egyptian cemeteries found to contain burials with seal impressions and mortuary complexes examined in Chapter 6. These burials could not be analysed in Chapter 3 for a variety of reasons. Abu Rawash tomb M16 did not have sufficient data available on its substructure, the Naqada mastaba lacked a substructure, the Giza grave was too ruined to use in the database, and the enclosures of Peribsen and Khasekhemwy were funerary superstructures without burials.

Egypt & influenced contiguous regions	# of burials		Site size (ha)	Source
	W. sealings	Total		
Abu Rawash cemetery M	1	28	1.5	Kaplony 1963a; Tristant 2008
Naqada mastaba (1 tomb)	1	1	0.15	Kahl <i>et al.</i> 2001
Giza, Dynasty 2 burial (1 tomb)	1	1	NA	Petrie 1907
Abydos, mortuary enclosure of Peribsen	1	1	0.56	Newberry 1909, Plate XXIV,XIII
Abydos, mortuary enclosure of Khasekhemwy	1	1	0.83	Newberry 1909, Plate XXIV,XIII

Table 1.4: Southwestern Asian settlement sites from which seal impression data is examined. Rows highlighted in grey indicate settlements whose analysis is the principal focus of Chapters 4 and 5. Column marked ‘Era’ documents era(s) to which artefacts from each site were dated.

Southwestern Asia	# of sealings examined	Recovery context	Site size (ha)	Era	Source	Chapter examined
Chogha Mish	181	Settlement	17	Uruk	Delougaz and Kantor 1996a,b; Alizadeh 2008	Chapter 4
Tell Brak	96	Settlement	0.95	Early Dynastic IIIb– Akkadian	Felli 2003	Chapter 5
Susa	158	Settlement	18	Uruk	Amiet 1971; Amiet 1972a,b; Le Brun and Vallat 1978	Chapter 6
Uruk	118	Settlement, temple area	250	Uruk	Englund and Boehmer 1994; Boehmer 1999; Englund <i>et al.</i> 2001, 2005	Chapter 6
Jemdet Nasr	81	Settlement	9	Uruk–Jemdet Nasr	Matthews 1993; Matthews 2002	Chapter 6
Habuba Kabira	14	Settlement	NA	Uruk	Rittig 2014	Chapter 6
Jebel Aruda	3	Settlement	NA	Uruk	Van Driel 1982; Van Driel 1983	Chapter 6
Hacinebi	1	Settlement	NA	Uruk	Stein <i>et al.</i> 1996; Pittman 1999	Chapter 6
Godin Tepe	14	Settlement	15	Uruk	Weiss and T. Cuyler Young 1975; Gopnik and Rothman 2011	Chapter 6
Tell Sheikh Hassan	3	Settlement	NA	Uruk	Boese 1995	Chapter 6
Tepe Farukhabad	1	Settlement	NA	Uruk	Wright 1981	Chapter 6
Nineveh	1	Settlement	NA	Uruk	British Museum 2015	Chapter 6
Tepe Sialk	1	Settlement	NA	Uruk	Ghirshman 1938	Chapter 6

Table 1.5: Egyptian settlement sites from which seal impression data is examined. Rows highlighted in grey indicate settlements whose analysis is the principal focus of Chapters 4 and 5. Column marked ‘Era’ documents era(s) to which artefacts from each site were dated.

Egypt & influenced contiguous regions	# of sealings examined	Recovery context	Site size (ha)	Era	Source	Chapter examined
Elephantine	121	Settlement, temple, & administrative areas	5.76	Dynasty 1–2	Pätznick 2005	Chapter 4
Balat	86	Temple	0.1	Dynasty 6	Soukiassian <i>et al.</i> 2002	Chapter 5
Halif Terrace	3	Settlement	8.8	Dynasty 1	Seger <i>et al.</i> 1990; Levy <i>et al.</i> 1997	Chapter 4
'En Besor	65	Administrative buildings	0.16	Dynasty 1	Schulman 1995a,b,c; Quack 1989; van den Brink 1995	Chapter 4
Buto	18	Settlement	NA	Naqada III– Dynasty 2	Von Der Way and Schmidt 1988; Faltings and Köhler 1996; Faltings <i>et al.</i> 2000; Hartung <i>et al.</i> 2012	Chapter 4
Tell el Farkha	13	Settlement	+4	Naqada III– Dynasty 1	Chłodnicki <i>et al.</i> 2002; Chłodnicki 2012; Kołodziejczyk 2012	Chapter 4
Mendes	5	Settlement	NA	Dynasty 1	Redford 2010	Chapter 4
Naqada	2	Settlement	NA	Naqada II–III	DiMaria 2007	Chapter 4
Adaima	7	Settlement	0.08	Naqada III– Dynasty 1	Midant-Reynes <i>et al.</i> 1998	Chapter 4
Tell el-Iswid	12	Settlement	NA	Dynasty 1	Regulski (2014)	Chapter 4
Elkab	6	Temple	30.68	Dynasty 2–3	Regulski 2009a	Chapter 4
Hierakonpolis	253	Settlement	10.5	Dynasty 1–2	Fairservis 1971–1972, 1986; Weeks 1971–1972; Bussmann 2014a,b	Chapter 4

Patterns of administrative use are easier to detect if large samples are scrutinized. Therefore, the dataset focuses preferentially on sites that have yielded relatively large assemblages of seals and seal impressions. Included in the dataset are artefacts from older as well as more recent excavations. Sites were selected taking the following factors into account:

1. Accessibility of the excavated material. Sites with published material available for study were preferentially selected.
2. Size of the excavated body of material. Sites with large quantities of excavated seals and impressions were selected, since larger bodies of evidence may provide more relevant results.

1.9 Chronological framework

This study examines a wide variety of trends in seal and seal impression use and deposition over time. Data from the 4th millennium is compared to 3rd millennium data wherever possible to detect temporal trends. Standard current chronologies and dating have been used to temporally situate the material examined here. By analysing primary data from a variety of sources, this thesis determines what observable deposition patterns reveal about sealing practice in the early complex societies of southwestern Asia and Egypt. These findings are then contextualized in wider discussions.

For southwestern Asian material, the chronology as defined by Brisch (2013, 115–116) was used (see Table 1.6). Sites dated from the Uruk and Jemdet Nasr period circa 4000–2900 BCE, as well as a site dated from the Early Dynastic IIIB—Akkadian period circa 2500–2200 BCE are examined in this thesis.

For Egyptian material, artefacts and sites dated from Naqada II to Dynasty 6 (circa 3600–2153 BCE (Hendrickx 2006, 92; Hornung *et al.* 2006, 491–492)) are examined. The datings provided by Hendrickx (2006, 92) were employed for Naqada II, III, and the beginning of Dynasty 1. From the end of Dynasty 1 to Dynasty 6, the chronology given by Hornung *et al.* (2006, 490–491) was used (see Table 1.7). The accepted beginning date for Naqada IIA is still under debate. Consequently, the Naqada II date range employed here effectively begins at Naqada IIC (Hendrickx 2006, 92; Watrin 2007, 10; Stevenson 2015, 151). Aside from two graves included in the study dated to Naqada IIB–C (see Section 2.3.10), all seal- or seal impression-containing burials and settlement contexts examined here can be dated to Naqada IIC or later. Thus the validity of the present study is not affected by the chronological uncertainty currently surrounding Naqada IIA. The end of Dynasty 6 was considered to coincide with the end of the reign of Pepi II.

A correlation of the current chronology of southwestern Asia with archaeological material demonstrates that cylinder seals and other artefacts of the Uruk culture

Table 1.6: Southwest Asian era datings employed in this thesis and sources employed for dates.

Relative dating period	Absolute dating period	Dating source
Uruk	ca. 4000–3000 BCE	Brisch (2013, 115)
Jemdet Nasr	ca. 3100–2900 BCE	Brisch (2013, 116)
Early Dynastic I–IIIa	ca. 2900–2500 BCE	Brisch (2013, 116)
Early Dynastic IIIb	ca. 2500–2350 BCE	Brisch (2013, 116)
Akkadian period	ca. 2350–2200 BCE	Brisch (2013, 116)

Table 1.7: Egyptian era datings employed in this thesis and sources employed for dates.

Relative dating period	Absolute dating period	Dating source
Naqada IIC–D	ca. 3600–3350 BCE	Hendrickx (2006, 92)
Naqada IIIA1–B	ca. 3350–3150 BCE	Hendrickx (2006, 92)
Dynasty 1	ca. 3150–2730 BCE	Hendrickx (2006, 92) and Hornung <i>et al.</i> (2006, 490)
Dynasty 2	ca. 2730–2593 BCE	Hornung <i>et al.</i> (2006, 490)
Dynasty 3	ca. 2592–2544 BCE	Hornung <i>et al.</i> (2006, 490)
Dynasty 4	ca. 2543–2436 BCE	Hornung <i>et al.</i> (2006, 490)
Dynasty 5	ca. 2435–2306 BCE	Hornung <i>et al.</i> (2006, 491)
Dynasty 6	ca. 2305–2153 BCE	Hornung <i>et al.</i> (2006, 491)

were present in ancient settlements located in the region of modern-day Syria from 3400–3000 BCE (Schwartz 2001, 241–242). This approximately coincides with the period during which Uruk cylinder seal technology was introduced into Egypt, from Naqada IIC–D, circa 3600–3350 BCE (see Section 1.3.3). Consequently, cylinder seal technology may have been introduced to Egypt via an overland route from Syria during this period.

1.10 Overview of Methodology and Thesis Structure

To clarify how seal-based administrative systems may have functioned in 4th and 3rd millennium southwestern Asia and Egypt, this study undertakes a wide-ranging analysis of seals and sealed material from different sites in both regions. Each region is analysed separately to determine local trends in seal use. These trends are then compared to clarify how socio-cultural differences may have affected the implementation of cylinder seals within early complex societies in southwestern Asia

and Egypt. This highlights differences in the development of seal-based administration and by extension complex society in the two regions. Available datasets are unfortunately skewed by preservational and excavational biases. Additionally, early excavations frequently did not record exact find contexts. However, it is still possible to investigate administrative practices in southwestern Asia and Egypt by comparing how seals were employed to seal different objects, and by scrutinizing their depositional context in burials and settlements.

This study compiles databases that contain information on the appearance, motifs, and provenance of sealings from southwestern Asia and Egypt and seals from Egypt. The database is used to perform comparative quantitative examinations of cylinder seal impressions on sealings found in settlement sites from both regions. The deposition patterns of seals versus seal impressions in Egyptian burials is also examined. The find locations of seals were only examined if they were found in Egyptian burials since settlement finds of discarded seals likely do not provide direct evidence for administrative practices and areas of administrative activity. By contrast, seals found in Egyptian tombs do provide evidence for the adoption of the seal in Egypt, as well as cultural practices with regard to the seal. The seals and seal impressions investigated here have previously been examined primarily in terms of the iconography or inscriptions they display. In the present study, seal imagery and inscriptions are considered in conjunction with the types of seals or impressions they are found on.

Chapter 2

Chapter 2 investigates trends in the deposition of seals as grave goods in 4th to 3rd millennium BCE Egypt. Graves are preferred over settlement contexts since they are frequently less disturbed and can be more accurately dated to a particular period in Egyptian history.

This chapter also attempts to determine how the new technology may have been regarded in early Egypt. The general lack of written sources in 4th and 3rd millennium Egypt prevents an examination of how seal-bearing individuals were regarded while living. However, graves can provide an indication of the post-mortem ascribed status of individuals buried with seals.

The analysis in this chapter is performed by graphing seal-containing tomb surface areas with respect to periods in Egyptian history and calculating their mean and 1σ standard deviation. Due to the intraregional scope of the analysis, it is considered infeasible to focus on multiple status-indicating variables.

Tomb size is employed as a general metric for the status of individuals. Only extreme size differences (i.e. 1 m² versus 10 m², and 10 m² versus 1000 m²) are considered as significant. Trends in the use of different materials for seals and different depositional patterns are also examined. As many cemeteries as possible are

examined to assemble a sufficiently large sample of burial sites found to contain tombs with seals for all periods under examination here. Not all of the cemeteries surveyed had data available on all of the burials in the graveyard. When sufficient data is available on all burials in a cemetery, the surface areas of seal-containing tombs and non-seal containing tombs is also plotted with the mean and 1σ standard deviation calculated to compare the size of seal vs non seal-containing tombs. Frequency histograms of seal-containing tombs versus non-seal containing tombs per era and per cemetery are also generated. Further information on the methods employed to analyse data in this chapter can be found in Section 2.2.

Chapter 3

Chapter 3 investigates the deposition patterns of grave goods sealed with seal impressions in 4th and 3rd millennium BCE Egypt. In this chapter, it is possible to observe the implementation of cylinder seal-based administrative systems via the incidence of sealed goods in graves over time throughout the region. Tomb contexts found to contain seal impressions are suitable for this study since they can be more accurately dated and are frequently less disturbed than settlement contexts.

Recorded grave surface areas are analysed to determine if the status of individuals buried with seal impressions is also expressed in the surface area of their tombs. This methodology follows the one employed in Chapter 2 to allow for direct comparison of data. The results of the analysis are then compared to the tomb areas calculated in Chapter 2, to determine whether seal impression-containing burials fall within different size ranges when compared to seal-containing burials. Thus, the present chapter establishes if a different post-mortem status may have been attributed to individuals buried in seal-containing graves versus individuals interred in seal impression-containing tombs.

Tomb size is employed as a general metric for the status of individuals. Thus, only extreme size differences (i.e. 1 m² versus 10 m², and 10 m² versus 1000 m²) are considered as significant. Trends in the use of different seals on seal impressions and different depositional patterns are also examined. As many cemeteries as possible are examined to assemble a sufficiently large sample of burial sites found to contain tombs with seal impressions for all periods under examination here. Southwestern Asian graves are not analysed due to the widespread lack of evidence for burials in this area during the 4th millennium (McMahon and Stone 2013; Philip 2015). Consequently, a diachronic comparison of Egyptian and Southwestern Asian material from the 4th to 3rd millennium cannot be conducted at present.

The analysis in this chapter is performed by graphing seal impression-containing tomb surface areas with respect to periods in Egyptian history and calculating their mean and 1σ standard deviation. The results obtained are also compared with the data from seal-containing burials analysed in Chapter 2 to analyse surface area

trends in the two types of graves. Not all of the cemeteries surveyed had data available on all of the burials in the graveyard. When sufficient data is available on all burials in a cemetery, the surface areas of seal impression-containing tombs and non-seal impression containing tombs is also plotted with the mean and 1σ standard deviation calculated. Frequency histograms of seal impression-containing tombs versus non-impression containing tombs per era and per cemetery are also generated. Further details on the methods employed to analyse data in this chapter can be found in Section 3.2.

Chapter 4

This chapter examines and compares the find locations of different types of cylinder seal impressions on clay (balls, tablets, jar sealings, etc.) in two 4th millennium settlements, one in southwestern Asia and one in Egypt. To date, studies of this type analyse stamp seal-based administrative systems in single settlements from southwestern Asia. The present study partially adopts the approach of these previous analyses to examine and compare cylinder seal-based administrative systems from southwestern Asia and Egypt.

The southwestern Asian site of Chogha Mish and the Egyptian site of Elephantine are examined since these sites were relatively well recorded and contained large quantities of sealed material⁸. Both settlements were found to contain seal impressions in probable discard contexts that had been disturbed on occasion. These find deposition patterns are typical of settlements in both regions. By examining seal impression find locations, this chapter analyses evidence for activity areas where sealed objects were stored and unsealed. Multiple sealings bearing the impression of the same seal are also analysed, since they may indicate the presence of important ‘sealers’ and administrative hierarchies at the sites. Maps of the excavation sites are used to chart approximate find locations of sealed artefacts.

The sites scrutinized here belong to settlement types whose seal impression deposition patterns have yet to be thoroughly examined. Chogha Mish was located in the core area of the Uruk culture in the 4th millennium. The functioning of seal-based administration in settlements employing Uruk-style seals has not been thoroughly examined to date (Matthews 1993). The analysis of Chogha Mish sealings conducted in the present chapter therefore provides an initial overview of how Uruk-style seal-based administration may have functioned in settlements. Also, no thorough analysis of seal impression discard patterns within a settlement from 4th millennium Egypt has been conducted to date. The analysis of material from Elephantine consequently provides an initial overview of early seal-based administration in Egyptian settlements during this period.

⁸Some early 3rd millennium evidence was also included in the examination of Elephantine, due to the difficulty in distinguishing sealed material from late 4th–early 3rd millennium Egypt.

This case study of two sites also provides a template for future studies examining and comparing impression discard patterns in both regions. To date, a study of this type has not been conducted on sealings from southwestern Asia and Egypt. Consequently, the present chapter provides a baseline of results that can be proven or disproven in future comparative examinations.

Chapter 5

This chapter examines and compares the find locations of different types of seal impressions on clay (balls, tablets, jar sealings, etc.) in two 3rd millennium settlements, one in southwestern Asia and one in Egypt. The findings are then compared to results from Chapter 4, in an attempt to examine how seal-based administration in both regions may have changed over time.

The southwestern Asian site of Tell Brak and the Egyptian site of Balat are examined since these sites were relatively well recorded and contained large quantities of sealed material. Both settlements were found to contain seal impressions in probable discard contexts that had been disturbed on occasion. These find deposition patterns are typical of settlements in both regions. By examining seal impression find locations, this chapter analyses evidence for activity areas where sealed objects were stored and unsealed. Multiple sealings bearing the impression of the same seal are also analysed, since they may indicate the presence of important ‘sealers’ and administrative hierarchies at the sites. This chapter also takes into account any changes in seal-based administrative practices that can be observed in comparison to the 4th millennium sites examined in the previous chapter. Maps of the excavation sites are used to chart approximate find locations of sealed artefacts.

The sites scrutinized here belong to settlement types whose seal impression deposition patterns have yet to be thoroughly examined. Tell Brak was located in modern Syria, on the periphery of the Mesopotamian heartland in southern Iraq–Iran. The functioning of seal-based administration in settlements outlying the central Mesopotamian region has not been thoroughly examined to date (Charvát 2005). The analysis of Tell Brak sealings conducted in the present chapter therefore provides an initial overview of how seal-based administration may have functioned in settlements outlying the central Mesopotamian region. Also, no thorough analysis of seal impression discard patterns within a settlement from 3rd millennium Egypt has been conducted to date. The analysis of material from Balat consequently provides an initial overview of early seal-based administration in Egyptian settlements during this period.

This case study of two sites also provides a template for future studies examining and comparing impression discard patterns in both regions. To date, a study of this type has not been conducted on sealings from southwestern Asia and Egypt.

Consequently, the present chapter provides a baseline of results that can be proven or disproven in future comparative examinations.

Chapter 6

Counter-sealing, or the practice of sealing a clay administrative artefact multiple times with different seals, is considered a sign of administrative complexity. In this chapter, known counter-sealed artefacts from southwestern Asia are compared to counter-sealed objects from Egypt to determine what type of administrative artefacts tended to be counter-sealed in both cultures in the 4th millennium BCE. The number of different countersealed objects from different sites are tabulated or graphed to determine use trends over space and time. Thus, this chapter examines evidence for the existence of more complex seal-based administrative practices and how they may have functioned in both regions.

Chapter 7

This chapter synthesizes and contextualizes the results obtained in all previous chapters. The differences and similarities between cylinder-seal based administrative systems within southwestern Asia and within Egypt in the 4th to 3rd millennium BCE are summarized. Evidence from previous studies of seals and seal impressions from these regions in the same era is summarized to determine if previous theories on administrative systems in both regions are proven or disproven in light of the evidence uncovered.

Chapter 8

In the final chapter, a conclusion is drawn regarding cylinder seal-based administrative systems that may have existed in both regions in the 4th to 3rd millennium BCE, and how the structuring of these systems may have developed.

Chapter 2

Trends in Egyptian burials containing seals

2.1 Introduction

The introduction of the seal into Egypt prior to the appearance of the first written symbols (Hartung 1998) indicates that cylinder seals and their impressions were likely one of the first systems of reproducible symbolic communication in Egypt. From the time they were first used to seal goods circa 6000 BCE (Wengrow 2008, 14), seals have been in continuous use in various forms for the purpose of identifying suppliers and producers of goods and guaranteeing the integrity of sealed contents.

Cylinder seals were associated with concurrently emerging complex societies in southwestern Asia, and were introduced into Egypt (Guyot 2004, 86) during the Naqada II period (circa 3600–3350 BCE (Hendrickx 2006, 92)), at a time when the lavishly appointed burials of local elites were used to highlight their status (Wengrow 2006, 40, 166). Stamp seals were also introduced to Egypt during this period, though little evidence exists for them until Dynasty 4. Native seal carving developed relatively rapidly within the same period in Egypt and seals were employed for administrative purposes, as shown by the earliest native seal impressions from the Naqada II Cemetery U at Abydos (Hartung 1998). Given the likely elite status of individuals buried in Cemetery U from this date forward, it is possible that seals and seal impressions were restricted burial goods. The status of individuals buried with cylinder and stamp seals versus seal-impressed goods from Naqada II onward has not been thoroughly investigated to date.

Large elite burials were likely used to indicate status during the period when complex civilization was developing in Egypt (Morris 2007b, 188). Consequently, this chapter investigates whether seals tended to be found in large elite burials. This will indicate whether the possession of seals as a funerary artefact may have been restricted to individuals of a particular status at the time the technology was first introduced. The tendency to build large elite burials culminated with the creation of

royal pyramids and elite mastabas in the Old Kingdom during Dynasty 3–6 (circa 2592–2153 BCE Hornung *et al.* 2006, 491–492). During this period, stamp seals also came into more widespread use as a mortuary artefact and administrative tool in settlement sites (Pantalacci 2013, 40). Consequently, Old Kingdom graves found to contain stamp seals are included in the present tomb analysis. The following analysis also seeks to examine how seals, were perceived by the general populace. By examining how commonly seals occurred in burials and trends in the types of seals included in burials, the cultural significance of seals as a grave good can be investigated.

Previous studies of early Egyptian burials tend to focus on one cemetery site at a time. Thus, graves found to contain seals have been analysed only within a local context and a limited time frame. To date, no study has performed an in-depth analysis of the depositional trends of seals in burials throughout Egyptian-influenced territory over a larger span of time. Consequently, this chapter undertakes a statistical examination of the areas of 4th and 3rd millennium BCE Egyptian and Nubian tombs containing seals.

2.2 Methodology

In this study, the post-mortem status of buried individuals is determined primarily via grave area, the most consistently available burial datum, as well as secondary evidence from previous studies. The analysis scrutinizes the variation in area of tombs found to contain seals over four periods in Egyptian prehistory and early history: Naqada II (circa 3600–3350 BCE (Hendrickx 2006, 92)), Naqada III (circa 3350–3150 BCE (Hendrickx 2006, 92)), Dynasty 1–2 (circa 3150–2593 BCE (Hendrickx 2006, 92; Hornung *et al.* 2006, 491)) and Dynasty 4–6 (circa 2543–2153 BCE (Hornung *et al.* 2006, 491–492)) No seal-containing burials dated to Dynasty 3 appear to have been published to date. Thus, Dynasty 3 material cannot be included in the evidence examined here⁹. Nubian and Egyptian burial practices are known to have been similar in the 4th to early 3rd millennium BCE (Wengrow 2006, 173). Consequently, burials found to contain seals in Nubia from this era were also included in the analysis database.

In Dynasty 1–2, subsidiary graves were placed around royal tombs (see Figure A.4) and high elite mastaba burials (see Figure A.5). These tombs could be entirely subterranean (see Figure A.6) or have small superstructures (see Figure A.7). Tombs of other important individuals were also occasionally surrounded by subsidiary burials (Morris 2007a, 17, 24). These graves are frequently characterized as retainer

⁹Funerary pottery (Petrie 1953, 27), stone vessel types (Aston 1994, 99, 100, 104, 127, 129–132, 170), and the appearance of non-royal burials (Dodson and Ikram 2008, 140) are all similar during Dynasty 2–3. Thus, Dynasty 3 burials with seals may have already been excavated, and simply mis-dated to Dynasty 2.

sacrifices of individuals who accompanied the ruler or high-ranking individual in death (Morris 2007a, 17). According to current scholarship, the use of subsidiary burials was restricted to Dynasty 1 (Morris 2014, 78). However, at least one possible subsidiary burial was found in a chamber directly proximate to Kasekhemwy's central burial chamber in his royal Dynasty 2 Abydos tomb (Petrie 1902, 13, Plate LXIII; Morris 2007a, 17, Footnote 2; Dreyer 2013). Also, mastaba 3035 at Saqqara appears to have several subsidiary burials around its perimeter (Martin 1974, Fig. 7, Plate VI). The burial was originally dated to Dynasty 3 (Martin 1974, 23), but this thesis provisionally re-dates the mastaba to Dynasty 2 given the presence of subsidiary burials. Thus, it appears the practice of constructing such burials may not have disappeared until sometime in Dynasty 2¹⁰.

The small surface area of these subsidiary tombs was likely artificially standardized in comparison to the area of the main tomb (see Section 2.3.2.3), and probably enhanced the prestige of the owner of the main burial. Few of these subsidiary burials have been found to contain seals or seal impressions. Subsidiary graves are included in the present analysis in an attempt to determine whether any trends can be detected in the deposition patterns of seals in subsidiary graves.

2.2.1 The use of tomb dimensions as a post-mortem status marker

Grave area and grave goods have been used as variables in analyses of Egyptian cemeteries (Castillos 1982; Bard 1988; Ellis 1992; Ellis 1996; Delrue 2001; Köhler 2008b; Stevenson 2009b). In Seidlmayer's (1988, 28–30) study of the cemeteries of Armant (149 graves), Tura (582 graves), and Tarkhan (1073 graves), he examined the quantity of ceramic vessels per grave as an indicator of grave 'richness'. However, he concluded that the range of data obtained was insignificant (1988, 45–46). Consequently, although he never examined grave sizes in his analysis, he recommended that grave size data should be preferred over data on the quantity of ceramic vessels by future researchers. Bard's cluster analysis of 151 graves at Armant in 1994 concluded that graves more richly appointed with higher quantities of ceramic vessels tended to correlate with larger grave areas throughout Naqada I–III, the periods during which the cemetery was in use (Bard 1994, 68). The study of Nag el-Deir cemetery 7000 (305 graves sampled) by Delrue (2001, 24, 42–43) demonstrated that grave area appeared to increase proportionally to the quantity of 'wealthy' grave goods found in the tomb. Delrue's wealth index for the graves was based on a system devised by Hendrickx and van Rossum (1994, 217–218). By graphing dated tombs uncovered in the Operation 4 excavation at Helwan, Köhler (2008b) noted significant size distinctions between large tombs and smaller graves in the subsets of burials dated

¹⁰A re-examination of archival material pertaining to mastaba 3035, and/or a re-excavation of this burial, is necessary to fully determine the era to which this tomb should be assigned.

to Naqada III, Dynasty 1, and Dynasty 2. Köhler concluded that such variations in burial size likely demarcated the social status of deceased individuals in these tombs. According to the correlation analysis conducted by Stevenson (2009b, 8, 193–194), grave area and the number of different types of artefacts deposited in the grave (used to measure grave ‘wealth’ in her study) do not appear to correlate at the cemetery site of Gerzeh (288 graves). Instead, she proposes that grave area and grave ‘wealth’ may have been indicators of different types of heterarchical status.

Given the results of previous studies, it appears grave area is one clear indicator of ascribed post-mortem status in cemeteries, regardless of the technique used to examine the cemeteries. Thus, this chapter examines whether burials found to contain seals consistently fall into a certain area range. This would suggest individuals buried with these items may have been ascribed a particular status in death.

The individuals buried with seals were not necessarily of higher or lower social status than those interred without seals. Instead, the presence of a seal in a grave may be an indication that the deceased was being accorded a specific post-mortem status by mourners (Stevenson 2009b, 160). The area of the tomb individuals were buried in may provide further evidence to the ascribed social status of the dead. Larger graves likely required more effort to construct (Richards 2005, 109). Thus, it is possible that a larger grave was meant to display the status of the tomb owner and/or the tomb owner’s family when the deceased was deposited in the tomb.

Burial size is used in this study as an estimate of the perceived post-mortem status of an individual in 4th to 3rd millennium BCE Egypt and Nubia. Extremely large tombs were built by the emergent elites of the stratified complex society evolving in the region during this period, likely as a means of reaffirming the status of the deceased (Pearson 1999, 87). Thus, the presence or absence of seals or seal impressions in such outstandingly large burials may provide indications whether seals or sealed artefacts were considered elite funerary goods. Possible social perception of seals and sealed goods can thus also be inferred from the presence or absence of seals or sealings in elite and non-elite burials.

Approaches based on the energy expended in constructing graves can likely only provide information on particular aspects of past cultural burial practices (see Pearson (1999, 31) re: Tainter (1975)). Consequently, object biographies (Woodward 2002, 1040) and contextual analyses of the find locations of seals in burials are also employed to analyse the data wherever feasible, to provide a more balanced outlook on the possible meaning of seals in graves.

Almost all of the studies previously cited only scrutinized the sizes of graves in one cemetery. By contrast, the present study examines the areas of a total of 1687 graves, both seal and non-seal-containing, from 15 well-documented cemeteries throughout Egypt and Nubia (see Table A.6). The areas of a further 43 seal-containing graves from 16 other cemeteries are also included when undertaking analyses of only seal-

containing burials (see Table A.1). Furthermore, Chapter 3 examines a total of 1123 graves, both seal impression-containing and non-impression-containing, from 16 well-documented cemeteries throughout Egypt and Nubia (see Table A.15). The surface areas of a further 43 seal impression-containing graves from 20 other cemeteries are also included in the analysis in Chapter 3 (see Table A.10). No previous study has specifically analysed grave size in relation to the deposition of seals or seal impressions as a grave good. Thus, this study is one of the most extensive analyses of seals and seal impressions in early Egyptian tombs conducted to date.

In this analysis, different ‘status’ is not assigned to individuals depending on whether they had a tomb larger or smaller than a given area (e.g. 5 m²). Instead, radical differences in burial size, such as a tomb found to contain seals or sealings measuring 1000 m² vs a tomb measuring 5 m², are noted. The full continuum of tomb size ranges is examined wherever possible, and the place of seal- or impression-containing burials within that continuum is scrutinized.

2.2.2 Data gathering approach

The periods under consideration in the current study extend from Naqada II to Dynasty 6 (circa 3600–2153 BCE (Hendrickx 2006, 92; Hornung *et al.* 2006, 491–492). Thus the present database spans from Naqada II, when seals were first introduced in Egypt, to the Old Kingdom. It includes four periods: Naqada II, Naqada III, the Early Dynastic (Dynasty 1–2) and the Old Kingdom (Dynasty 4–6). During the Early Dynastic and Old Kingdom, the use of seals was probably integrated into the functioning of the newly formed Egyptian state as well as more locally-centred administration (Bussmann 2011, 18; Regulski 2011, 26).

Cemeteries tend to contain graves dated to a range of different periods. In earlier periods, comparatively few burials in a given cemetery contain seals (see Table A.1). Also, seal-containing graves found in Predynastic and Early Dynastic graveyards are generally dated to only one period out of the range covered by each cemetery. For example, a Naqada II seal burial can be found in a cemetery with graves dated from Naqada I–III, or a Dynasty 1 seal burial can be found in a cemetery dated from Dynasty 1–2. This trend changes in the Old Kingdom. During this period, seals can be found in burials dated to different Dynasties within a single necropolis. For example, graves dated from Dynasties 4–6 at Qaw were found to contain seals. As many cemeteries as possible were investigated to assemble a sufficiently large sample of burial sites found to contain tombs with seals for all four periods under examination.

The seals excavated from burials were presumed to have been found in the tomb where they were originally deposited as grave goods. If evidence to the contrary was present or recording of the burial was insufficient to determine context, the grave was not included in the database. At times, seals may have been destroyed by

taphonomic processes, scattered outside the tomb, or removed by ancient or modern looters. However, this factor can not be accounted for, and remains a caveat to any study of this type. The breadth of the current analysis helps to offset this factor.

Excavators working in the 19th and early 20th centuries may have missed some seals in burials due to the use of less well-developed excavation methodologies. However, since many of the cemeteries examined here were excavated during this period, the error margin for such incidences is likely evenly distributed across most sites, making intra-site comparison possible. The few more recently excavated cemeteries of Qustul L, Qustul W, and Gezira Dabarosa 6-G-18 each contained only one or two cylinder seals, similar to the find rate from Naqada III cemeteries excavated by earlier teams. Similarly, comparing the earlier excavations at Old Kingdom cemeteries of the Qaw region¹¹ to the larger cemeteries from Balat¹² shows that more graves with seals were excavated in the older pre-WWII Qaw region expeditions (see Table A.1). Thus, the depositional trends examined here likely reflect actual depositional trends in graves during 4th–3rd millennium Egypt and Nubia.

Seals were inscribed with pictures and abstract designs in Naqada II–III (Hartung 1998, 2001). Hieroglyphs were added to the repertoire of seal motifs from Dynasty 1–2 onward (Regulski 2010a, 36). Individuals would probably have been capable of recognising and distinguishing between different seal patterns found on seals or on sealed objects (Smith 2001, 193). Seals may have served as distinct identifiers of the person they were buried with, or may have been associated with the individuals who deposited the artefacts in the burial (Reisner 1908, 122).

To determine the potential social role of tomb-owners that were buried with seals, the total area of seal-containing tomb substructures are calculated and analysed by time period. Wherever possible, the areas of all other tombs in cemeteries with seal-containing burials are also calculated and graphed, to compare the possible status of seal- and non-seal-containing burials in cemeteries. A tomb typically consists of either a single chamber, or a central burial chamber surrounded by attached or detached subsidiary chambers used for storing funerary goods (see Figures A.4–A.14). The total area of each burial was calculated to include all of these chambers. The larger area occupied by multiple storage chambers and a burial chamber is evidence of a greater expenditure of effort on the part of those constructing the burial, and is likely indicative of the status of the deceased (Seidlmayer 1988, 45–46; Stevenson 2009b, 186).

Graves containing seals whose dimensions were not measured were excluded from this study, as well as tombs where the seals may have been intrusive¹³. It is frequently

¹¹Qaw, el-Mustagidda, and Matmar.

¹²The graveyard of Ima-Pepy/Ima-Meryre and the graveyard outside the Khentika mastaba.

¹³Not included in the seal database were:

- Naqada grave T29 (Petrie Museum 1999), grave measurements not given.
- The ivory cylinder from an un-described grave at El-Mahasna (Ayrton and Loat 1911, 34), grave location and measurements not given.

difficult to date smaller tombs to either Dynasty 1 or 2. Since these two periods are commonly referred to as the ‘Early Dynastic’, they were grouped together in the present analysis. The area of tombs was recorded in all excavation reports scrutinized, but the depth was not always noted. Consequently, area measurements, not volume measurements, were chosen for use in this analysis.

The analysis concentrates primarily on the area of tomb substructures found to contain seals. Wherever possible, measurements of all non-seal-containing tombs from a single cemetery are compared to the area of the seal-containing tomb(s) from the same cemetery. The non-seal-containing tombs are only excluded from the analysis if they were animal burials, or if no measurements or diagrams for the graves were available. The dimensions of entryways, such as stairs for the Early Dynastic graves (see Figure A.8) and entrance shafts for Old Kingdom shaft tombs (see Figure A.9), are excluded to increase inter-period comparability of data, since earlier burials had no stairs. On occasion, Old Kingdom tombs contained only a shaft and no separate burial chamber. In these cases, the shaft dimensions were used as tomb dimensions in the database. Averages of grave lengths and widths were used to calculate the areas of burials, since they often have uneven sides. A few Old Kingdom tombs were found to contain more than one individual that was buried with a seal or seals. In these cases, the area of the burial was divided by the number of interments it was found to contain, and the resulting area measurements were considered as separate ‘graves’ in statistical examinations. If some interments in these group burials were not entombed with seals, the ‘grave’ area assigned to them was excluded from the database of seal-containing burials.

Measurements of tombs were frequently derived from scale diagrams of burials. If the graves were simple pits (see Figure A.10), the diagrams were measured from the outer edges of the burial. If the graves were lined with bricks (see Figure A.11), the outer edges of substructures were measured. All tomb measurements were converted into metres for the purposes of this study.

Early excavators often did not publish drawings of all burials. Thus, it was occasionally necessary to rely on the published tomb measurements provided in early

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- Abusir el Meleq grave 1035 Möller and Scharff (1926, 58, 152–153), grave measurements not given.
 - Djer Subsidiary Graves 51 and 53, both contained fragment of the same wooden cylinder (Amélineau 1904, 96, 98, Plate XXV no. 2), making it impossible to judge in which tomb it was originally deposited.
 - One seal impression found in Djer valley subsidiary tomb 643 (Petrie 1925, Plate III, no. 9), may have originated from the nearby funerary enclosures of Peribsen and Khasekhemwy, since examples of it were also found in these locations Kaplony (1963b, Tafel 96, 388). The seal impressions found in the valley or funerary enclosure subsidiary graves of Djet (tomb 341, 437 (Petrie 1925, Plate XXI)) resemble this impression, and may therefore be intrusive as well.
 - Wooden seal found in the royal burial chamber of Djer at Abydos (Dreyer *et al.* 2011, 60, 63) was not included since it was probably an intrusive artefact.

excavation reports to compile the necessary data. These excavators frequently did not specify whether measurements were taken from the inner or the outer edges of substructures. Since no other data on the dimensions of these tombs was available, the measurements from these publications were integrated into the database as published. If the dimensions of the pit or brick substructure lining the pit were given for the top and bottom of the grave, the measurements for the top of the grave were preferred. If a publication stated that a grave was disturbed or undisturbed by tomb robbers, graves were recorded as ‘disturbed’ or ‘undisturbed’/‘intact’.

Nubian graves were arranged within the Egyptian chronology by comparing their chronological assignment with the tables given by Takamiya (2004, Table 3) and Gatto (2006, 67). In the present analysis, the reign of Narmer was used to separate the Naqada III period from Dynasty 1 (Hendrickx 2006, 92; Hornung *et al.* 2006, 491). All tombs found to postdate the reign of Narmer were considered part of the Early Dynastic dataset. The grave of Narmer was therefore considered to be part of the Naqada III data.

2.2.3 Data processing

The size measurements and age of each seal-containing grave are determined from the most accurate and up-to-date information available. Wherever possible, the area of all non-seal containing tombs in cemeteries is calculated, and the mean and 1σ standard deviation of these burials is derived. These statistics are then compared to the area of seal-containing tombs in these cemeteries. Frequency histograms are also generated based on this information. Subsequently, seal-containing tomb surface areas are graphed with respect to periods in Egyptian history and their mean and 1σ standard deviation is calculated to determine whether trends can be seen in the size of seal-containing burials over time.

2.3 Egyptian burials containing seals

In total, 109 seal-containing tombs were included in the present analysis. The tombs contained cylinder and/or stamp seals, and were dated to Naqada II, III, Dynasty 1, 2, 4, 5, and 6. A summary of the data can be found in Tables A.2–A.5.

The data from the Naqada II period, circa 3600–3350 BCE (Hendrickx 2006, 92), includes two tombs, Nag el-Deir N7501 and Haraga Cemetery H, grave 470, that were found to contain stamp seals. These tombs provide evidence that the concept of stamp seals was imported to Egypt in addition to the concept of cylinder seals¹⁴. A Naqada II string sealing from Abydos tomb U-134 also bore impressions

¹⁴It is not possible at this point in time to determine whether these early stamp seals were direct imports or imitations of imports. The Nag el-Deir stamp seal is considered to be an import item (Podzorski 1988, 263). However, no analysis has been conducted to determine the origin of

of a stamp seal (Hartung 1998, 195), demonstrating that ancient Egyptians were aware of the uses of stamp seals and apparently employed them from the time of the first introduction of sealing technology into Egypt. Thus, the widespread use of stamp seals from the Old Kingdom onward in Egypt (Regulski 2012, xvi) may have involved the popularization of a technology that was already known to the Egyptians from much earlier.

In Naqada II, Middle and Upper Egyptian cemeteries appear to have contained burials with seals deposited in them as a grave good (See Figure A.15, A.16, and A.17). Haraga (Engelbach 1923, 14) and Matmar 3000–3200 (Brunton 1948, 2) in Middle Egypt both contained one seal-containing burial each. The Upper Egyptian cemeteries of Nag el-Deir 7000 (Lythgoe and Dunham 1965, 179–180, 317–318), Deir el-Ballas (Podzorski 1988, 265), and Naqada (Baumgartel 1970, LX) were also found to contain burials with seals, and data from the seal-containing burials in these cemeteries is analysed in this chapter.

Known Naqada III seal-containing graves are only found in areas *outside* of Upper Egypt. One seal (Köhler 1999, 54) was excavated in the Lower Egyptian cemetery of Helwan (see Figure A.15). The majority of currently known seal-containing burials dated to Naqada III are located in Nubia (see Figure A.18). Aside from the insufficiently published cemetery of Saras West (Mills and Nordström 1966, 8–9), seals were also found in the cemeteries of Faras 3 (Griffith 1921, 12–13, Plate II; Griffith Institute 2016), Qustul W (Williams 1989, 46–47) and Gezira Dabarosa 6-G-18 (Nordström 2014, 38–50), as well as the cemetery of Qustul L (Williams 1986, 304, 305–313). Artefactual evidence indicates that Gezira Dabarosa could be dated to Dynasty 1–2 (see Table A.1). However, the appearance of the seal found in this cemetery (see Table A.3) corresponds more closely to other Predynastic seals than Early Dynastic seals. Consequently, the cemetery and seal-containing tomb were categorized as Naqada III in this study.

In Dynasty 1–2, seal-containing burials appear to be more evenly geographically distributed. In Lower Egypt, seals were found in a shaft tomb at Abusir and a plain rectangular tomb at Helwan. In Upper Egypt, seals were found in a brick-lined tomb with a stairway at el Amra. Meanwhile, Nag el-Deir 1500 contained five brick-lined tombs with seals as a burial good, while at Nag el-Deir 3000 one small infant burial in a clay coffin was found to have a seal deposited in a pottery vessel beside the coffin. A round pit grave at Cemetery 215 near Abu Simbel was also found to contain a seal. Additionally, a few brick-lined subsidiary burials at both Lower Egyptian Saqqara and the Upper Egyptian royal burials at Abydos were also found to contain seals and are therefore included in this study (see Table A.4 for more information on Dynasty 1–2 burials).

the stone used to make the seal or the techniques employed to fabricate it. The Haraga seal has been misplaced (Payne 1993, 203), and no physical analysis of the object is currently possible.

In the Old Kingdom, seals appear to have been primarily excavated from Middle and Upper Egyptian graves (see Figure A.16 and A.17). Seals were found in shaft graves (see Figure A.9) that occasionally had a side chamber constructed for the burial at the cemeteries of Matmar, el-Mustagidda, and Qaw in Middle Egypt, and Nag el-Deir 500–900 in Upper Egypt. Shaft graves of a similar type were found to contain seals at Balat. However, some Old Kingdom seal-containing burials had stairways leading into the burial chamber instead of a shaft. Others were found in secondary side-chambers dug in a corridor leading to a primary interment. Two shafts in different complexes of grouped burial shafts with enclosures were found to contain seals at Saqqara (Jéquier 1929, 2). Finally, a pot burial from Elkab is also included in the present database (see Figure A.12). The graves from Matmar, Mustagidda, and Qaw examined in this chapter were assigned Old Kingdom dates by Seidlmayer (1990, 135–139, 395). Burials from these cemeteries that were not assigned a date within his classification system are not included here.

2.3.1 Incidence of seals in tombs

Few Pre- and Early Dynastic tombs have been found to contain seals. Table A.1 demonstrates that prior to Dynasty 1, no more than two burials per cemetery contained a seal as a grave good. Though more tombs dated to the subsequent Old Kingdom contained seals, the number of seal-containing graves per cemetery remained low. Many of the cemeteries analysed here were used for multiple periods. However, until Dynasty 4–6, seals were generally found in burials dated to only one of these periods in a given cemetery (see Table A.1). Thus, seals were apparently not consistently used as grave artefacts in cemeteries from Naqada II to Dynasty 6.

2.3.2 Area of tombs containing seals: comparison of tomb area of seal- and non-seal-containing tombs

In this section, the area of tombs found to contain seals is compared to tombs that did not contain seals from the same cemeteries. Graveyards from throughout Egyptian-influenced territory are examined. The graves are classified according to the period each cemetery is dated to. This will help to determine the post-mortem status of individuals buried with seals in different cemeteries from different eras. All cemeteries where area data could be obtained for the totality of burials are analysed here. Some cemeteries were not sufficiently well-recorded and could not be included in the analysis. These cemeteries are individually identified in the relevant sections below. An intraregional and chronological comparison of this type has not been previously attempted.

Comparing the area of seal-containing burials to all other burials in the same cemetery provides an indication of the status an individual interred with a seal

held within a local community. Examining the area of graves across cemeteries also helps to delineate whether the size range of burials within different graveyards was standardized to any degree.

Cemeteries were grouped according to their assigned chronological dates. Ideally, only the tombs in a necropolis that are dated to the same period as the seal-containing burials would be analysed. However, graves in most graveyards examined here have not been individually dated according to currently accepted standards. Thus, it was frequently not possible to filter grave data from cemeteries according to the date of each tomb. Graveyards were therefore classified based on date ranges assigned to them by previous research (see Table A.1). For instance, Matmar was dated from Naqada I–II. Nag el-Deir 7000 has been studied more actively than other cemeteries. Consequently, many of the graves had been dated specifically to Naqada I, II, or III by Friedman (1981). Since the seal-containing graves from Nag el-Deir were dated to Naqada II, burials that were dated to Naqada I or III were excluded from the present dataset.

Figures A.19, A.23, A.28, and A.34 group the analysed cemeteries according to the eras they are dated to. Within each figure, the cemeteries of a particular dating range are listed in alphabetical order, with the exception of the subsidiary burial cemeteries from Dynasty 1. These graveyards are separated into their own alphabetically organized category on the right hand side of Figure A.28. A logarithmic scale is used in all of these figures to clearly display the different tomb areas recorded in each cemetery. The mean and 1σ standard deviation is calculated for the areas of burials in each necropolis.

The graves shown in Figure A.19 were created during Naqada I–II. All seal-containing burials from these cemeteries date to Naqada II, when seals appear to have first been introduced into Egypt from southwestern Asia (Guyot 2004). Cemeteries that were actively in use circa Naqada III are shown in Figure A.23. The seal-containing graves from these cemeteries were all dated to Naqada III (see Table A.1). Cemeteries created and used during Dynasty 1 and 2 are shown in Figure A.28. Graveyards used by the inhabitants of a region and subsidiary burials are included, in order to compare the grave area distribution for both types of cemeteries. Finally, cemeteries in use from Dynasty 4–6 are shown in Figure A.34.

2.3.2.1 Naqada I–II cemeteries

Figure A.19 shows grave area data from seal and non-seal-containing graves at Haraga and Matmar 3000–3200 in Middle Egypt, and Nag el-Deir 7000 in Upper Egypt (see Figures A.15, A.16, and A.17). Seal and non-seal-containing graves from Naqada and Deir el-Ballas in Upper Egypt (see Figure A.17) could not be included in the data analysed in this section since the majority of non-seal-containing graves in these cemeteries have not been dated using the latest standards. Consequently, the data

from these cemeteries could not be sorted to eliminate graves assigned to Naqada III and later periods.

Haraga Cemetery H was a small cemetery, but only 16 out of 26 graves had recorded and published dimensions (Engelbach 1923, Plate LV). Matmar 3000–3200 was somewhat larger, but grave dimensions were only noted for 48 out of 74 burials (Brunton 1948, VIII–X). Nag el-Deir 7000 (see Figure A.40) was published in its entirety and therefore provided a much larger quantity of data. The grave area data for Nag el-Deir was derived from Savage (1995). Extensions of graves to insert secondary burials were counted as separate graves by Savage (1995). Of these three graveyards, only Nag el-Deir 7000 has been re-analysed in recent publications (Friedman 1981; Savage 1995; Delrue 2001).

The average grave area within all three cemeteries is relatively small, never exceeding 2 m² (see Table A.6). The smaller 1 σ standard deviation of Haraga and Matmar could theoretically be an indicator that more standardized grave dimensions were employed in these cemeteries. From the original publications, it appears that all three cemeteries contained both simple graves without any distinguishing features, as well as smaller and larger graves that were found to contain more valuable artefacts such as stone vessels or gemstones. Thus, these cemeteries were likely ‘mixed’ cemeteries that contained burials of individuals of both higher and lower status.

Figure A.19 shows that the grave found to contain a seal in Haraga was much smaller than most recorded graves in the cemetery, falling outside the 1 σ standard deviation. In contrast, the seal-containing Matmar burial, with an area of 1.1 m², and the smaller seal-containing grave at Nag el-Deir, at 0.6 m², fall within the 1 σ limits. The 5.6 m² seal-containing Nag el-Deir burial is abnormally large in comparison to most other graves, as can be seen in Figure A.19. Based on this evidence, it appears that seals were not definitively associated with individuals buried in tombs within a particular size (area) range during the Naqada II period. Graves with small, mid-sized, and large areas could all be found to contain seals. Thus, the Egyptian populace of this period does not appear to have perceived seals as burial goods that were exclusively reserved for graves of individuals of a certain status.

This is corroborated by graphing the surface areas of graves in Haraga, Matmar, and Nag el-Deir 7000 in histograms. At Haraga, the seal containing grave falls within the smallest size range of burials at the site: 0.5–0.75 m² (see Figure A.20). In Matmar, the largest peak formed by the grave data consists of burials between 1 and 1.3 m² (see Figure A.21). The seal-containing burial found in this cemetery also falls within this category. Thus, though slightly larger than the Haraga grave, the Matmar burial is of average size when compared to other burials in the same cemetery. Finally, in Nag el-Deir 7000, one seal-containing burial (N7501) again falls within the largest peak of the histogram, containing graves between 0.5–0.75 m² (see Figure A.22). The other seal-containing grave, N7304, is an exceptional outlier since

it is the only grave measuring between 5.5–5.75 m². It is also exceptional as only two other graves in the cemetery were found to exceed N7304 in size.

2.3.2.2 Naqada III cemeteries

The grave areas of non-seal-containing tombs and seal-containing tombs in the Nubian cemeteries of Faras 3, Gezira Dabarosa 6-G-18, Qustul L and Qustul W (see Figure A.18) are graphed in Figure A.23. The Deltaic site of Helwan (see Figure A.15), and the Nubian sites of Saras West (see Figure A.18) have never been properly published. Thus, data from these sites could not be included on the graph. To date, none of these sites have been scrutinized in studies after their original publication.

All four Nubian cemeteries were relatively small. Faras 3 was the largest, with a total of 117 graves, of which 29 were excluded since their dimensions were not recorded. Gezira Dabarosa 6-G-18 contained 20 graves. Three shafts with no material in context were excluded from the present examination. Cemetery L contained 25 graves. Bovine burials and one ‘cache’ were also located in this graveyard and are not included in the examination (see Figure A.41). Cemetery W (incorporating cemeteries W1–W2, as shown in Figures A.42 and A.43) contained 31 graves dated to early periods. All four seal-containing graves from each cemetery have been dated to Naqada III according to the chronology given by Gatto (2006, 67).

Some cylinder seals may have entered Nubian burials as a result of the trade of elite object types from Egypt (Wengrow 2006, 166–170). Thus, seals may have been perceived as elite objects in Nubia during Naqada III. This hypothesis is scrutinized below by examining the find context of Nubian cylinder seals.

At the cemetery of Faras 3, the seal-containing grave 4 was 1.5 m², and grave 17 was 0.9 m². Thus, these burials were of a similar size to most seal-containing graves dated to Naqada II. The average tomb area at the graveyard was approximately 1 m², similar to the Naqada I–II cemetery at Nag el-Deir 7000 (see Table A.6). Thus, this graveyard was likely a mixed cemetery, much like the previously examined Naqada I–II cemeteries. The exceptionally small standard deviation of tomb sizes at Faras 3 may indicate that relatively ‘standardized’ grave dimensions were employed for burials at this site.

The average grave area at Gezira Dabarosa 6-G-18 was similar to that evidenced in previous Naqada I–II graveyards (see Table A.6). However, the seal-containing burial in this cemetery was larger than most of the seal-containing Naqada II graves examined previously, at approximately 2.4 m². It was also one of the largest burials in the cemetery, exceeded in size by only four other graves. The graves in this cemetery had an average area and standard deviation similar to that exhibited by previously examined Naqada I–II cemeteries (see Table A.6). Consequently, Gezira Dabarosa was likely a mixed cemetery, similar to the Naqada I–II cemeteries. The

extremely small standard deviation of tomb sizes at this graveyard may indicate that relatively 'standardized' grave dimensions were implemented for burials at this site.

In Cemetery L, the average grave area is much larger than any of the averages calculated for the previous Naqada I–II cemeteries (see Table A.6). The seal-containing burial L17 in this cemetery was also larger than any of the other Naqada III seal-containing graves, at 7.3 m². Thus the Cemetery L seal was buried in a fairly prestigious grave that was part of a cemetery where high-ranking individuals were buried. This is corroborated by the luxury items discovered in many tombs at this site (Williams 1986). Wengrow (2006, 169) also singles out tomb L17 as exceptional due to the high quantity of locally manufactured prestige goods it contained. The large standard deviation for this cemetery shows that the communities making use of Cemetery L may not have adhered to any particular size standards when constructing graves.

By contrast, Cemetery W had a much smaller average grave area, and a standard deviation fairly similar to that exhibited by the Haraga and Matmar cemeteries (see Table A.6). Thus, communities utilizing the cemetery may have constructed graves based on certain standard measurements. Some individuals buried within the cemetery may have been of a higher status judging by the size of their interments. However, the cemetery does not appear to have been exclusively reserved for such large burials (Williams 1989, 43). Thus, Cemetery W cannot be described as an exclusively elite cemetery, but as a mixed cemetery similar to Haraga, Matmar, and Nag el-Deir 7000 in the Naqada II period. The seal-containing grave W2 was of average surface area in comparison to the other burials in Cemetery W as shown on Figure A.23. It was much smaller than burial L17, and also had fewer grave goods (Williams 1989, 46). The area of W2 is comparable to most Naqada II seal-containing graves, as shown in Figure A.19. Thus, the seal found in cemetery W was likely deposited in a non-elite burial. From this analysis, it appears that seals could be found deposited in non-elite as well as elite Nubian Naqada III graves. Consequently, the concept that seals were non-exclusive burial goods that could be buried with elite and non-elite individuals may have been transmitted to Nubia from Egypt along with the actual seals (*contra* Roy 2011, 228).

The results shown in Figure A.23 can be examined in further detail when the surface areas of all graves with recorded dimensions in these four cemeteries are graphed in histograms. Figure A.24 shows that grave sizes in Faras Cemetery 3 follow a normal distribution, with a few outliers larger than 2 m². The largest peak of the histogram consists of graves ranging from 0.5 to 1.5 m² in area. Thus, at 0.9 and 1.5 m², the seal-containing graves at Faras had approximately the same area as many other burials in the cemetery. In Figure A.25, the seal-containing tomb at Gezira Dabarosa is located with only five other burials in a cluster of graves measuring between 2–3 m². In Figure A.26, the seal-containing grave at Qustul L is located

between the two peaks at the 3–4 m² mark and the 19–20 m² mark, and is one of only two graves of roughly 7–8 m². Thus, the seal-containing grave was not constructed to conform to any of the size norms possibly represented by the two peaks. In Cemetery W, the two largest peaks in the histogram are found at 0.75–1 m² and 1.5–1.75 m² (see Figure A.27). The seal-containing grave was again located between the two largest peaks in the histogram, classified with five other graves in a cluster between 1–1.50 m². Thus, the seal-containing grave in this cemetery was found in a tomb that was mid-sized in comparison to other graves in the same cemetery.

Although the individual buried with a seal in Cemetery L was likely of somewhat higher status than the individual in Cemetery W, both individuals were apparently attributed an intermediate post-mortem status in their respective cemeteries, judging by the size of their graves. By contrast, the individual from Gezira Dabarosa may have been attributed a somewhat higher status within the local community, given that grave 55 is one of the largest graves in that cemetery. Finally, grave 17 at Faras was of average size, while grave 4 was only slightly larger than the average grave at the site. Consequently, the individuals buried in these grave may not have been of exceptionally high status. Consequently, available data for Naqada III burials again shows that during this period, seals could be deposited in both larger and smaller burials that likely belonged to individuals of different status.

2.3.2.3 Dynasty 1–2 cemeteries

Figure A.28 plots the areas of graves found to contain seals and non-seal-containing burials located in well-recorded Upper Egyptian graveyards dating to Dynasty 1–2. These include: Abu Simbel Cemetery 215, Nag el-Deir 1500, Nag el-Deir 3000 (see Figure A.17), the Aha subsidiary cemetery at Abydos (see Figure A.46), and the Djer valley enclosure subsidiary cemetery (see Figure A.45). Abusir, Helwan, the Saqqara subsidiary burials (see Figure A.15), and the subsidiary burials surrounding the Abydos grave of Djer (see Figure A.46) were not included in the tomb substructure area analysis due to a lack of recorded tomb measurements in the publications for these sites. The Aha subsidiary cemetery was recently re-excavated (Dreyer *et al.* 1990), but no other Early Dynastic cemetery analysed here has been re-examined.

As shown in Figure A.28, Abu Simbel 215 is the only non-subsiary cemetery that exhibits tight clustering and a small standard deviation. The average grave area in this cemetery is 1.24 m², comparable to the averages of the Naqada II cemeteries analysed previously as well as the average area of Gezira Dabarosa, and Qustul W graves (see Table A.6). Thus, locals burying their dead at this site may have adhered to a certain grave size template. The distribution pattern of grave areas appears to be similar to that shown by Gezira Dabarosa and Qustul W, implying that Abu Simbel 215 may have been a mixed cemetery. At 1.89 m², the seal-containing grave

85 at Abu Simbel 215 fell well within the 1σ standard deviation for tomb areas at this cemetery.

In contrast to the tight clustering exhibited by Abu Simbel 215, Nag el-Deir cemeteries 1500 (see Figure A.44) and 3000 exhibit a wide range of grave dimensions and depositional contexts for seals. The individuals buried here appear to have had their ranks more clearly delineated by grave area. The large standard deviation and large average tomb area for these graveyards (see Table A.6) support this hypothesis. Seals were found deposited in graves with large, mid-sized, and small area measurements in Nag el-Deir 1500. Consequently, individuals could be buried with seals in this cemetery regardless of their status as indicated by burial area. In Nag el-Deir 3000, only a single small child's grave was found to contain a seal as part of the grave goods. Multiple burials of widely varying areas contained seals in Nag el-Deir 1500. Thus, this graveyard provides evidence that the practice of depositing seals in burials may have been growing more widespread in Dynasty 1–2.

Both the Aha subsidiary burials and the Djer valley enclosure subsidiary burials are highly clustered with small standard deviations. It is likely that some degree of administrative supervision on the part of the nascent pharaonic authority would have ensured that these graves remained within a particular size (area) range. These artificially standardized graves may have been constructed to visually eradicate the status of the occupants. A similar practice can be seen on Egyptian relief art from late Naqada III onward. In these images, the ruler or important individual is frequently depicted as significantly larger than all other individuals in a scene (Schäfer 2002, 233).

From available evidence, it seems that not all individuals in subsidiary burials were considered worthy of having a cylinder seal deposited in their grave. Normal cemeteries of Dynasty 1–2 examined here generally contain few burials with seals. The subsidiary graveyards thus appear to be imitating normal seal deposition practices in contemporary cemeteries.

The two unusually large subsidiary graves of Aha found to contain seals (B13 and B14, see the large graves circled on Figure A.46), may have been the original grave chambers of the ruler that were subsequently re-purposed for use as subsidiary burials (Dreyer *et al.* 1990, 63). This would explain their presence as outliers within an otherwise tightly clustered dataset. The burials that fall outside the 1σ standard deviation in the Djer cemetery also demonstrate that somewhat larger graves may have been allotted to individuals of a certain status in this cemetery.

Plotting the surface areas of graves from this period as histograms further corroborates and clarifies the previously stated findings. Examining the distribution of grave sizes on the histogram for Abu Simbel in Figure A.29 shows that it most closely resembles the distribution evidenced in Matmar 3000–3200 (Figure A.21). Thus, this graveyard was likely a mixed cemetery similar to Matmar. The seal-

containing grave at Abu Simbel is classified under the category of graves ranging from 1.25–1.50 m² in size. This makes it slightly larger than the majority of the graves in the cemetery, which fall under the 0.5–1.25 m² category.

As shown in Figure A.30, Nag el-Deir 1500 has the most diversified distribution of seal-containing graves, with many outliers greater than 10 m². The seal-containing grave greater than 20 m² is the largest seal-containing burial among the non-subsiary Dynasty 1–2 cemeteries examined in this section. The distribution of the grave surface areas resembles that of Abu Simbel and Nag el-Deir 7000 to a certain extent, but exhibits more outliers. Figure A.30 therefore shows that elite and non-elite individuals may have been buried in this cemetery.

The distribution of graves in Nag el-Deir 3000, as seen in Figure A.31, is similar to that of Abu Simbel, aside from the one outlier at 18.5 m². Thus, it can also be designated as a mixed cemetery. The child burial found to contain a seal is located in the largest peak of the graph, which contains eight other graves between 0–1 m². The tomb may have had a seal deposited in it as a sign of the child's status or importance.

The Aha subsidiary graveyard next to the royal burial of Aha at Abydos exhibits a relatively wide variety of grave areas (see Figure A.32). Two large seal-containing graves are located within two outliers at approximately 13 and 25 m² respectively. The third seal-containing grave is located with two other tombs in a small peak at 13–14 m². There are no graves smaller than 6 m² in this cemetery.

In the Djer valley subsidiary cemetery, grave surface area variation is generally more restricted (see Figure A.33). While the Aha cemetery had many graves larger than 10 m², the Djer cemetery tombs do not exceed 6 m² in size. Also, no burials under 1.25 m² are present in this subsidiary graveyard. Two seal-containing burials are located in the largest peak between 1.50–1.75 m². The other two seal-containing burials are located in outliers between 2–2.50 m². The size of the outliers in Figure A.33 is fairly evenly distributed, with only a few gaps in an almost uniform 'long tail' distribution.

The Aha cemetery was likely the first dynastic subsidiary graveyard to be constructed (Bestock 2009, 27–28). Thus, 'norms' for subsidiary burial sizes may not have been established at the time when the Aha cemetery was created. This could explain the greater variation in surface area in the Aha cemetery compared to the Djer subsidiary cemetery. Additionally, the Djer valley subsidiary cemetery was likely created to surround a ritual space (Petrie 1925, 3). Standardized grave sizes may have been used to ensure that the dimensions of the 'enclosure' formed by the graves would be fairly even (see Figure A.45).

2.3.2.4 Dynasty 4–6 cemeteries

The areas of seal-containing and non-seal-containing burials from Middle and Upper Egyptian graveyards dating to Dynasty 4–6 are analysed in Figure A.34. The cemeteries included in this examination are: the Middle Egyptian cemeteries of Matmar, el-Mustagidda, and Qaw (see Figure A.16), and the cemetery surrounding the large mastaba tomb of Khentika at Balat, in the Dakhla Oasis in Upper Egypt (see Figure A.109). The graveyards found within the vicinity of other large mastabas at Balat were not included due to the small quantity of burials they contained (see Table A.1). The Saqqara cemetery surrounding the pyramid of Pepi II (see Figure A.15), Elkab, and Nag el-Deir 500-600 (see Figure A.17) were not included due to lack of documentation on the size of many burials. To date, no seal-containing burials unequivocally dated to Dynasty 3 appear to have been published. Thus, due to a lack of available data, Dynasty 3 seal-containing burials could not be covered by the present examination.

The Balat burials graphed in Figure A.34 exhibit tight clustering aside from a few outliers, as well as a small standard deviation. Three seal-containing tombs with an area of 1.7, 1.9, and 2.5 m² fell within the 1 σ standard deviation. At 1 m², one seal-containing grave was smaller than the standard deviation. Finally, two seal-containing burials with areas of 3 and 3.2 m² were found to be greater than the 1 σ standard deviation. The relatively tight clustering of the data indicates that some standard measurements appear to have been in use with regard to burial sizes. The small size of the burials indicates this was likely not an elite cemetery. However, the proximity of the cemetery to a prestigious mastaba and the small quantity of graves found in comparison to a cemetery like Matmar indicates that this area may have been reserved for burials of individuals of a certain status. The larger seal-containing burials were found in direct proximity to the governor Khentika's mastaba. These may have been graves of somewhat more prominent individuals that chose to be buried in close proximity to this high-ranking individual (Castel and Pantalacci 2005, 126, 149, 157). The same applies to other large burials in the cemetery that did not contain seals (Castel and Pantalacci 2005, 100, 120). Thus, the more prestigious burials in this cemetery apparently did not have stamp or cylinder seals as a default grave good. Also, no preference for placing cylinder vs stamp seals in graves of particular sizes could be detected (see Table A.5).

The tombs at Matmar are normally 1–2 m² in area (see Figure A.34). Aside from burial 3210, which had an area of 0.6 m², all seal-containing Old Kingdom tombs at Matmar fell within the 1 σ standard deviation range. Thus, seal-containing burials at Matmar generally appear to have belonged to individuals that were not granted exceptionally large or small burials. Most Old Kingdom graves at Matmar were 3 m² or less. The largest burial was 4.1 m² in size. Given the fairly standardized small dimensions of tombs, it is possible that this was a non-elite cemetery. The cemetery

also exhibits tight clustering of grave areas, indicating that locals may have adhered to certain standard size measurements when constructing burial chambers.

A similar trend in tomb seal deposition can also be seen at el-Mustagidda. Most seal-containing tombs were of a similar size to the average burial at the site. Only one grave was significantly smaller, at 0.1 m². Apart from two outliers at 9 and 7 m², all Old Kingdom burials at this cemetery are 2 m² or smaller. Thus, Mustagidda shows an even stronger tendency toward standardized burial sizes. However, given the large outliers, this may have been a mixed cemetery. Based on tomb size evidence, this graveyard appears to have been comprised mainly of non-elite burials with some exceptional burials of individuals attributed a somewhat higher status.

At Qaw, almost all seal-containing burials fall within the 1 σ standard deviation range. Three burials with an area of approximately 2 m² are marginally larger than the 1 σ standard deviation, and one burial is exceptionally small, at approximately 0.2 m². Given the larger size range of graves present at this cemetery and the presence of larger outliers, Qaw was likely a mixed cemetery in the Old Kingdom. Again, seals do not appear to have been placed in exceptionally large burials, and evidence for only one very small seal-containing burial exists. Thus, based on grave area evidence, individuals interred with seals at Qaw were not afforded exceptional status.

The evidence examined here tends to demonstrate that the use of seals as a burial good continued to spread among individuals not belonging to the high elite. As shown in Table A.1, burials prior to Dynasty 4 are rarely found to contain more than 2 seal-containing burials. By contrast, the Old Kingdom cemetery of Balat (graves around Khentika mastaba) included 5 seal-containing graves. Matmar, el-Mustagidda, and Qaw all had 10 or more seal-containing graves. Of the cemeteries not included in Figure A.34, Nag el-Deir contained a comparable number of graves with seals (18), but Elkab and Saqqara were badly recorded. The other small Balat cemeteries still had at least one seal-containing tomb each (see Table A.1). By comparison, many small and large cemeteries from earlier periods contained no seals at all.

When the surface areas of the burials shown in Figure A.34 are plotted as histograms, further details emerge. The Khentika histogram in Figure A.35 shows that seal-containing graves occur in smaller and larger size ranges within this cemetery. At Matmar (Figure A.36) and el-Mustagidda (Figure A.37), seal-containing graves are located close to the median size range for tombs in both cemeteries. The Qaw cemetery contains many more burials, and displays similar trends (see Figure A.38). Thus, this burial trend appears to have existed in all cemeteries of the Qaw region during the Old Kingdom. All evidence examined here shows that seal-containing graves continued to have relatively small areas during the Old Kingdom period (circa 2686–2181 BCE). However, the incidence of seals in graves appears to have grown during the Old Kingdom. Thus, there was likely an increase in the adoption of

seals and seal-making technology among the populace during this period. Although burials cannot provide evidence whether the use of seals in daily life grew during the Old Kingdom, it does provide a means of measuring the rise in popularity of sealing technology during this period. This finding is further corroborated by seal impressions from an Old Kingdom settlement examined in Chapter 5.

2.3.3 Combined analysis of data from seal-containing cemeteries from all periods

If all the data from section 2.3.2 is combined, as shown in Figure A.39, trends can be seen when analysing average grave areas over time. The average area of graves that were not found to contain seals increases from approximately 1 m² to 3 m² from Naqada II to Naqada III. This average increases only by 0.5 m² from Naqada III to Dynasty 1–2, and finally decreasing to 1 m² again in Dynasty 4–6. By contrast, the average area of graves that were found to contain seals increases by almost an order of magnitude from Naqada II to Dynasty 1–2. By Dynasty 4–6, the average area decreases to approximately the same level seen in Naqada II seal-containing burials. The decrease in tomb surface area during the Old Kingdom is possibly due to changes in tomb design during this period (Dodson and Ikram 2008, 160). Previously, tombs were built as pits or as underground chambers with stairs leading to them (see Figure A.8). In the Old Kingdom, entrance shafts leading to burial chambers were popularized in cemeteries (see Figure A.13). Almost none of the burials from this period examined here have the mastaba superstructures attributed to elite graves (see Figure A.14).

Thus, grave area evidence graphed in Figure A.39 appears to show that the status of individuals buried with seals increased somewhat from Naqada II to the Early Dynastic. However, the low numbers of seal-containing burials from Naqada II and III shown here does not allow for definite conclusions. A detailed analysis with more data will be conducted in Section 2.3.4. Despite the decrease in tomb size during Dynasty 4–6, the number of seal-containing tombs continued to increase (see Figure A.39), indicating that seals may have been a more commonly available grave good for individuals of lower status.

The average areas of seal- and non-seal-containing burials during Dynasty 4–6 is almost equal. Thus, the grave area data seems to indicate that individuals buried with seals were of equal status to those buried without seals in the Old Kingdom. Evidence provided by tomb areas appears to show that seals in burials were not used in conjunction with grave size as a marker of status during the Old Kingdom. Seals may therefore have become a more easily accessible grave good during this period.

2.3.4 Graves found to contain seals: detailed analysis

This section analyses the characteristics of only seal-containing graves. In the previous sections (see Sections 2.3.2–2.3.3), seal-containing graves were included in the analysis only if they were found in cemeteries where the rest of the tombs were well-documented. In Figure A.39, analysed in Section 2.3.3, the dimensions of all graves from well-documented cemeteries that were found to contain burials with seals were compared to non-seal-containing burials from these graveyards. By contrast, Figure A.47, analysed here, plots only seal-containing burials from graveyards throughout Egypt (see Tables A.2–A.5). It includes the seal-containing tombs that could not be included in Figure A.39 because the non-seal-containing burials from these cemeteries were inadequately documented.

The area of each seal-containing grave is shown plotted in Figure A.47 according to the era attributed to each burial. The data was plotted on a logarithmic scale to display it more clearly. Subsidiary burials are included in the data plotted for the Early Dynastic. The line connecting the box-shaped dots on Figure A.47 represents the average grave area for each period, and the error bars represent the 1σ standard deviation. The averages and standard deviations are also summarized in Table A.7.

Given the relatively standardized small areas of subsidiary burials (see Section 2.3.2.3), it is possible that the data from these graves skews the dataset. Figure A.48 shows that removing the subsidiary grave data only slightly increases the average burial size for Dynasty 1–2. Thus, subsidiary grave data does not appear to skew trends present in the available data on seal-containing tombs of the Early Dynastic.

As shown in Figure A.47, in Naqada II, circa 3600–3350 BCE (Hendrickx 2006, 92), almost all of the 6 tombs examined are 2 m² or smaller, with a mean grave area of 1.8 m². Based on the results for Naqada I–II cemeteries given in Section 2.3.1, it appears that this is a fairly normal area range for tombs of this period. Thus, judging by grave area alone, almost all individuals buried with seals in Naqada II were of equal status. Only one Naqada II tomb examined fell outside the 1σ standard deviation for this dataset: Nag el-Deir N7304 at 5.6 m². This burial may have belonged to an individual accorded significant rank, as indicated by the precious copper wire and copper ‘fish hook’ found in this heavily plundered burial (Lythgoe and Dunham 1965, 179–180; Reisner 1908, 114).

Figure A.47 shows that the mean area of the 7 seal-containing graves from Naqada III, circa 3350–3150 BCE (Hendrickx 2006, 92), is larger than in the preceding period (see also Table A.7). This may partially be due to the three graves from this era that were found to be larger than 2 m² (see Table A.3). The largest Naqada III tomb, Grave L17 at Qustul in Nubia, falls outside the 1σ standard deviation for this dataset. It is evident from the area of this grave and the amount and variety of grave goods it contained (Williams 1986, 304–313; Stevenson 2009b, 193) that

this burial probably belonged to a prestigious individual. The increase in average grave area is likely due to the restricted dataset available for this period, rather than any trend in burial practices. The general tendency exhibited by data from Naqada II thus continues in Naqada III, and the average seal-containing grave is relatively small. Most Nubian seal-containing graves from this period exhibit fairly small sizes, indicating that seals may have been considered a burial good that could be placed in non-elite as well as elite graves (*contra* Roy 2011, 228).

The number of tombs found to contain seals in Egypt increases to 21 in the Early Dynastic, circa 3150–2593 BCE (Hendrickx 2006, 92; Hornung *et al.* 2006, 491)). This increase seems to show that use of seals as burial goods was beginning to spread during this period. The presence of cylinder seals in subsidiary burials surrounding royal and elite tombs indicates that the emerging Pharaonic government may have been employing seals and sealing technology in this period, since the creation of these burials was likely regulated (see Section 2.3.2.3 and 2.3.7).

Many tombs continue to cluster around 2 m² in Dynasty 1–2. However, there has also been an increase in the number of larger tombs found to contain seals. The average tomb area is 8.2 m², with a standard deviation of 10 m² (see Table A.7).

The three burials that fall outside of the standard deviation range calculated for this data set consist of two subsidiary graves (Aha Subsidiary Grave B13, B14) and one exceptionally large private burial, Nag el-Deir N1605. All three of these burials are exceptional due to the type of cylinder seals they contained as well as the area of the graves. Further analysis of these unique burials will be conducted in Sections 2.3.7 and 2.3.8. It appears that during Dynasty 1–2, seals were deposited in tombs that exhibited a variety of surface areas, as previously shown in Figure A.28. This trend is quite different from that exhibited during the previous and following eras.

During Dynasty 4–6, circa 2543–2153 BCE (Hornung *et al.* 2006, 491–492), a significant increase in the number of seal-containing burials can be seen. Figure A.47 plots the areas of 70 graves recorded as containing seals. This increase may indicate that use of seals as a burial good had become more widespread at this time. Most seal-containing tombs during this period tended to measure 1–3 m² in size. The average size of seal-containing burials decreased from the previous era to 1.3 m², with a standard deviation of 1.4 m², as can be seen in Figure A.47 and A.48. As mentioned in Section 2.3.3, this is likely due to changes in tomb design during this period. Thus, the brief trend towards larger burial sizes in Dynasty 1–2 does not appear to have continued into subsequent dynasties.

If the areas of all seal-containing burials from Naqada II–Dynasty 6 (ca. 3500–2181 BCE) are graphed on a histogram, as shown in Figure A.49, it is clear that throughout all four periods, the area of most tombs found to contain seals (85 out of 105, or 81% of the total) is under 3 m². Relatively few tombs (13 or 12.3% of the total) are 3.01–8 m², and only 7 (or 6.7% of the total) have dimensions greater than

8 m² (see also Table A.8). Thus, judging by grave size, most seal-containing burials appear to have belonged to individuals that did not have elite post-mortem status. Other possible depositional trends and indicators of status in tombs found to contain seals from Naqada II–Dynasty 6 are investigated in Sections 2.3.5 to 2.3.8.

2.3.5 Relational biographies of seals in graves

Seals were infrequently deposited in burials of the early Naqada II–Dynasty 6 periods examined here. In an attempt to determine the significance of seals placed with the deceased, this section analyses grave goods found in proximity to seals in graves and the position where these goods were found relative to the deceased individual from an anthropologie de terrain (Duday *et al.* 1990, 34) perspective. The depositional contexts of these seals can be analysed to establish relational biographies of seals in graves, by determining how the seals may have been related to other objects and the deceased at the time of burial (Joy 2009, 545). Consequently, only reasonably intact and well-recorded burials included in the present study are scrutinized here.

2.3.5.1 Naqada II

Some of the earliest Naqada II seals are judged to have been imports from southwestern Asia based on the motifs carved on the seals (Boehmer 1974; Guyot 2004, 87). Thus, ‘imported’ seals may have been considered exotic goods that conferred prestige (Helms 1988, 120). This possibility is explored by investigating whether seals were buried in proximity to other exotic artefacts in Naqada II burials.

In the case of Nag el-Deir N7501 (Lythgoe and Dunham 1965, 317–318) and Haraga Cemetery H grave 470 (Engelbach 1923, Plate VI), stamp seals were found associated with a single shell bead and circa 4 shell beads respectively. These shells were likely sourced from distant regions. In Naqada 1863, the cylinder seal was found in association with 5 milky rock crystal beads and 1 carnelian bead (Petrie Museum 1999; Petrie Museum 2015, UC 5005). The material for rock crystal beads is obtainable in Egypt’s Western Desert and the Sinai peninsula, and the carnelian was likely sourced from the Red Sea area (Aston *et al.* 2003, 27, 52). Naqada II era grave T29, not included in the main analysis due to a lack of size measurements for the tomb, was found to contain a cylinder seal, 17 lapis lazuli beads, and 2 brown stone beads (Scharff 1929, 108; Frankfort 1939, Plate XLVI). The brown stone beads may have been smoky quartz (Aston *et al.* 2003, 52), which is easily obtainable in Egypt, but the lapis lazuli is a well known early import from the region of Afghanistan (Guyot 2004, 84). From this, it appears that seals deposited in Naqada II burials were placed alongside other types of exotica indicative of the special status of the deceased, who had access to goods from foreign lands. However, comparing this practice to previously highlighted instances of exceptional exotic bead deposition at Gerzeh (Stevenson 2009a, 194–195) provides further insight into

seal deposition patterns in Naqada II. The Gerzeh burials were found to contain numerous beads made from exotic materials. However, the seals in Nag el-Deir, Haraga, and Naqada were never accompanied by more than 20 exotic beads of any type. Moreover, only one type of exotic bead appears to have been deposited alongside the seals in a given tomb (shells at Nag el-Deir and Haraga, carnelian in Naqada 1863, and lapis lazuli in Naqada T29). At Naqada, the exotic beads were also accompanied by beads apparently made of more local quartz.

Other types of seal deposition have also been documented in other Naqada II graves. In the Deir el-Ballas grave B307, the cylinder seal was found resting on a different type of prestigious good: an ostrich eggshell pendant (Podzorski 1988, 264). Though ostriches were relatively common in Egypt during the predynastic (Phillips 2003, 332), obtaining an eggshell and working a fragment into a pendant was likely still a complex process requiring specialized knowledge. The seal found in the Ballas grave is speculated to be of native Egyptian manufacture (Guyot 2004, 87). Thus, its association with a native Egyptian pendant may have served to emphasize the more local character of this burial deposit.

One other Naqada II grave from Nag el-Deir numbered N7304 contained a cylinder seal. This grave was heavily looted, but the seal was found on a pottery dish filled with dirt. Also resting on top of the dirt were a carved ivory pin, a well-knapped flint blade, copper wire attached to a copper fish-hook, and a miniature diorite vase (Lythgoe and Dunham 1965, 179–180). Presuming that these materials were originally placed in the dish by the mourners, it appears that the cylinder seal in this grave was found alongside goods that may have conveyed the exceptional status of the occupant. Regardless of whether the pin is made of hippopotamus or elephant ivory, its material would have been difficult to source due to the dangers posed in hunting hippopotamus, or the need to trade for valuable elephant ivory with southern Nubian peoples (Krzyszkowska and Morkot 2003, 324). The source material for the diorite vase may have come from Middle Egyptian quarries (Aston 1994, 8, 30). These sites were located around the Nile toward the top of Figure A.16, in Middle Egypt, far from the site of Nag el-Deir in Upper Egypt (see Figure A.17). The copper for the wire and fish-hook could have been sourced either in the Eastern Desert to the east of the Nile, the southern Aswan region, or in the southern Levant (Ogden 2003, 148–149). All of these regions are relatively distant from Nag el-Deir. Finally, the relative rarity of flint artefacts in tombs in cemeteries tends to indicate that flint was also considered a special grave good. For instance, 22 out of 654 burials or 3.3% at Nag el-Deir 7000 (Savage 1995)¹⁵ were found to contain flint artefacts.

Almost all Naqada II seals examined here were made of limestone (see Table A.2), with the exception of the seal found in Haraga grave 470, which has now been

¹⁵The total number of graves listed here for Nag el-Deir 7000 includes Naqada I and III material. This material was not examined in the present thesis and is therefore not listed in Table A.1.

misplaced (see footnote on page 58). This seal was originally identified as being made of carnelian (Payne 1993, 203). However, early southwestern Asian seals made of red limestone have been found in that region (Pittman and Potts 2009, 110). Consequently, the seal from Haraga may also have been made of limestone, and therefore not constitute an outlier in this dataset.

2.3.5.2 Naqada III

In Naqada III, burial practices for seals appear to have changed. At Faras, both seals were found in the shaft filling of the grave. Grave 4 had been looted, but grave 17 was apparently undisturbed (Griffith Institute 2016). Consequently, it can be posited that the placement of the seal in the filling may have been deliberate in both cases. At Saras West, the seal was found by itself in front of the pelvis of the female skeleton, which was lying on its left side (Mills 1965). At Qustul L17, the seal was found in front of the arms of the burial, along with copper rings, a quartzite palette and a large green rubbing pebble (Williams 1986, 115, Fig. 133)¹⁶. As previously mentioned, the copper was likely sourced at Aswan or more distant regions. Quartzite may also have been sourced at quarries near Aswan (Aston *et al.* 2003, 53). Consequently, neither of these artefacts can be unequivocally interpreted as exotic, though the palette and copper rings may still have been considered prestigious (Nordström 2002).

At Gezira Dabarosa, the seal was found beside a shell bracelet next to the right elbow of the skeleton (Nordström 2014, 47–48). Neither the bracelet nor the seal were apparently attached to the arm. If the bracelet was made of an exotic shell, this grave may represent a continuance of the seeming trend of associating cylinder seals with exotic objects in Naqada II burials.

Abusir el Meleq grave 1035 (Möller and Scharff 1926, 58, 152–153; Hartung 2001, 232), was not included in the main analysis of this study due to a lack of available grave measurements. However, the relatively intact context of the ivory seal warrants the examination of its relational biography. The seal was found suspended on a thread around the grave owner's neck. Apparently, no other objects were found in the direct vicinity of the seal, aside from some ivory pins in the hair of the deceased individual.

Thus, available evidence indicates seals were generally not placed in direct association with exotic goods during Naqada III. The first known incidence of a seal suspended around the neck of the deceased is also recorded at Abusir el Meleq. All seals from graves examined here were made of ivory (see Table A.3). As mentioned above, this material may have been considered exotic if sourced from elephant tusks, or merely prestigious if sourced from native hippopotami (Krzyszowska and Morkot 2003, 324).

¹⁶The palette is listed as being made of quartz in the publication, but more recent publications of similar burials list such palettes as being made of quartzite (Nordström 2014, 56). Consequently, this palette was likely also made of quartzite.

Given previously discussed results, it appears that during Naqada II and III, seals made of particular materials tended to be placed in tombs. Limestone was seemingly preferred in Naqada II, while ivory was apparently the material of choice in Naqada III. The seal may have carried exotic connotations in Naqada II. However, it remains uncertain whether these exotic associations carried over into Naqada III. In future, a microscopic analysis of ivory Naqada III seals may serve to determine whether these objects were made of exotic elephant tusk, or hard-to-obtain local hippopotamus ivory.

2.3.5.3 Dynasty 1–2

To date, only four seal-containing burials dated to Dynasty 1–2 were found to be sufficiently intact to enable analyses based on depositional context. In Nag el-Deir, grave N1604, the black stone cylinder seal was found near the neck area. Beads made of ‘blue glaze, carnelian and green stone’ (Reisner 1908, 24) were also found in this area. However, it is not stated whether these beads were found close enough to the seal to judge whether they had been strung together. It is also possible that the context was confused due to the collapse of the wooden roof of the tomb (Reisner 1908, 24, 140). At Nag el-Deir N3091, a child burial inside a pottery coffin was uncovered. A pot placed above the head of the child outside the coffin was found to contain ‘dirt’, and a fragmentary wooden cylinder seal was found inside this dirt (Reisner 1908, 86). The depositional context resembles the placement of a seal and other goods on a dirt-filled dish in Nag el-Deir N7304. However, in N3091, the seal was buried inside the ‘dirt’ filling the jar. Finally, the two subsidiary burials of mastaba 3500 at Saqqara contained no grave goods other than an uncarved ‘dummy’ wooden cylinder seal under the right hand of the male in subsidiary grave 1 and the female individual in subsidiary grave 2 (Emery 1958, 104).

The lack of well-preserved graves from Dynasty 1–2 prevents a general overview of burial placement practices, though it appears the materials employed to create the seals and the depositional contexts diversified during this period. Finds of single seals in the hand area of the deceased are also relatively common during Dynasty 4–6 (see below).

2.3.5.4 Dynasty 4–6

In Dynasty 4–6, burial practices related to seals changed, though older traditions with regard to seal deposition can still be seen in some graves. At Balat, 14 graves were found to contain seals as grave goods. Of these, 13 were undisturbed and are discussed here.

1. Burial T4, a secondary interment within the mastaba of Medou-Nefer, was found to contain a single mature male individual, estimated to have been

approximately 60 years old at his death (Valloggia and Henein 1986a, 196). Around the left wrist was a bracelet of carnelian beads and a stamp seal made of iron-rich quartzite (Valloggia and Henein 1986a, 60, 102).

2. In Tomb C, located within the mastaba tomb complex of Ima-Pepy II, two stamp seals, one of carnelian and the other of glazed steatite, were found in the vicinity of the right wrist of the deceased. A bracelet with matching carnelian and steatite beads was also found in the area of the deceased's wrists, but is described separately (Minault-Gout *et al.* 1992, 56, 101–102). Presumably, the seals were found in a position that indicated they were not part of the bracelet. Both the seals and the bracelet beads were made of the same types of stone. This matching of material types may have been deliberate. Aside from the previously mentioned carnelian (see Section 2.3.5.1), steatite would likely have been mined in the distant Eastern Desert (Aston *et al.* 2003, 59).
3. Tomb T5 within the mastaba tomb complex of Ima-Pepy/Ima-Meryre, was found to contain a female skeleton aged circa 25–35 years (Valloggia 1998a, 28). A necklace consisting of azurite, carnelian, and faience beads, as well as a small faience stamp seal was found near the neck of the deceased (Valloggia 1998a, 92, 110). The azurite beads may have been misidentified, since this material is considered unsuitable for carving (Aston *et al.* 2003, 23). A copper stamp seal was also found in the knee area (Valloggia 1998a, 28). No other objects were found immediately adjacent to this seal.
4. Tomb T22 was found to contain a child burial. A copper stamp seal was the only grave good found in this burial. The seal was located near the neck of the deceased (Valloggia 1998a, 30, 94). Consequently, the seal may originally have been attached to a string around the neck of the child.
5. In Tomb T10, a male skeleton was found with carnelian beads in the vicinity of the neck. A chrysoprase or green jasper stamp seal also appears to have been an element of this necklace (Valloggia 1998a, 32, 94, 113).
6. Tomb T20 contained a female skeleton ca. 60 years old at time of death. A beige jasper cylinder seal was found with a pottery cup in the area of the skeleton's chest (Valloggia 1998a, 32, 90, 163). Significantly, one of the objects located near the feet of the deceased was a pottery vessel shaped in imitation of Early Dynastic lugged stone vessels and painted black (Valloggia 1998a, 174; Valloggia 1998a, Pl. CXIV, CXVII). Given the gradual disuse of cylinder seals during the Old Kingdom (Pantalacci 2013, 40), the imitation heirloom vessel, and the age of the deceased woman, it is possible that the cylinder seal and the imitation vessel were placed in the burial to highlight the age of the deceased. These grave goods may have served to underline the passing of old

traditions and old funerary practices, such as the use of cylinder seals and lugged vessels as grave goods. In the case of the vessel, it can be argued that the artefact invokes ancestral memory. The use of stone vessels of a similar shape as funerary goods had apparently ceased after the end of Dynasty 1 (Aston 1994, 91), circa 2730 BCE (Hendrickx 2006, 92; Hornung *et al.* 2006, 490). By contrast, the tomb was dated to the end of Dynasty 6, circa 2153 BCE (Hornung *et al.* 2006, 490), based on the appearance of the cup found near the woman's chest (Valloggia 1998a, 163).

7. Burial T15 contained a female of 35–45 years of age. The skeleton apparently wore a necklace consisting of a gold amulet bead, amulets of carnelian and faience, carnelian, faience, and copper beads, as well as a steatite stamp seal (Valloggia 1998a, 36, 114, 115). Another stamp seal of steatite was found near the right hand (Valloggia 1998a, 36).
8. Burial 5100 in the mastaba complex of Khentika was found to contain the remains of a female aged 40–50 years. A copper stamp seal was found in the area of the left wrist (Castel *et al.* 2001a, 55).

Several graves in the cemetery located to the east and west of the mastaba of Khentika were found to contain seals as grave goods:

9. A deceased female individual of circa 30–35 years of age was found buried in tomb 30. In the wrist area of the deceased, a glazed steatite cylinder seal was found (Castel and Pantalacci 2005, 127, 419). Only two bones from possible food offerings were found near the seal inside the coffin (Castel and Pantalacci 2005, 129, 133). The inscription on the seal led the excavators to conclude it was an official seal belonging to a priestess of Hathor, likely the grave occupant (Castel and Pantalacci 2005, 419).
10. Tomb 101 was found to contain the remains of a younger woman aged 20–25 years. Around the neck were found the elements of two necklaces, composed of beads of faience, steatite, carnelian, pottery, and cowrie shells, amulets of stone, glazed pottery, and carnelian, as well as a glazed steatite stamp seal. This seal may formerly have been part of one of the necklaces (Castel and Pantalacci 2005, 149–150, 446–447).
11. The remains of another female individual judged to have been 20–25 years old were found in tomb 105. When discovered, the skeleton wore two bracelets, one on each wrist (Castel and Pantalacci 2005, 157–159). On the right wrist was found a bracelet consisting of cowrie shells, carnelian beads, glazed steatite beads, a glazed pottery amulet, and a faience or glazed steatite stamp seal (Castel and Pantalacci 2005, 418, 448). On the left wrist was a bracelet of cowrie

shells, carnelian beads, glazed steatite beads, and a glazed steatite stamp seal (Castel and Pantalacci 2005, 419, 449).

12. In tomb 113, the 35–40 year old female skeleton was found wearing a necklace of glazed pottery and carnelian beads, pottery, glazed pottery, and carnelian amulets, a unio shell, and a glazed steatite stamp seal (Castel and Pantalacci 2005, 194–195, 419, 450–451).

13. Finally, a young woman of 17–18 years was found in tomb 118. Around her neck was a necklace of quartz, ivory/bone, glazed pottery, and hardstone beads, glazed pottery and carnelian amulets, and a glazed steatite stamp seal (Castel and Pantalacci 2005, 213–214, 419, 452–453).

Close examination of the evidence from the Balat burials does not reveal any consistent pattern in the placement of seals in graves. However, some trends can still be seen in the data. Tomb T15, grave 5100, and tomb 30 were all found to contain mature female individuals buried with stamp or cylinder seals placed in the wrist area. These seals were not attached to bracelets. In tomb T20, a cylinder seal was found by itself in the area of an old woman's chest, and could originally have been suspended from a thread around the neck of the female individual. The women found in these four burials can be said to have led a relatively long life (Zakrzewski 2015, 2), indicating that they may have been respected elders of the settlement community at Balat. It is possible that these seals could have been used in the lifetime of the individuals to seal containers or doors as part of official functions as well as household administration.

At Elkab grave 166 (see Figure A.12), the deceased was buried in a large inverted jar. A pottery vessel decorated with red paint was deposited outside the jar (Quibell 1898, 9). The painted vessel was filled with 'mud'. Inside this mud was found:

- A green steatite cylinder seal,
- Beads of 'ivory, green feldspar, gold, carnelian, blue frit, and serpentine' (Quibell 1898, 9),
- Two ivory pins,
- An ivory disc,
- A smooth brown rubbing pebble,
- A small calcite vessel, likely of Old Kingdom type (see (Reisner and Smith 1955, Fig. 145)),
- Three bracelets of unknown type, but possibly also of ivory, and
- Two shells, the inside of which was stained with green pigment, likely malachite (Quibell 1898, 9, Plate II,2).

The seal was inscribed with the name of a Dynasty 5 Pharaoh (Kaplony 1981, 437), indicating that the grave was likely created during the Old Kingdom period. However,

cylinder seals may have been considered old-fashioned by this time (Pantalacci 2013, 40). Consequently, the use of this seal as a grave good may have served to evoke older practices and burial traditions.

All other items found in the jar are also evocative of earlier Predynastic grave assemblies (Wengrow 2006, 51, 155; Stevenson 2009a, 194–195). The assortment of beads, some made of exotic materials, parallel known burial practices at Gerzeh (Stevenson 2009a, 194–195). In Predynastic/Early Dynastic tombs, the rubbing pebble would likely have been placed together with a palette (see grave Qustul L17 in Section 2.3.5.2). The green pigment-filled shells, although not found in graves discussed here, are a known Predynastic burial good (Petrie and Quibell 1896, 5, 6, 15, 16). The placement of such objects in a container is also not unprecedented, as shown by the example of N3091, where a seal was deposited inside the dirt filling of a jar, and N7304, where a stone vessel, ivory pin, flint flake, and copper fish-hook were deposited alongside a cylinder seal on a dish filled with earth. A flint flake was also found in Elkab 166, though its find location is unknown. However, the flake was photographed alongside other objects from the painted vessel, indicating it may also have been found inside this jar (Quibell 1898, 18, Plate II,2). If so, this would parallel the finds at N7304. The practice of filling the jar with mud seen in grave 166 can also be paralleled with the Predynastic practice of ‘sealing’ a grave by pouring liquid mud over most or all of the burial area prior to backfilling (Stevenson 2009b, 83; Dębowska-Ludwin 2012, 65).

Also found in Elkab 166 were:

- A bowl made to serve as a lid with red paint decoration on the outside,
- A cylindrical calcite vessel, likely of Old Kingdom type (compare image of vessel, Quibell (1898, Plate I), to Reisner and Smith (1955, Fig. 135)),
- Two calcite bowls, also apparently of Old Kingdom type (see Reisner and Smith (1955, Fig. 145)), and
- Fragments of ivory speculated to have originally been box inlays by the excavators (Quibell 1898, 9).

The vessel found to contain the objects had a shelf-like extension to the vessel lip. A decoration in red paint of dots inside triangles was also found near the lip of the jar (Quibell 1898, II). Similar vessels to this one with incised decoration depicting the same pattern and a shelf-like lip have been found at Badari and at el-Adaima. In both cases, these pots were used as ‘coffins’ for child burials. The el-Adaima pot has a less pronounced lip, and the East Cemetery where it was found was dated to Dynasty 1–2 (Hendrickx 1998, 109, 111). The vessel from Badari was found in the filling of a stairway grave dated to Dynasty 3 by the excavators (Brunton and Caton-Thompson 1928, 46; Brunton 1927, 10). The excavators identified this pot as dating to Dynasty 1. However, given the context of the pot, it may have been an intrusive burial that post-dated Dynasty 1. Consequently, this vessel may have

been a special type of burial ware, possibly used by a particular Egyptian cultural or ethnic group.

Given the archaic associations of the shelf-lipped vessel and its contents in Elkab grave 166, this container may have been deliberately deposited to evoke past cultural practices in the Nile Valley, which may no longer have been current in burials during the Old Kingdom period. Since this vessel type has been found to contain child burials at Badari and el-Adaima, it is possible the archaic objects inside the Elkab pot were meant to be symbolically ‘returned to the womb’. Thus, the pot and its contents may be evidence for a graveside ritual that emphasized the passing of old traditions and old funerary practices.

At Nag el-Deir cemetery 500–900, 13 graves were found to contain seals as burial goods. Of these, 10 relatively intact interments are examined here. All grave occupants were unsexed adults, unless otherwise specified.

1. Of the three bodies found interred in N505, two were found with amulets and seals in the neck area. ‘Body II’ was found with ivory, faience, and calcite amulets, faience, carnelian, steatite, and shell beads, as well as an ivory stamp seal.
2. ‘Body III’ in N505 was found with two ivory stamp seals, a steatite stamp seal, and a bone cylinder seal, as well as ivory beads and amulets (Reisner 1932, 111, 266–267).
3. Faience, carnelian, and shell beads, ivory and faience amulets, and an ivory stamp seal were found in the head area of an infant burial in N508 (Reisner 1932, 268).
4. In N567, a necklace was found in the neck area of the deceased. It was made of faience amulets, one carnelian amulet, faience beads and carnelian beads as well as a glazed steatite stamp seal (Reisner 1932, 270).
5. The occupant of N609 was found with the remains of several necklaces, including one featuring ivory, faience, and carnelian amulets, faience, carnelian, and glazed stone beads, and a glazed steatite stamp seal (Reisner 1932, 274).
6. In grave N615, an ivory stamp seal was found in the head/neck area of the deceased (Reisner 1932, 274–275).
7. In N751, a necklace of faience amulets, one carnelian amulet, glazed stone, faience beads and carnelian beads as well as a faience stamp seal was found in the neck area of the deceased (Reisner 1932, 292).
8. A necklace of carnelian, ivory, and faience amulets, carnelian, faience, glazed stone and one shell bead as well as two faience stamp seals was found in N780.

The individual was lying on their left side, and the necklace was found in the vicinity of the neck and left arm (Reisner 1932, 304).

9. In grave N898, the deceased was lying on their left side. A spouted limestone bowl was placed behind the flexed legs of the deceased, and was found to contain 4 carnelian and 3 glazed stone beads as well as a glazed steatite stamp seal (Reisner 1932, 337). The beads uncovered were made of similar materials as the beads on necklaces found in other graves at Nag el-Deir 500-900. In el-Mustagidda grave 2618 (see below), a necklace consisting only of two beads and a seal was found. Thus, it is possible the beads and seal found in N898 originally constituted a necklace, despite the small number of beads uncovered.
10. Finally, 'body II' discovered in N953 was found to have faience amulets and beads as well as a glazed steatite stamp seal scattered 'between the waist and neck' (Reisner 1932, 348).

An overview of the evidence from the 10 relatively intact burials at Nag el-Deir cemetery 500–900 shows that the use of stamp seals as burial goods at the site was relatively uniform. With very few exceptions, seals were strung on necklaces with beads and amulets. A restricted material set was also used for the elements of these necklaces. Beads were generally made of faience, carnelian, steatite, and shell. Amulets were almost always made of ivory, faience, and carnelian. By contrast, seals were made of glazed steatite, ivory, and faience. The only exceptions to these trends were the necklace on Body II in N505, which was also strung with calcite amulets, and Body III in N505 which wore a necklace made exclusively of ivory beads, amulets and seals, as well as a bone cylinder seal. The ivory seal in N615 was found by itself in the neck area, indicating it was possibly attached to a string with no further ornamentation, and grave N898 contained a spouted limestone bowl with elements that possibly constituted a necklace.

At the sites of Matmar, el-Mustagidda, and Qaw, few seal-containing burials dated to Dynasty 4–6 were properly recorded. At Matmar, 8 graves were found to have sufficient records to examine seal depositional contexts:

1. Grave 822 was found to contain a female burial. Near the foot area of the deceased was a box that contained a bone stamp seal. A string of amulets and beads was also inside the box. The amulets and beads were made of blue glaze and bone (Brunton 1948, 32, XXV, XXXVIII). Significantly, the bone material of the stamp seal matched that of 2 beads and 2 amulets (Brunton 1948, XXXI, LXXI). Consequently, this depositional context recalls the findings in Tomb C at Balat, where the seals found in the burial were made of the same materials as bracelets from the same tomb. Also found inside the box were 'two *Spatha* shells, a lump of yellowish material, a flint flake, and two human teeth' (Brunton 1948, 32). The 'yellowish material' could originally have been

a lump of cosmetic fat, and the shells may have been used for pigment as was found to be the case in Predynastic burials (Petrie and Quibell 1896, 5, 6, 15, 16). The flint flake (Stevenson 2009a, 5) and the teeth may have been ritually significant.

2. A female individual lying on their left side with right palm raised to their face was found in grave 3208. A green-glazed steatite stamp seal and steatite and carnelian beads were found in the area of the right hand and neck, indicating the elements may originally have formed a necklace (Brunton 1948, 30, XXIV, XXXVII).
3. The female individual in grave 3214 was buried on their left side with hands over the pelvis (Brunton 1927, XXV). A brown soapstone stamp seal was found near the hands, as well as a copper mirror (Brunton 1948, 30, XXIV, XXXIII.8).
4. In grave 3217, a green-glazed steatite stamp seal was found near the female individual's right hand (Brunton 1948, 30, XXIV, XXXIII.4). The body was again found lying on the left side with hands over the pelvis (Brunton 1927, XXV).
5. The soapstone stamp seal in grave 3315 was found in the neck area of the female skeleton (Brunton 1948, 33, XXV, XXXIII.13), and a pottery vessel was also found near the head area.
6. The steatite stamp seal in the female grave 5301 was also found in the neck area (Brunton 1948, 31, XXIV, XXXIII.5). The grave also contained a pottery vessel and calcite vase placed behind the head of the deceased.
7. In the female grave 5304, the green-glazed steatite stamp seal was again found in the neck area. Nearby were also a pottery vessel and calcite vase in front of the face, and a mirror to the 'north of' the head (Brunton 1948, 31, XXIV, XXXIII.6).
8. Finally, the female individual buried in grave 5323 was found wearing a necklace of blue glaze and limestone beads, one shell bead, and a steatite stamp seal. Also found around the neck was another necklace composed of gold, steatite, carnelian and blue glazed beads (Brunton 1948, 37, XXXIII.22, LXXII).

At el-Mustagidda, 4 seal-containing graves were found:

1. El-Mustagidda grave 1420 was found to contain an individual sexed as female. The blue-glazed steatite stamp seal deposited in this burial was found in the left hand of the deceased (Brunton 1937, 97, XLV, LX.6). The body was

apparently placed on its left side so that both palms were in front of the deceased's face (Brunton 1927, XXV).

2. Grave 2618 also contained an individual sexed as female, but this time the green-glazed steatite stamp-seal was part of a bead necklace around the neck of the skeleton (Brunton 1937, 98, XLV, LX.3). The beads were listed as: 1 blue-glazed, 1 black-and-blue glazed (Brunton 1937, XLIX).
3. El-Mustagidda 10002 was a richly appointed child grave. In the neck area were found 1 glazed steatite, 1 green soapstone, 1 pink limestone, and 1 blue-glazed stamp seal. In addition to these four stamp seals, beads of blue glaze, blue glazed steatite, black limestone, feldspar, carnelian, bone, limestone, copper, black and white glazed beads of unspecified type, and two types of shells were found in the head and neck area of the body (Brunton 1937, 99, XLIX, LX). The rich diversity of materials employed for both the seals and beads recalls earlier Predynastic depositions of exotic beads (Stevenson 2009a, 194–195). The beads in 10002 may therefore have served to display the status of the deceased child and the child's family, who had access to and could afford to provide the individual with exotic grave goods.
4. Finally, in burial 10020, a box placed on top of the foot end of a wooden coffin of a female individual, was found to contain 'three alabaster vases, two bone spatulae, beads, a frog seal-amulet, and some red ochre (?)' (Brunton 1937, 99). The stamp seal was apparently made of blue-glazed material (Brunton 1937, LX.37). The beads consisted of blue glaze, blue glazed steatite, feldspar, carnelian, and calcite (Brunton 1937, XLIX). Presumably, the beads and seal may have belonged to a necklace, though the seal may also have been separate from the beads.

At Qaw, the following three seal-containing burials were documented:

1. Grave 1977 was said to contain a female individual. One necklace found in the neck area consisted of black glazed beads and amulets and an ivory stamp seal. The other necklace consisted of carnelian beads (Brunton 1927, 34).
2. Grave 3125 contained a female individual inside a wood coffin. At the foot of the coffin, a wooden box was found to contain four calcite vases, an ivory stamp seal, blue glaze amulets and one ivory amulet, as well as beads made of shell, blue glaze, and black glaze (Brunton 1927, 29; Brunton 1928, LXXI). The stamp seal, amulets, and beads were likely found loose in the box, since it is not specified whether all these ornaments were strung together. Thus, it is possible the stamp seal was deposited separately while the beads and amulets were strung together, as was the case in Matmar burial 822.

3. Finally, burial 3217 was found to contain a female individual. A deposit of vessels was found at the feet of the deceased. This consisted of one black pottery cosmetic vessel, two calcite vessels, one inscribed with the name of the spouse of ruler Pepi I (Brunton 1927, 30, 64), and a carved and ornamented shell provided with a spout which was found to contain a bone stamp seal (Brunton 1927, 30). The shell is said to have been found at the feet of the remains of the deceased (Brunton 1927, 64, XL, LVII).

Based on evidence examined here, the large cemeteries of Matmar, el-Mustagidda, and Qaw (Brunton 1948, I, II; Brunton 1937, I, II; Brunton 1927, I), showed no evidence for consistent practices with regard to seal deposition in graves, aside from an apparent tendency to place these objects in female burials. However, some trends could be detected. At Matmar, three burials, 3315, 5301, and 5304 were found to contain female individuals with stamp seals placed in the neck area but not associated with other beads, indicating the stamp seals may have been suspended from a string around the neck. In two graves at Matmar, numbers 3214 and 3217, and one at el-Mustagidda, number 1420, a single stamp seal was near the hands of the deceased. In el-Mustagidda 10020, and Qaw 3125, the stamp seal was found loose with other beads in a box at the foot of the coffin. In Matmar 822, the stamp seal was also found in a box at the foot of the coffin, but was separate from the beads, which were still strung together. Finally, a stamp seal was found by itself inside an elaborate spouted shell vessel in Qaw 3217. At Matmar 5323, El-Mustagidda 2618, and Qaw 1977, the stamp seals were found strung together with other beads around the neck of the female individuals. Finally, the stamp seals in Matmar 3208 and El-Mustagidda 10002 were located in the neck area, but it was not possible to determine whether they were strung with the beads also found in this area.

In the Dynasty 4–6 graves examined here, almost all materials employed to create seals as well as the beads and amulets associated with them could be found within Egypt. Ivory beads may have been made from exotic elephant ivory. However, an analysis of these beads is required to determine whether they were made of local or exotic material. The faience beads found on many ornaments could have been of local manufacture, but most of the seal and bead materials were likely sourced from sites distant to the cemeteries where they were buried (Aston *et al.* 2003). Consequently, it can be surmised that seals and the beads they were associated with were used to display the status of the owners in death, since the deceased had access to seals and jewellery made of materials sourced from distant regions within Egypt.

Examining the intact burials has shown that there was no unified practice governing the deposition of seals. Trends in seal deposition appear to have varied from era to era and cemetery to cemetery. Thus, regardless of what function seals served before being deposited in the grave, they seem to have acted as markers of individual identity in death.

2.3.6 Depositional trends according to age and sex of burials

This section examines the burials for which data on sex and age were recorded in an attempt to determine whether seals tended to be deposited with particular categories of individuals. The majority of the assembled data on seal-containing tombs consists of single-occupant graves. The remainder consists of a few multiple burials, as well as burials that were heavily looted and contained no human remains. In Naqada III, one grave from Saras West contained an infant alongside a female adult individual (see Table A.9)¹⁷. The seal in this intact burial was found in front of the pelvis of the female skeleton (Mills 1965; Mills and Nordström 1966, Fig. 3). Thus the seal was probably deposited as a grave good for the adult grave occupant. In the Old Kingdom, Tomb 105 in the cemetery surrounding the mastaba of Khentika at Balat was found to contain a female individual and a child. The two seals it contained were found on the female individual's bracelets (Castel and Pantalacci 2005, 158, 163). One other Old Kingdom burial at el-Mustagidda 514C East was found to contain two female individuals and a child. However, the exact find context of the seal was not recorded (Brunton 1937, 97, XLV). Given this evidence, it appears that the seal(s) deposited in burials from the Predynastic to the Old Kingdom were generally perceived as a grave good deposited for a single individual.

When the sex of individuals buried with seals is scrutinized, no tendency toward preferential deposition of seals with either sex of adult individuals can be detected prior to the Old Kingdom (see Table A.9). In Dynasty 4–6 burials, females rather than males tended to be buried with seals (see Table A.9). This could theoretically be due to the use of seals as amulets given later written evidence for magic spells involving the use of seals (Dubiel 2012, 69). However, evidence contradicting this position can be found within the data examined here. Dubiel's case study of Middle Kingdom (circa 1980–1760 BCE (Hornung *et al.* 2006, 491)) seal find positions in the Matmar, el-Mustagidda, and Qaw burials (Dubiel 2012, 65) seemed to indicate that male burials generally wore seals on the wrist, while women could also have seals hung around their neck and waist. She argued that the positioning of the seal around the wrist was indicative of its administrative use for male individuals. By contrast, from her perspective, seals were used for amuletic purposes in necklaces and waistlets of female individuals (Dubiel 2012, 65, 70).

However, evidence examined here also displayed trends that go against Dubiel's conclusions. In Naqada II, the Nag el-Deir N7501 burial of a female was found to contain a stone stamp seal under the right wrist of the body, along with one exotic shell bead (Lythgoe and Dunham 1965, 317–318). The stamp seal found in the Haraga Cemetery H grave 470 burial of a female was found with shell beads of unspecified type in front of the hands (Engelbach 1923, Plate LV). In both cases, the

¹⁷Naqada grave T29, not included here due to a lack of recorded size measurements, was found to contain the fragmentary remains of at least two individuals (Petrie Museum 1999) and represents an exception to the general depositional tendencies shown here.

seal and beads may originally have been attached to the wrist of the buried individual. In the Dynasty 1 subsidiary burial of a female individual next to mastaba 3500 at Saqqara, a ‘dummy’ cylinder seal was found under the right hand (Emery 1958, 104). Old Kingdom burials examined here provide further evidence contradicting this conclusion. At Balat, a bead necklace with a rich variety of beads and a seal was found around the neck of a male burial in tomb T10 near the mastaba of Ima-Pepy/Ima-Meryre (Valloggia 1998a, 32). Consequently, necklaces with seals were apparently not exclusive to female burials throughout Egypt. A copper stamp seal was found near the left wrist of a mature female individual in burial 5100 in the mastaba complex of Khentika. A cylinder seal from tomb 30 near the mastaba of Khentika was found by itself in the area of the deceased woman’s wrists. It was judged to have belonged to the female grave occupant and likely represented the seal of office of a priestess of Hathor (Castel and Pantalacci 2005, 419). Tomb 105 from the same cemetery contained a younger woman wearing a bracelet consisting of beads and a stamp seal (Castel and Pantalacci 2005, 419, 449). Of the Old Kingdom burials at Matmar, the female individual in grave 3214 was found to have a brown soapstone stamp seal deposited near the hands (Brunton 1948, 30, XXIV, XXXIII.8). Grave 3217 was found to contain a stamp seal near the female skeleton’s right hand.

Consequently, the ‘tradition’ of placing cylinder seals on the wrist of male deceased individuals may have been spatially and temporally restricted to burials of the Qaw region during the later Middle Kingdom. The tradition of using a seal as a bracelet element should therefore not be considered as an inherently masculine or feminine tradition given the lack of clear evidence in favour of this hypothesis¹⁸. The exclusive use of seals on necklaces at Nag el-Deir Cemetery 500–900 also indicates that the placement of seals in burials may have varied from cemetery to cemetery in Egypt (see Section 2.3.5).

Use wear patterns on seals found buried with individuals have yet to be investigated. Further investigations should also scrutinize the difference between daily wear caused when a seal was strung as an amulet versus use wear caused by use of the seal as an administrative tool. Thus, the degree to which seals buried with individuals were used in life remains to be determined by future studies. It must also be considered that such seals could have been multifunctional, serving both as administrative tools and as amulets (Cooney 2008, 6).

Children would likely not have been responsible for administrative duties. Thus, the only occasions where a strong case can be made for the exclusively amuletic purpose of cylinder or stamp seals in a burial is when they are found interred with a child. Relatively few child-burials containing seals are found in the database assembled for the present analysis. Nag el-Deir N1604 and N3091 from the Early

¹⁸In her study, Dubiel was unable to account for the possibility that male individuals wore bead wristlets on which seals were also strung in the Middle Kingdom Qau burials due to a lack of documentation (Dubiel 2012, 65, Footnote 12).

Dynastic, as well as el-Mustagidda 10002, Balat Ima-pepy/Ima-Meryre mastaba burial T22, and Nag el-Deir N627 from the Old Kingdom were all burials of immature individuals that may have been given ‘amuletic seals’ as grave goods. Finally, Nag el-Deir N508 was found to contain an adult individual, an immature individual, and an infant, but the stamp-seal in this grave was found with other amulets and beads around the neck of the infant. Consequently, seals were probably not normally an appropriate burial good for immature individuals from the Predynastic to the Old Kingdom period in Egypt.

2.3.7 Subsidiary Tombs: Highlighting exceptional status

Subsidiary graves are only found surrounding elite graves dated to Dynasty 1–2¹⁹. Most of the 11 subsidiary burials included in the data analysed in Figure A.28 showed little variance in area. The area of these tombs was likely artificially standardized, even if the individuals buried in these tombs may have been of varying social status (Morris 2007a, 28).

Seals found in most of the non-subsidiary Egyptian burials under consideration were made of stone or ivory (see Tables A.2–A.5), materials that were relatively common in Egypt and Nubia from the Predynastic to the Old Kingdom (Aston *et al.* 2003; Krzyszkowska and Morkot 2003, 323). Conversely, inscribed or uninscribed cylinder seals found in subsidiary graves were almost always made of wood (see Table A.4). Good-quality wood was probably imported into Egypt since it was almost impossible to obtain domestically (Gale *et al.* 2003). Thus, the deposition of wooden seals in subsidiary graves likely conferred a special status on these individuals.

The uninscribed ‘dummy’ ivory seals found in the subsidiary graves of Aha represent an outlier to this trend (see Table A.4). The Aha subsidiary cemetery may have been the first subsidiary cemetery ever constructed (Bestock 2009, 27–28). Thus wood may not yet have been established as a pre-eminently elite material for seals²⁰.

Wooden seals were found in only two non-subsidiary burials. One was the el-Amra b91 grave, and the other, Nag el-Deir N3091. Thus, of all the graves assembled in this analysis, only burials dated to the Early Dynastic were found to contain wooden seals.

The rarity of wooden seals in Dynasty 1–2 burials runs contrary to the assumption made by Richards (2005, 110, 111) about the relatively low ‘wealth’ or prestigiousness of wood as a material used in burials. This postulate was made based on texts from the Middle Kingdom and New Kingdom (circa 1980–1760 and 1539–1077

¹⁹See page 52 for a definition of subsidiary burials.

²⁰Two uninscribed ‘ebony’ cylinder seals were found in the general vicinity of the B16 subsidiary tombs, but their exact location was not given by Petrie (1902, XXXII, no. 27, 28). One of these cylinders is now catalogued with the number 01.4.23 in the Metropolitan Museum, New York.

BCE (Hornung *et al.* 2006, 491–493)). Consequently, evidence seems to show that assumptions about the ‘richness’ of a particular material used for funerary goods in Egypt cannot be arbitrarily projected backward onto earlier Egyptian material. The absence of wooden seals from the Predynastic and Old Kingdom eras may be an indication that seals made from other materials were considered more prestigious during these periods, or may simply be due to poor organic preservation in tombs that had once contained wooden seals.

Seal impressions from late Naqada III and Dynasty 1–2 are frequently known to bear titulary or insignia of rulers and officials as well as names of possible administrative divisions (Kaplony 1963a; Müller 2012). However, none of the seals excavated from subsidiary graves appear to have had the name of any known high official or ruler inscribed on them (see Table A.4). To date, no Early Dynastic seal bearing these features has been found in Egypt. Decorum or ancient administrative regulation may have prevented these types of seals from becoming grave goods. The administrative symbol of the ‘Upper Egyptian Shrine’ has been found on the seal from the Djer valley enclosure subsidiary grave 772. However, this was a more general symbol possibly associated with administrative institutions (Müller 2012, 21). Thus, it may have been considered acceptable for such a symbol to be buried with a sacrificed individual.

Administrative seals bearing royal imagery and names/titles of high officials employed on sealed mortuary goods may have been destroyed after their bearer(s) no longer employed them. It may have been judged wiser to destroy administrative seals rather than have their symbolic and authenticating power (Collon 2005, 113) misused or appropriated. However, given the prevalence of wood as the material used to make these seals, it is also possible that administrative seals were discarded in areas where they were quickly subject to degradation, such as on a rubbish heap in a settlement on the Nile floodplain.

Some seal impressions bearing royal names and titulary, the names and titulary of high officials, or administrative titles, exhibit flaws that may be consistent with the cracks found in wooden seals (Petrie 1900, 24; Emery 1954, 115, 117). Thus, wooden cylinder seals were apparently used in pharaonic administrative transactions. Placing a wooden seal in a subsidiary burial may have served to emphasize the administrative position of the deceased within the pharaonic state. It is equally possible that the administrative status highlighted by this seal was only conferred on the individual in death, as an additional honour. Since many of the carved wooden seals or carved seal fragments apparently show little evidence of wear (see Table A.4.), it is possible that seals deposited in subsidiary tombs were explicitly fabricated as grave goods. This was almost certainly the case for uncarved ‘dummy’ seals.

Examining available evidence for seals found in subsidiary graves also reveals other burial trends. The seals deposited in the subsidiary burials next to the grave

of Aha at Abydos were all ‘dummy’ cylinder seals (see Table A.4 and Figure A.46). Meanwhile, the seals deposited in the subsidiary graves surrounding Djer’s burial and found in burials surrounding Djer’s valley enclosure at Abydos were all fully carved seals that could theoretically have been used (see Table A.4 and Figure A.46). Thus, the burial complexes associated with each ruler’s grave seem to provide evidence for different types of seal deposition practices. In Aha’s burial complex, only non-functional seals were interred in subsidiary burials, while Djer’s burial complexes only contained fully functional seals. No other seals were found interred in subsidiary burials associated with subsequent rulers.

When this evidence is compared to the evidence for seal impressions from subsidiary burials at Abydos, it becomes clear that only a single Aha III valley enclosure and seven subsidiary burials surrounding Djer’s grave were apparently found to contain seal impressions at Abydos (see Table A.13). Thus, it appears the deposition of cylinder seals or seal impressions in subsidiary burials intended for rulers at Abydos was also restricted to grave complexes associated with the two earliest Pharaohs of Dynasty 1: Aha and Djer.

In the long row of tombs located to the north of the main burial chamber of Djer, the first column, lying closest to the burial chamber itself, had burials found to contain seal impressions (see Figure A.64), while the second column next to it had burials with seals placed in them (see Figure A.46)²¹. Thus, a hierarchy of proximity appears to be present in the placement of impressions versus seals in the northern subsidiary burials of the Djer tomb. Those buried closest to the ruler were given seal-impressed goods, while individuals interred in the ‘second rank’ were given seals.

Finally, the non-royal Saqqara mastaba 3500 was found to include two burials with ‘dummy’ cylinder seals, this time inscribed in black ink. mastaba 3500 has been dated roughly to the reign of Qa’a (Regulski 2010a, 71), the last pharaoh of Dynasty 1. Thus, the type of cylinder seal deposited in subsidiary burials appears to have varied from grave complex to grave complex during Dynasty 1 (circa 3150–2730 BCE (Hendrickx 2006, 92; Hornung *et al.* 2006, 491).

Most subsidiary graves are similar in size to normal graves of this period. Subsidiary and normal cemeteries also both contain very few seal-containing graves during Dynasty 1–2 (see Table A.1). Each burial examined here was recorded as containing only one seal. Thus, the use of such artefacts as burial goods in subsidiary graves was apparently restricted to one artefact per grave. Only 11 subsidiary burials with seals were recorded in the present study (see Table A.4). Given that valuable wood was frequently used to create these seals, they may have been considered to hold a special status as subsidiary grave goods.

²¹The two burials found to contain separate fragments of a single seal were also located in this row.

2.3.8 Unusual burial contexts and seal types

Incidences of multiple seal deposition in a grave and special types of seals are examined here to determine what the meaning of these seals may have been within their specific context. In two cases, an Early Dynastic burial was found to contain more than one seal. El-Amra b91 contained two cylinder seals, one stone and one wooden. Since wooden seals were likely prestigious (see Section 2.3.7) and the burial was large (24.5 m²), these seals may have been deposited to emphasize the status of the grave occupant. The other burial was Nag el-Deir N1605, found to contain an unprecedented nine stone seals. Nag el-Deir N1605 was one of the largest conventional burials examined, with an area of 21.4 m². Abydos B13 and B14 are larger (33.7 and 25 m² respectively), however these two burials were subsidiary burials attached to the tomb of a ruler. Consequently, Nag el-Deir N1605 was likely the burial of a prominent private individual.

Of the nine seals found deposited in Nag el-Deir N1605, all but one exhibit some degree of wear (Reisner 1908, 151). Reisner (1908, 122) suggests the seals were given to the deceased as ‘marks of authority’ by other individuals, or were employed by the deceased in life and included in the grave. Many of the nine seals found in Nag el-Deir N1605 were carved with the same sets of hieroglyphs, but in different combinations on each seal (see Table A.4). Thus, most of these seals may have been associated with a single administrative position or individual. However, it is also possible that several people employed these seals while acting as agents under the authority of a superior, possibly the individual buried in the tomb. When this individual passed away, the seals may no longer have been usable, leading to their interment in the burial.

The cylinder seals from Nag el-Deir graves N1501, N1562, and N1604 were discovered together with cylindrical beads (Reisner 1908, 118). In two cases, (N1501, N1604), the cylinder seal was listed as ‘worn’, while the cylinder from grave N1562 was noted as ‘nearly new’ (Reisner 1908, 122, 151). It is possible that these cylinder seals were worn on necklaces with other beads, while still being used as administrative artefacts. It is also notable that only tubular beads were found in the vicinity of cylinder seals in these burials (Reisner 1908, 118). The use of beads similar in appearance to the seal may have been deliberate. Tubular beads were more difficult to manufacture (Stocks 2003, 205, 207) and may have served to enhance the prestige of the seal-wearer. Further investigation into the wear on the tubular beads and the wear on the cylinder seals is required to investigate whether the seals had been restrung with a newer set of beads at any point in time. Differentiating between use wear and wear caused by chafing on the cylinder seals should also be investigated.

Five Old Kingdom tombs also contained more than one seal:

1. Tomb C, found within the precinct of the mastaba tomb of the governor Ima-Pepy II at Balat, was judged to belong to a relative of the governor (Minault-



Figure 2.1: Seal hieroglyph from false door of the Dynasty 4 mastaba of Rahotep at Meydum. Image from (Petrie 1892, Plate XIII).

- Gout *et al.* 1992, 53). This would explain why two stamp seals were found in the intact burial, one made of carnelian and the other a seal with an elaborately carved zoomorphic handle (see Table A.5).
2. Tomb 105 in the cemetery surrounding the mastaba of Khentika at Balat was found to contain a female individual and child. One steatite stamp seal was found on each of the two beaded wristlets worn by the female (Castel and Pantalacci 2005, 158, 163).
 3. Nag el-Deir N505 was found to contain the skeletons of three individuals. A stamp seal was found on a bead necklace around the neck of body I. Two stamp seals were found on necklace(s) around the neck of body III. Four other stamp seals were also found in the debris of this disturbed tomb (Reisner 1932, 111).
 4. Nag el-Deir N780 belonged to a single individual, and was found to contain two faience stamp seals on a bead necklace still in place on the skeleton (Reisner 1932, 304).
 5. Mustagidda 10002 was the burial of a child judged by the excavators to have been approximately ten years old at the time of death (Brunton 1937, 99). The grave was found to contain four seals, each made of a different material (see Table A.5). The large quantity of calcite vessels also buried in the same tomb (thirteen) led the excavators to consider it exceptional (Brunton 1937, 99).

The status of Tomb C at Balat appears to have been marked by a somewhat larger than average grave size in comparison to many other seal-containing Old Kingdom graves (5.1 m²). None of the other tombs listed above were found to have outstanding grave sizes in comparison to the rest of the Old Kingdom seal-containing grave corpus. Mustagidda 10002 was found to contain exceptionally rich grave goods, indicating that the four stamp seals found in the burial may have served as status markers alongside the other tomb goods. Balat Khentika 105, Nag el-Deir N505, and Nag el-Deir N780 were not considered special by the excavators. Consequently, it appears it was not necessary to possess exceptional status that was expressed by tomb size or tomb contents to be buried with more than one seal in the Old Kingdom.

In Nag el-Deir N1532, a gold plating for a cylinder seal was discovered alongside gold plates for the top and bottom of the cylinder, a golden hanging loop originally attached to the top plate, and a golden outer casing wrapped around the width of the cylinder. The hole in the bottom cap of the cylinder exhibited evidence of wear, indicating it may have been worn on the body before deposition in the burial (Reisner 1908, 31). The excavators surmised (Reisner 1908, 31) that this plating formerly surrounded a seal made of perishable wood. However, it is also possible that the cylinder had a plain uninscribed wooden cylinder at its core, and the inscriptions were only chased into the gold plate. Given that the seal was fitted with a golden hanging loop on the top from which the seal could be suspended but shows evidence of wear on the bottom cap, the following object biography (Woodward 2002, 1040) of the seal can be reconstructed:

1. The gold plated seal was manufactured. The seal may have been strung so that both ends of a necklace or string passed through the top hole with the ends of the string secured by a bead adjacent to the bottom hole. This method of hanging is attested in Old Kingdom hieroglyphs (see Figure 2.1), and archaeologically, at Abusir El Meleq (Scharff 1929, 98). This could have caused the wear seen on the bottom cap. The seal could theoretically still have been used to seal clay sealings on particularly symbolic occasions.
2. At some point, the seal was fitted with a golden hanging loop placed over the top hole of the seal. With this addition, the seal could now be worn as a pendant. The gold plate cover may also have been wrapped around the seal at this time. Both the hanging loop and the cover may have nullified the original administrative purpose of the seal and transformed it from a theoretically functional to a purely ornamental object.

The care with which the seal had been covered in an uninscribed gold plate cover may indicate that it was also considered important to preserve the inscriptions on the seal, even when these were no longer visible. The precious nature of the material employed for the seal (Ogden 2003, 161) demonstrates that the seal likely served as an indicator of the grave owner's prestige. It is possible that this seal did not initially belong to the grave owner, but to an ancestor, and the buried individual may have inherited the object after it had been turned into an ornament. Thus, the gold seal from this tomb seems to provide evidence for the transformation of an object from a practical tool into an ornament over the course of its use life. Initially, the seal was an 'inscribed' object (Joy 2009, 546), destined from the moment of its making to display the status of the owner and potentially serve to seal objects on special occasions. It was subsequently transformed into a valuable ornamental pendant that may still have displayed the status of the wearer, but without the added symbolism of the cylinder's use to seal clay or the inscription chased on its surface.

Also found in this tomb were gold necklace beads, gold ornaments, and a gold forehead circlet (Reisner 1908, 29–33). Consequently, the rich contents of the burial indicate that the individual interred in this grave may have possessed considerable status in the eyes of the mourners (Wengrow 2006, 174).

2.3.9 The use of hieroglyphs on seals in Early Egypt

In Naqada II and III, seals deposited in tombs bore pictographic motifs, as shown in Tables A.2 and A.3. Thus, the idea of owning a seal whose distinctive imagery likely conveyed identity appears to have been well-established prior to the development of hieroglyphic writing. Individuals buried in tombs of any size were apparently entitled to have seals deposited in their tombs during these periods (see Section 2.3.2). Thus, seals were probably not restricted to burials of individuals of a certain rank.

In the Naqada III period, signs that formed the initial basis for hieroglyphic writing came into use. Notably, the data assembled in Table A.3 displays some evidence for the use of these proto-hieroglyphic signs on cylinder seals in relatively non-prestigious burials dated to Naqada III. A falcon atop a niched facade (later taken as a sign for the Pharaoh) can be seen on a seal from Helwan 160 H3. Similar niched facades are also found on the seal from Faras grave 4. Two upside-down ‘ka-arms’ are also visible on the seal from Saras West 11-H-6 grave 16. Thus, the precursors to written signs may already have been known to lower strata of society during this period.

The seals depicted in Table A.4, dated to Dynasty 1–2, are almost exclusively engraved with hieroglyphic signs. The hieroglyphs found on these seals are considered indecipherable (Baines 2007, 131). Consequently, hieroglyphs may have been used for display purposes as a marker of the tomb owner’s identity, even if they could not be read.

After the advent of Dynasty 1–2, elite pharaonic symbols such as the niched facade (Spieser 2010, 1) are no longer found on seals deposited in burials, perhaps indicating that the use of such symbols was no longer permitted on seals that were deposited in tombs. The disappearance of royal motifs from seals used in burials may have been part of the ‘standards’ that were being developed and used on seals employed by pharaonic administrative systems.

From Dynasty 1–2 onward, seals with pharaonic motifs were employed to mark goods that were deposited in elite and royal burials (Müller 2012, 17). Some evidence for high-status sealing practices has also been uncovered in settlements (Fairservis 1986, Figure 13; Pätznick 2005; Faltings *et al.* 2000). Thus, the pre-existing device of the seal appears to have been appropriated for elite and royal use for the purpose of administration and display. Seals likely manufactured for use on royal or high elite funerary goods employ types of iconography that differ from the seals attributed to private individuals. The type of hieroglyphs employed and how these are visually

arranged also differs substantially. An example of this in the present dataset can be found in evidence provided by sacrificial and non-sacrificial graves. The seals found in subsidiary burials surrounding royal graves listed in Table A.4 employ a different set of symbols and hieroglyphs on their surface in comparison to the non-royal seals from the same period (compare Nag el-Deir N1605 to the seals from the Djer valley enclosure). The visual composition of the images and hieroglyphs employed is also distinct. The pharaonic administration may have developed a different ‘elite’ symbol set and hieroglyphic ‘font’ to differentiate its seals from the seals used by the common populace. Conversely, private individuals may have adopted the use of hieroglyphs on seals as an imitation of elite writing practices (Baines 2007, 131). Both groups likely had written symbols carved on their seals due to the prestige associated with hieroglyphs (Baines 2007, 130–1).

It is possible that literate individuals composed the inscriptions carved on ‘elite’ or ‘royal’ seals, but it is not possible to determine whether the individuals using these seals were literate. However, it is likely that literacy may not have been a requirement to use these seals, as long as the meanings of the pictographic hieroglyphs was memorized (Smith 2001, 193).

Seals bearing royal names and titulary in addition to the names of officials from this era have been uncovered on occasion (Nolan 2010, 48), but not inside tombs. Thus, these types of seals were likely not considered appropriate grave goods. In Section 2.3.7, it was speculated that Early Dynastic wooden seals used to impress grave goods may have been destroyed or otherwise disposed of after the seal bearer(s) no longer employed them to ensure they were not misused.

Baines (2007, 291) and Wengrow (2006, 152–3) suggest that during the period when a central ruler emerged in Egypt, ordinary individuals were prevented from using visual forms of display on objects buried in tombs and employed in daily life (e.g. painted pottery). However, the evidence presented here suggests that non-elite individuals continued to deposit cylinder seals bearing visual representations during this period. Instead of being extinguished like many other Predynastic art forms, the stylistic evolution of the cylinder seal appears to have been divided between the elite and the common populace.

The importance of the cylinder seal within administrative systems may have contributed to its survival as a form of personal representation during the period when a ruling class emerged. Seal impressions bearing motifs similar to Pre- and Early Dynastic private seals like those under discussion here have been found in settlements (Fairservis 1986, Figure 13; Chłodnicki *et al.* 2002, 81, Figure 16; DiMaria 2007, 74; Chłodnicki 2012, 33, Figure 24; Kołodziejczyk 2012). Thus, seals of these types were likely employed in local administrative systems. Consequently, the practical applications of the seal may have prevented its disappearance from the private sphere at the advent of royal Pharaonic administration.

In the Old Kingdom period, seals continued to be employed for administrative purposes. The split between ‘elite’ seals inscribed with royal titulary and names, and non-elite seals was apparently deepened by the development of the stamp-seal. This type of seal was frequently button-shaped or had the profile of a frustum during this period (see Table A.5). In this era, it appears that cylinder seals may have been reserved for the use of higher-ranking individuals, while those of lower rank employed stamp seals, which frequently bore pictorial motifs (Pantalacci 1996, 360), but could also be inscribed with pseudo-hieroglyphs (Willems *et al.* 2010, 315). Due to the pictorial nature of hieroglyphs, the appearance of both anepigraphic and epigraphic seals could have been memorized by the illiterate or semi-literate. Thus these individuals were likely able to participate in seal-based administrative systems (Pantalacci 2013, 204, 208).

By examining burials from Balat, Matmar, el-Mustagidda, and Qaw, (see Table A.5) it was determined that cylinder seal-bearing individuals generally did not have larger burials than stamp-seal bearing individuals in these cemeteries. Based on these findings, it appears that the deposition of a cylinder seal in Old Kingdom graves was not a marker of status that was linked to tomb size. Thus, although cylinder seals may have been used by individuals of higher status in life, they were apparently not employed as symbols of higher status in death.

Cylinder seals found in Old Kingdom graves examined here are frequently inscribed with hieroglyphs (Castel and Pantalacci 2005, 419). Again, these hieroglyphs may have been functionally illegible in many cases, as illustrated by the images of cylinder seals found in Balat, mastaba of Khentika, Tomb 30, Qaw 955, 1145, and 5531 in Table A.5. Impressions made by illegible seals found at Sheikh Said appear to support the idea that these seal types could be used in administration, and were not purely manufactured as grave goods (Willems *et al.* 2010, 314). Two other cylinders, found in Nag el-Deir N505 and Mustagidda 2673, are bone seals that bear an abstract lattice pattern (Table A.5). The cylinders from Elkab 166 (Quibell 1898, 9–10), Qaw 1145, and 5531 (Brunton 1927, 8) are carved with imitation royal titles, indicating that elite imitation seems to have continued during this era.

2.3.10 The status of tomb-owners buried with seals

Grave occupants may have been entitled to make use of seals to seal objects in their lifetime, though it can never be confirmed if the seals deposited in tombs were utilized by the deceased. Seals may also have been left as gifts from relatives or friends. However, even in such circumstances, the deposition of these objects still confirms that the deceased was considered to be entitled to have these objects placed in their burial.

One theory states that the deposition of Predynastic grave artefacts bearing imagery was used to portray the deceased and their ties to others. This practice is

said to decline in the Naqada III–Early Dynastic period. State-level administrative structures that deprived the individual of agency in favour of the collective are considered the source of this change (Wengrow 2006, 174). However, based on the evidence assembled here, it is clear that seals were likely representative of the status of buried individuals in the eyes of others due to the unique imagery carved on these objects.

The establishment of a state-level society in the Early Dynastic probably did not change the representative function of the seal. Seals deposited in Dynastic burials can have illegible hieroglyphs carved on them that cannot be ‘read’ per se (Baines 2007, 131). However, the individuals responsible for the burial could still view the hieroglyphs as images evoking the status of the deceased. Thus, the deceased could likely still be portrayed by at least one type of inscribed artefact in this era. Subsidiary burials were found to contain seals that may have been ‘made to order’ for the burial, or were uninscribed (see Section 2.3.7). It was therefore possible to exert significant control over how the deceased individuals were portrayed for posterity by depositing these cylinder seals in the subsidiary graves. The identity of the sacrificed may have been re-written by those responsible for their funerary arrangements (Wengrow 2006, 166). The deposition of these seals may exemplify this practice.

Evidence reviewed in Section 2.3.2 shows that seals were generally deposited in burials with smaller surface areas. Thus seals may have been the purview of individuals that did not belong to the highest levels of society in ancient Egypt. Any individual not belonging to the high elite class could therefore theoretically have a seal accompanying them in their burial. However, few graves appear to have contained seals in Egypt during the Predynastic and Early Dynastic. The number of seal-containing burials per cemetery appears to have increased during the Old Kingdom period, but still never exceeds 12% (see the Matmar data in Table A.1). Consequently, individuals buried with seals may have been considered to have a special status.

The earliest seals found in Egypt have been dated to Naqada IIB–C. These seals were found in graves and are frequently posited to have been imported. Two of these graves are included in the present examination: Nag el-Deir N7501 and Haraga Cemetery H, grave 470. Previous studies have argued that seals were purely ornamental grave goods for the Egyptians at the time of their earliest introduction into the region (Guyot 2004, 88; Watrin 2004, 70; Honoré 2007, 43). However, the presence of clay seal impressions from graves at Cemetery U in Abydos provides evidence that seals were already being used to seal objects from Naqada IIC–D onward (Regulski 2010a, 35). Thus, the sealing function of seals may already have been known to individuals in Egypt at the time when these artefacts were first imported.

Evidence from Early Dynastic and Old Kingdom cemeteries shows that the use of seals as a burial good may have become more widespread during these periods. It has been theorized that seals buried with individuals were employed for amuletic purposes during the Old Kingdom. However, it cannot be ruled out that they were also used to impress clay sealings prior to their deposition in burials.

Early Dynastic seals found in tombs are often inscribed with hieroglyphs. Seated figures of humans are also frequently depicted on these seals. Objects that resemble tables laden with bread are sometimes carved in front of them (see the bottom left corner of the seal from el Amra, Table A.4). The prevalent theory suggests these seals were manufactured for purely votive funerary purposes (Regulski 2010a, 40; Regulski 2011, 24). However, sealings bearing impressions of similar Early Dynastic seated-figure seals²² have been found in settlement sites and temples, so these seals could potentially also have been used before being deposited. These seals bear no markings that associate them with the royal court. It is more likely they were utilized by local administrators. This tends to support the conclusions made in Section 2.3.2. This trend continues into the Old Kingdom, though the occasional use of royal titulary on relatively crudely carved seals found in burials indicates that decorum or regulations may no longer have prohibited the burial of seals bearing royal names in graves (see Section 2.3.7).

Some seals included in this analysis were found to be heavily worn²³. These seals could theoretically have been employed by the individual being buried, or by other individuals prior to the deposition of the seal in a burial (Reisner 1908, 122). The ‘hieroglyphs’ on these seals may have been illegible combinations (Baines 2007, 131). However, it is plausible that these combinations were meant to be unique and identifiable. Consequently, the pictographic ‘hieroglyphs’ could still be identified as sequences of recognizable images, even by the illiterate (Pantalacci 2013, 204). The same can be said of the designs on all other seals discussed in this chapter, each of which is unique. It has been posited that non-legible cylinder seals from the later Old Kingdom could be ‘read’ by people working in a particular locale since they knew the identity of the individual(s) with whom the seals were associated (Willems *et al.* 2010, 315). This was likely also true of seals in earlier periods. Thus the seals found in burials discussed in this study could all theoretically have been utilized by the owner or another individual to leave impressions on sealings as part of local administrative duties.

²²For evidence of offering table seal use, see Petrie 1903, Pl XVI, no. 13; Dreyer *et al.* 2006, 121, Abb. 18m; Fairservis 1986, Figure 13, no. 221 Pätznick 2005, 489, 493, 503, 526; Regulski 2014, 236, Fig. 6; Bussmann 2014b, 30–31.

²³The inscribed seals from Nag el-Deir (Reisner 1908, 122, 151), the ivory seal found at Abusir (Blaschka 2006, 77) and an earlier Naqada III pictorial seal from Helwan 160 H3 (Köhler 1999, 50) were all found to exhibit evidence of wear.

2.4 Conclusion

Individuals buried with seals may have held the privilege of making ‘their’ mark and being recognized for that act. It has been theorized that mourners who assembled and organized the burial of the deceased held a significant degree of agency when representing the identity of the deceased through grave goods (Stevenson 2009b, 160). Funerary gifts (Pearson 1999, 85) may have also symbolized life stories and relationships between the living and the deceased. The ability to symbolize such relationships via artefacts buried with the dead may have been reduced once a pharaonic state formed in Egypt at the end of the 4th millennium (Wengrow 2008, 173–174). However, it has been posited in Section 2.3.10 that seals were one of the few artefacts that could still symbolize identity through the symbols carved on their surface. The small quantity of tombs found to contain seals in all eras examined here (see Figure A.47) seems to indicate their placement in a burial was a deliberate act. Since each seal found in the burials examined in this chapter is unique, it is also possible that the images carved on each of these seals could be associated with a specific individual²⁴. Thus, the deliberate placement of seals in a burial was likely indicative of the individual’s identity, regardless of whether they had been an administrator, used the seal as an amulet, or whether the seal was only placed with them after death.

Judging by available skeletal evidence, seals were not preferentially buried with males or females in the Predynastic to Early Dynastic. However, seals were apparently more frequently deposited with female individuals in the Old Kingdom. Very few child graves had seals as burial goods, indicating that this was not often considered an appropriate grave good for immature individuals.

Adults of both sexes could be buried with seals in tombs that varied in area and quantity of grave goods, though these tombs were generally modest in size. Consequently, access to seals as a burial good was apparently not perceived as an elite prerogative in ancient Egypt. The relative scarcity of tombs found to contain seals indicates that depositing a seal in a tomb may not have been an institutionalized burial practice in the Predynastic and in Dynastic Egypt up to and including the Old Kingdom.

In Egypt, seals were deposited in tombs before, during, and after the development of a ruling elite. Cylinder seals were appropriated for use by this new elite administrative system. Unlike other decorated objects, they were not removed from use in the common sphere. This was probably due to their administrative usefulness. Hieroglyphs, though generally considered to be restricted to elite administrative practices, were apparently utilized for display purposes on non-elite seals. As a result,

²⁴Administrative seals bearing the name or titles of the ruler or high officials are a possible exception to this rule, and will be discussed in the following chapter on sealings.

the concept of writing as a prestigious act may already have filtered through to the general populace shortly after its invention.

When examined, seals from graves have been found to exhibit wear, indicating that they were perhaps employed for administrative purposes before being deposited in a burial. ‘Offering table’ seals depicting figures seated in front of offerings were previously argued to be funerary amulets. However, finds of impressions by similar seals in settlements indicates that such seals could also have been used prior to deposition in a burial. The number of graves found to contain seals increases in the Early Dynastic and Old Kingdom. No seals were found in the large tombs favoured by the high elite (Morris 2007b). Thus the use of the seal as a burial good appears to have spread over time throughout the lower stratas of ancient Egyptian society. Early Dynastic subsidiary burials found to contain wooden and ivory seals form an exception to this trend. From available evidence, it appears these seals were clearly deposited in subsidiary burials as a sign of prestige acquired by the occupant in death. The importance of an individual who is entitled to ‘make their mark’ on clay should not be underestimated. The power of reproducible images enables individuals and corporations to spread their influence to this day.

Given the evidence analysed in this chapter, it is likely that access to seals as a burial good was never restricted to individuals of high status, even during the era when seal technology was first introduced into Egypt in the Naqada II period (*contra* Regulski 2010a, 40; 2011, 24). Also, seals may have been used prior to their deposition in a tomb. Thus, in early ancient Egypt, seals were probably perceived as objects that could be used by and buried with individuals that were not of high elite status. Consequently, the administrative function of the seal may not have been restricted to high elite administrative systems in early Egypt. Evidence from Naqada II–Dynasty 6 shows that cylinder seals and stamp seals remained a relatively rare grave good.

Based on the examination of tomb areas, it appears that individuals granted the possibility of displaying their status via grave size were not automatically entitled to have a seal in their burial. It can be argued that seals found in tombs were therefore a marker of heterarchical status (Stevenson 2009b, 193–194). However, since seals were used to impress clay sealings on goods as part of administrative systems from Naqada II onward (Hartung 1998), seals may also have been intrinsic markers of hierarchical status. Seals buried with individuals may have been employed by these individuals in life, or could have been placed in their graves as amulets. Regardless of the reasons for placing these objects in burials, the use of seals as a grave good in Egypt is a indicator of the degree to which the new technology was adopted by the population. Seals were likely used by the living for administrative purposes. Individuals entitled to ‘make their mark’ may have had a special status regardless of their hierarchical position, since they were capable of authorizing goods

and transactions. Thus, the rarity of seals in graves may be an indication that seals were only given to deceased individuals ascribed a special status. Given the scarcity of seals in tombs, even seals deposited for purely amuletic purposes would likely have only been deposited with select individuals. Evidence from intact tombs indicates that the possible meaning of seals placed in burials may have been as diverse and significant as the lives led by each buried individual.

Chapter 3

Egyptian burials containing seal impressions

3.1 Introduction

This chapter examines depositional practices applied to seal-impressed goods and sealings placed in burials in early Egypt. As stated in the previous chapter, tombs provide better preserved, more easily datable contexts than settlements (see Section 2.1). Rather than tracing administrative processes through inscriptions on seal impressions (Kaplony 1963a; Kahl 2003 Regulski 2008; Regulski 2009a; Müller 2012; Engel 2013), this study seeks to examine how seal-impressed goods were perceived by the general populace. Tomb goods may not provide accurate information on the occupations of the deceased in Egypt. However, data from burials can be utilized to identify the different classes of individuals for whom seal-impressed containers were deemed to be an appropriate grave good (Stevenson 2009b, 160–161). The accessibility of seal impressions as a grave good for ancient Egyptians can be inferred by examining how frequently these artefacts occur in interments, and the type of graves they are found in. Subsequently, the evidence for seal-containing burials from Chapter 2 is compared to the material analysed here, to determine differences between depositional practices related to seals and sealed products in graves.

Müller (2012, 17) has stated that seal impressions tend to be found in large elite burials, but no analysis has been conducted to support this statement. Consequently, this chapter also endeavours to investigate whether certain classes of individuals were more likely to be buried with seal impressions in Egypt. This will indicate whether the possession of seal-impressed goods as a funerary artefact may have been restricted to individuals of a particular status at the time of the technology's first introduction. Tombs are scrutinized to determine the possible post-mortem attributed status of individuals buried with seal impressions.

3.2 Methodology

In this study, the post-mortem status of buried individuals is determined primarily via grave area, the most consistently available burial datum, as well as secondary evidence from previous studies. Tomb area seems to be a clear indicator of status in early ancient Egypt, as outlined in Section 2.2. A similar methodology to the previous chapter is applied here to data on seal impression-containing tombs. Graves dating from Naqada II (circa 3600–3350 BCE (Hendrickx 2006, 92)), Naqada III (circa 3350–3150 BCE (Hendrickx 2006, 92)), Dynasty 1–2 (circa 3150–2593 BCE (Hendrickx 2006, 92; Hornung *et al.* 2006, 491)) and Dynasty 3–6 (circa 2592–2153 BCE (Hornung *et al.* 2006, 491–492)) are examined in this chapter, and the data from these tombs is compared to data from Chapter 2.

Data on the substructures of tombs found to contain seal impressions throughout ancient Egypt and Nubia dated from Naqada II to Dynasty 6 is compiled and examined. Tomb types referred to in this chapter are illustrated by examples in Figures A.10–A.14. Naqada I data from Abydos (circa 4000–3600 BCE (Hendrickx 2006, 92)) is also included for comparative purposes. Wherever possible, measurements of all tombs from one cemetery are compared to the area of the seal impression-containing tomb(s) from that cemetery. Early Dynastic and Old Kingdom tombs found to contain sealings with seal impressions on them also frequently possessed superstructures. The measurements of these superstructures were not included in the analysis proper, since almost all earlier Naqada II–III tombs had no comparable superstructures. In many large Dynasty 1–2 mastaba tombs, several subterranean compartments with mud-brick lined entrance shafts were sunk underneath the brick superstructure (see Figure A.50 and A.51). The outer perimeter of the mud-brick substructure was used to calculate the total area covered by the portions of the tomb located underground. At times, seal impressions on clay may have been destroyed by taphonomic processes, scattered outside the tomb, or removed by ancient or modern looters. However, this factor can not be accounted for, and remains a caveat to any study of this type. The breadth of the current analysis helps to offset this factor.

It is also possible that excavators working in the 19th and early 20th centuries may have missed seal impressions in some burials due to the use of less well-developed excavation methodologies. However, this study includes material from 31 sites. Of these, 17 sites were excavated prior to WWII, and 14 sites were excavated after WWII. The breadth of the study and inclusion of material from more recently excavated sites helps to compensate for possible errors on the part of early excavators. Thus, the burials examined here likely reflect depositional trends in graves during 4th–3rd millennium Egypt and Nubia.

The same criteria employed to measure tombs containing seals in Chapter 2 is used here for tombs found to contain seal impressions. This is done to ensure the comparability of data analysed in this chapter with that examined in Chapter 2.

Graves with unrecorded measurements are not included in this analysis. In the earlier periods, comparatively few burials in a given cemetery contain seals or seal impressions (see Table A.10). This situation changes in the Old Kingdom, where seal impressions can be found in burials dated to different Dynasties within a single necropolis. For example, graves dated from Dynasties 4–6 at Giza were found to contain seal impressions. As many cemeteries as possible were investigated to assemble a sufficiently large sample of burial sites found to contain tombs with seal impressions for all four periods under examination²⁵. The data from tombs from the same cemetery was sub-divided by period wherever possible. For instance, the Naqada III data and Dynasty 1–2 data from Farkha is always plotted separately.

3.3 Egyptian burials containing seal impressions

In total, 120 seal impression-containing tombs were included in the present analysis. The tombs contained seal impressions, and were dated to Naqada II, III, and Dynasty 1–6. A summary of the data can be found in Tables A.11–A.14. Examples of the grave types mentioned below can be found in Figures A.4–A.14.

To date, the only Naqada II tombs found to contain seal impressions are located in Abydos Cemetery U in Upper Egypt (see Figure A.57). The eleven Naqada II dated seal impression-containing burials from this cemetery are listed in Table A.11.

In Naqada III, seal impressions are present in nine Cemetery U burials. Evidence for seal impressions in burials can also be found in other cemeteries for the first time during the Naqada III period (see Table A.12). In Upper Egypt (see Figure A.17), one sealing was found in a tomb at Hierakonpolis (Adams and Friedman 1992, 330; van den Brink 1992, 265). The first three burials of Pharaohs located in the royal Cemetery B at Abydos (see B 17/18, B7/9 and B1/2 on Figure A.46) also contained sealings (Kaiser and Dreyer 1982). Evidence for seal impressions in Lower Egypt is provided by an early mastaba-type tomb at the cemetery of Tarkhan (Petrie *et al.* 1913, 9), as well as small burials at Farkha (Dębowska-Ludwin 2012, 64) (see Figure A.15). In Nubia (see Figure A.18), seal impressions were found in two tombs from the cemeteries of Ashkeit 308 and 332 (Nordström 1972, 167–168, 178–179).

In Dynasty 1–2, Upper Egyptian data consists of the dynastic royal tombs at Cemetery B in Abydos (see Figure A.64), as well as one burial and one mastaba each at the mixed cemeteries of Nag el-Deir 1500 and 3000 (see Figure A.17). In Lower Egypt, evidence for the use of sealed wares as a grave good is provided by the mastaba tombs at Saqqara North, three underground tombs and one mastaba at the mixed cemetery of Helwan, a brick-lined tomb at Abu Rawash Cemetery 400, the mastaba 1060 at Tarkhan, a grave at the cemetery of Abusir, a mastaba

²⁵The royal burial substructures of Ninetjer, Netjerikhet, and Sekhemkhet at Saqqara were not included since their exceptional size would likely skew the dataset, and relevant impression-containing substructures were not always sufficiently documented.

at Giza, and the remains of an underground tomb at Tura (see Figure A.15). A seal impression fragment was also found in the stairway tomb P225 at the mixed cemetery of Kubaniya South in Nubia (south of Kubaniya North on Figure A.17). Seal impression-containing subsidiary burials surrounding elite burials at Abydos, Saqqara, and Tarkhan are also included in this analysis (see Table A.13 for more information on Dynasty 1–2 burials).

In Dynasty 3, five mastaba graves at Beit Khallaf in Upper Egypt and the Lower Egyptian mastaba 2305 of the high official Hesire were found to contain seal impressions. Also in Lower Egypt, (see Figure A.15), 22 tombs from 6 cemeteries (1000, 1100, 2100, 4000, 5000, and 7000) in the area of the Giza pyramids, dated from Dynasties 4–6 were found to contain seal impressions²⁶. Finally, two mastabas at Abusir were found to contain seal impressions: the mastaba of a royal princess, Hedjetnebu, dated to Dynasty 5, and the mastaba of Qar ‘Junior’, dated to Dynasty 6.

3.3.1 Incidence of seal impressions in tombs

As shown in Table A.10, cemeteries from Naqada II onward were frequently found to contain more than one burial with a seal-impression. However, the number of seal impression-containing burials per cemetery frequently does not exceed five. The only exceptions are Abydos Cemetery U, Cemetery B, the subsidiary burials of Djer at Abydos, the Saqqara mastabas, and Giza Cemetery G 7000. Thus, seal impressions were apparently not consistently used as grave artefacts in graveyards from Naqada II to Dynasty 6. Many of the cemeteries analysed here were used for multiple periods. However, the data available for these cemeteries frequently enables the division of available tomb data by era. Graveyards that spanned more than one period in Egyptian chronology (i.e. Naqada III and Dynasty 1, or Predynastic–Early Dynastic) and were not sub-dividable according to the age of burials could not be included.

3.3.2 Chronological analysis of graves at Abydos

Tombs found to contain seal impressions frequently belong to cemeteries that are incompletely excavated or recorded. However, the site of Abydos contains relatively well-documented cemetery zones spanning from Naqada I–Dynasty 2. As a result, the use of sealed objects in burials at a single location over time can be examined (see Table A.16). The areas of the burials at Abydos can be traced temporally, giving a clearer indication of how use patterns of the cemetery site may have changed over time (Seidlmayer 1988, 45). Chronologically, Cemetery U at Abydos spans the period from Naqada I–III, while Cemetery B was founded as a royal cemetery in late Naqada III and continued to be used for the same purpose in Dynasty 1–2 (Hartung 2007, 187, 190). All Abydos graves with published area measurements are

²⁶Two seal impression containing graves from Giza could not be included in the present study, since the size of the tomb substructures were not recorded. They are: G 2156 and G 4461.

graphed chronologically in Figure A.52. Data from the Naqada I period, pre-dating the introduction of sealing technology into Egypt during Naqada II, is included here in order to compare trends in burial practices at Abydos before and after the introduction of sealing technology to Egypt.

Table A.16 shows that less than 50% of Naqada II and III graves at Abydos Cemetery U were found to contain seal impressions. This contrasts with royal Cemetery B burials from late Naqada III–Dynasty 1–2, almost all of which were found to contain sealed goods. The only two exceptions to this trend are B40 and B50, two unfinished burials (Dreyer *et al.* 1990, 71). Thus, sealed goods were regularly used in tombs at Abydos Cemetery U from the time of the introduction of seal technology into Egypt in Naqada II, but the relative scarcity of their use during Naqada II–III may be indicative of the elite nature of these goods. The consistent use of sealed goods in the later royal Cemetery B shows that the deposition of goods with seal impressions was clearly associated with elite burial practices by the late Naqada III era. It is also during this period that the graveyard is said to have become an elite cemetery (Dreyer 1998; Hartung 2001).

The average area of graves with and without seal impressions at Abydos increases over time (see Figure A.52). The grave area distribution in Cemetery U in Naqada I, prior to the introduction of seals in Egypt, is comparable to that of other cemeteries with graves dated from Naqada I–II examined in the previous chapter, as shown in Figure A.19. Naqada I Cemetery U graves are frequently smaller than 1 m² and do not exceed 10 m² in area.

Hartung (2007, 189) characterises graves of the earlier Naqada II at Cemetery U as less prestigious. However, the data plotted in Figure A.52 includes all published data on Cemetery U graves from early and late Naqada II, and shows that the majority of graves from this period in this cemetery significantly exceed 1 m² in area. This is a marked change in the burial pattern with regard to the previous period. It stands in direct contrast to almost all other non-subsidiary cemeteries previously examined in Chapter 2, aside from the elite Cemetery L at Qustul (see Figure A.23). The data also clusters tightly in a manner similar to later subsidiary cemeteries previously analysed in Figure A.28. Thus, already in early Naqada II, Cemetery U was apparently becoming reserved for more elite burials. The tight clustering observed in tomb area data from this period suggests that the dimensions of these burials may also have been regulated. As shown in Figure A.52 the mean area of Naqada II and III Cemetery U tombs containing seal impressions is larger than the mean area of non-impression containing graves. Comparatively few of the Cemetery U graves (approximately 37 % in Naqada II and 26 % in Naqada III) were found to contain seal impressions. Thus, only certain prominent individuals may have been considered worthy of having sealed objects buried with them.

Table 3.1: Average surface area of burials found within the first and second peaks of Figures A.53, A.54 and A.55, and the ratio of these averages.

	Average of first peak (m ²)	Average of second peak (m ²)	Second peak/First peak
Naqada I	0.8	2.4	3.1
Naqada II	4.4	8.4	1.9
Naqada III	7.3	16.5	2.2

Plotting the surface areas of graves in Cemetery U using histograms reveals interesting regularities in the data. As shown in Figure A.53, the early, non-impression containing burials of Naqada I show evidence for two distinct peaks, the first one higher than the second one. Seven burials were 0.5–1 m² in size, and ten were 2–3 m². In Naqada II, the grave data again exhibits two peaks (see Figure A.54), with the first, higher peak occurring between 4–5 m², and the second between 8–9 m². Half of the graves classified under the first peak were found to contain seal impressions, and three quarters of the graves composing the second peak contained seal impressions. Almost all impression-containing tombs clustered close to these peaks. Two exceptions were one small grave with an impression was located between 1–2 m², and a large outlier was present between 13–14 m².

Figure A.55 shows Naqada III data from Cemetery U. Again, impression-containing burials clustered close to peaks in the data. Two graves were located in the largest peak from 7–8 m², other graves were located in a peak from 16–17 m² and three other graves were either located within smaller peaks or close to one of these peaks. Thus, most impression-containing tombs clustered around 7–18 m². Only two exceptionally large outliers were attested at 31–32m² and 68–69 m². This matches the general deposition pattern seen in the Naqada II graves. However, the highest peak of the data in Naqada II was located between 4–5 m². By contrast, the highest peak during Naqada III was located from 7–8 m². Thus, a shift in grave size trends appears to have occurred from Naqada II to Naqada III in Cemetery U.

The average surface areas of both smaller and larger graves appears to have increased over time in Cemetery U. Tombs smaller than 7 m² were also no longer found to contain impressions during Naqada III, indicating that a trend toward placing sealed goods in larger, possibly more elite burials was already underway in Naqada III.

To examine if the possibly ‘elite’ individuals accorded larger tombs were being distanced from ‘commoners’ with smaller tombs, a ratio analysis can be performed. This is done by dividing the larger second average peak size by the smaller first average peak size, as shown in Table 3.1. Apparently, ‘elite’ individuals with larger burials in Cemetery U were more markedly distanced from ‘common’ tombs by the

Table 3.2: First difference of the first and second peaks of Figures A.53, A.54 and A.55.

Naqada I to Naqada II		Naqada II to Naqada III	
First difference Peak 1	First difference Peak 2	First difference Peak 1	First difference Peak 2
3.6	6	3	8.1

Table 3.3: Second difference of the first and second peaks of Figures A.53, A.54 and A.55.

Second difference - Peak 1	Second difference - Peak 2
-0.7	2.2

surface area of their graves during Naqada I and Naqada III, and less markedly distanced during Naqada II. According to these findings, the distance between the two peaks decreased by 39% between Naqada I and Naqada II, and subsequently increased by 18% between Naqada II and Naqada III.

Studies of other graveyards have determined that an increase in the size of all tombs over time appears to be common in early Egyptian cemeteries (Bard 1988, 51; Delrue 2001, 43). This trend is also present in Cemetery U, as shown in Table 3.1. To determine the rate of increase of each peak over time, the first difference and second difference of the two peaks over time was calculated, as shown in Table 3.2 and 3.3 respectively.

Given the positive values in Table 3.2, this table shows that the size of burials in Abydos Cemetery U was likely increasing over time, as was the case in cemeteries examined by Bard (1988, 51) and Delrue (2001, 43). The negative -0.7 second difference value in Table 3.3 shows that there appears to have been a decrease in the rate at which smaller grave areas increased in size from Naqada I to Naqada III. Conversely, the positive second difference value of 2.187 in Table 3.3 shows that there was an apparent increase in the rate at which larger grave areas increased in size from Naqada I to Naqada III. Thus, it can be said that over time, the larger graves in Cemetery U were markedly distancing themselves in surface area from smaller graves. It is possible that over the use period of Cemetery U, more prestigious individuals were being buried in tombs that were notably larger than ordinary tombs.

There are only three graves dated to Naqada III in Cemetery B. Thus, it was not possible to chart trends in grave surface area via histograms for the earliest use period of Cemetery B. However, sufficient Dynasty 1–2 graves were uncovered in this cemetery to produce Figure A.56. In this figure, it is evident that most of the royal tombs in Cemetery B were built to custom dimensions, the only exception being two tombs falling within the 300–310 m² range. It is also clear that aside from the two

unfinished burials not found to contain impressions, these graves were much larger than their predecessors in Cemetery U.

In the royal Cemetery B dated from Naqada III to Dynasty 1–2, tomb areas exceeded almost all previously recorded burial dimensions at Cemetery U. All burials in Cemetery B were found to contain seal impressions aside from two unfinished graves, showing that seal impressed goods were considered a standard elite funerary good for rulers in this era. Thus, over time, a steady progress toward the construction of ever increasingly larger elite tombs at Abydos was likely correlated with the deposition of seal-impressed goods in those tombs.

3.3.3 Area of tombs containing seal impressions: comparison of tomb area of impression- and non-impression-containing tombs

Abydos Cemetery U is the only cemetery uncovered to date that has seal impression-containing burials dated to Naqada II. However, from Naqada III onward, burials in other cemeteries also contained sealed goods. All cemeteries with seal-containing burials for which area data could be derived for the totality of burials are analysed here. Some cemeteries were not sufficiently well-recorded and could not be included in the analysis. The methodology employed here closely follows that used in Section 2.3.2 on seal deposition in tombs, in order to ensure the comparability of both datasets. In the case of well-documented cemeteries found to contain tombs with impressions, it was frequently possible to classify the burial data into individual eras instead having to specify a date range.

3.3.3.1 Naqada III cemeteries

The areas of non-seal impression-containing burials and seal impression-containing burials from the Upper Egyptian Abydos Cemetery U and B (see Figure A.17 and A.58), the Lower Egyptian site of Tell el-Farkha (see Figure A.15), and the two Nubian cemetery sites of Ashkeit 308 and 332 (see Figure A.18) are graphed in Figure A.59. Data from the non-seal impression-containing burials and seal containing burials of the Upper Egyptian site of Hierakonpolis (see Figure A.17) were not included here since the dimensions of most of these burials have not been published to date. The dimensions of non-seal impression-containing burials from the Lower Egyptian site of Tarkhan (see Figure A.15) were also not included since the graves in this cemetery have yet to be re-dated according to modern standards. Consequently, the data from these cemeteries could not be sorted to eliminate graves assigned to Dynasty 1–2 and later periods. The two Nubian seal impression-containing graves from each cemetery have been dated to Naqada III according to the chronologies given by Takamiya (2004, Table 3) and Gatto (2006, 67).

The average grave area at Abydos Cemetery U during Naqada III was comparable to the average grave area of burials at Qustul cemetery L (compare Table A.15 with Table A.6), at approximately 12 m². Given that graves from both cemeteries were found to contain luxury items (Williams 1986; Dreyer *et al.* 1993), it is likely that Abydos Cemetery U was also an elite cemetery like Qustul L during this period. All but two seal impression-containing burials found in this cemetery were larger than 10 m², whereas most burials without impressions were between 4 and 10 m². Thus, it appears that the area of non-impression containing burials was fairly standardized, but the same was not true of burials with impressions. This further illustrates the analysis in section 3.3.2, where larger, presumably more elite burials were found to increase in size over time compared to non-impression containing burials.

The subsequently founded late Naqada III royal Cemetery B at Abydos was found to have an average grave size of 50 m², exceeding the burial area averages of all other Naqada III cemeteries examined here and in Chapter 2 (compare Table A.15 with Table A.6). All three Naqada III burials in this cemetery were tightly clustered, indicating that grave size norms appear to have been used for the earliest royal tombs in this cemetery. The average grave sizes of Cemeteries U and B are shown connected with a line since cemetery B seems to have been founded chronologically after Cemetery U.

By contrast, Ashkeit cemeteries 308 and 332 had average grave sizes and standard deviations similar to the seal-containing cemeteries of Gezira Dabarosa and Qustul W (compare Figure A.59 with Figure A.23). Given the relatively tight clustering of graves in both cemeteries, grave sizes may have been regulated to some extent. The impression-containing grave at cemetery 308 was located within the 1 σ standard deviation at 2.9 m². The tomb in cemetery 332, on the other hand, was the second-largest burial in the cemetery at 3.9 m². Given the small size and tight clustering of the Ashkeit cemeteries, these graveyards do not appear to have contained large elite burials. However, the impression-containing grave 42 at cemetery 322 was found to contain the highest quantity of burial goods in the entire graveyard (Nordström 1972, 178–179). This may indicate it was the burial of an important individual (Delrue 2001; Stevenson 2009b, 193–194). Meanwhile, the smaller impression-containing grave 63 at cemetery 308 was looted. The remaining grave contents consisted of one seal-impressed sealing, one whole imported Egyptian jar, some fragments of native pottery, and shards of imported Egyptian pottery (Nordström 1972, 167–168). This grave may originally have contained other burial goods indicative of the individual's status in addition to the imported jars, but this cannot be determined at present.

The average and standard deviation of Naqada III graves at Farkha on Figure A.59 corresponds relatively closely to the distribution of graves at Nag el-Deir 3000 (see Figure A.28). Farkha has six outliers with an area greater than 6 m², while Nag el-Deir only has one. Farkha also has more outliers that are smaller than 1 m².

Grave sizes at Farkha are more widely distributed in comparison to Nag el-Deir 3000. Thus, standardized grave sizes were likely not employed when constructing burials at Farkha. Based on tomb areas at this cemetery, this may have been a mixed cemetery where individuals of differing status were buried. The impression-containing grave 49 was smaller than 1 m², and the impression-containing grave 30 was slightly larger than 2 m². Based on burial size data, it appears that seal impressions and the goods they likely sealed could be placed in smaller, possibly non-elite graves at Farkha in Naqada III.

Further details emerge when the surface areas of the burials shown in Figure A.59 are plotted in histograms. General trends in grave sizes of burials for Cemeteries U and B in Naqada III have already been examined in Section 3.3.2. When the size of impression-containing burials in Figure A.55 are scrutinized, the impression-containing graves at Abydos are all larger than any of the other impression-containing burials analysed here. The size of the Cemetery U impression-containing graves thus serves as another indicator of the likely elite status of this cemetery.

Histograms for the remaining cemeteries of Ashkeit 308, Ashkeit 332, and Farkha are shown in Figures A.60, A.61, and A.62, respectively. Figure A.60, shows that the area of the impression-containing burial in Ashkeit 308 is located in an outlier with one other burial at 1.5 to 1.75 m². By contrast, the majority of graves at this cemetery, have an area of 0.75 to 1.5 m². Thus, although grave 42 is not the largest tomb in the cemetery, it is clearly an outlier. By contrast, Figure A.61 shows that the seal-containing grave at Ashkeit 332 is the second-largest grave in the cemetery. Finally, Figure A.62 shows that the smaller of the two impression-containing graves in Farkha is located in the largest peak of the graph at 0.25–0.5 m². The other impression-containing tomb is located with one other grave at 2–2.25 m², close to another peak in the data. Thus, neither of the burials with seal impressions at Farkha were of exceptional size.

3.3.3.2 Dynasty 1–2 cemeteries

In the Early Dynastic, well-recorded grave area evidence for seal impression-containing burials and non-seal impression-containing burials was available for the royal Cemetery B at Abydos, the well-dated elite mastabas at Saqqara North published by Emery (1938; 1939; 1949; 1954; 1958) and Quibell (1923)²⁷, the mixed cemeteries of Nag el-Deir 1500 and 3000, and the subsidiary cemetery of Den at Saqqara (see Table A.13).

The graveyards of Abusir, Abu Rawash, the single Giza mastaba, Helwan, Kubaniya, Tarkhan, and Tura were not included in this analysis. These cemeteries were either not well-documented or their use spanned more than one period

²⁷The non-seal impression-containing burials excavated by Emery and Quibell were not accurately dated, and could therefore not be included in the analysis.

in Egyptian chronology and were not sub-dividable according to the age of burials. The subsidiary tombs of Djer at Abydos and the subsidiary burials surrounding the Aha III funerary enclosure were not examined here since the Djer tombs are not well-recorded and the Aha III cemetery only contained three burials.

As shown in Figure A.65, the royal Cemetery B at Abydos exhibits outstandingly large grave areas during this period. Only the two unfinished graves B40 and B50 that did not contain sealings were smaller than 100 m². By contrast, the Dynasty 1–2 burials at Farkha are small, only exceeding 1 m² in four cases. The seal impression-containing burial was the largest tomb in the cemetery at 11.6 m².

Nag el-Deir cemeteries 1500 (see Figure A.44) and 3000 exhibit a wide range of grave dimensions. Thus, individuals of varying status may have been buried in these cemeteries. The large standard deviation and large average tomb area for these graveyards (see Table A.15) support this hypothesis. In cemetery 1500, the seal impression-containing burial N1514 was the second-largest burial in the cemetery at 37 m². By contrast, the grave found to contain a sealing in cemetery 3000 was only 1.8 m², well within the 1 σ standard deviation range for this cemetery. Based on grave areas, it appears that a higher status individual was buried with the sealing in N1514, while a lower-status individual was buried with a sealing in grave N3023.

The Saqqara mastaba tombs have substructures that range from 17 to 201 m². Their substructures are clearly smaller than the royal burials at Abydos cemetery B in most cases. However, it is also clear that these substructures are larger than the 1 σ standard deviation range of all other non-elite cemeteries graphed in Figure A.65. Thus, the grave areas of the mastaba tombs at Saqqara likely display the exceptional nature of the interred individuals. This is corroborated by the size of the superstructures of these tombs as well as the luxury goods found in them (Emery 1938, 1939, 1949, 1954, 1958; Quibell 1923).

Finally, the subsidiary cemetery of Den at Saqqara displays tight clustering and a small standard deviation. As mentioned in Section 2.3.2.3, this is likely due to pharaonic administrative supervision. This supervision may have ensured that these graves remained within a particular size (area) range. Such artificially standardized graves may have been constructed to visually eradicate the status of the occupants. All four impression-containing burials found in this cemetery were greater than the 1 σ standard deviation range of tomb areas. One impression-containing grave numbered 230 was found to be the largest in the necropolis at 9.7 m². Thus, grave area data indicates that individuals buried with impressions in this necropolis may have been accorded an above-average status.

When the cemeteries analysed in Figure A.65 are plotted as histograms, a wide variety of grave surface area trends can be examined. The previously discussed histogram of the royal Dynastic Abydos Cemetery B burials in Figure A.56 displays

dimensions that far exceed all but the largest burials at Saqqara, demonstrating that grave size was likely equated with status in this cemetery.

Most of the dynastic graves found at Farka tend to be 0.5–0.75 m² in size (see Figure A.66). The largest outlier at circa 11 m² was found to contain a seal impression. A similar trend is visible at Nag el-Deir 1500 (see Figure A.67), where most graves are less than 5 m², and the seal impression-containing burial is the second-largest in the cemetery at approximately 37 m². Tell el-Farkha is still currently under excavation (Dębowska-Ludwin 2012). Future discoveries may prove that the grave deposition pattern at Farkha matched that of Nag el-Deir 1500 to a greater extent than can currently be seen in Figure A.66.

Few graves at Nag el-Deir 3000 exceeded 5 m² in size, as shown in Figure A.68. The majority of graves uncovered were 3 m² or smaller in size, including the seal impression-containing grave. Thus, although it follows a similar pattern to the previously examined cemeteries, this graveyard also presents an exception in the form of a small burial found to contain a seal impression.

The data on the subterranean structures of the large mastaba tombs at Saqqara (see Figure A.69) is clearly divided into two size categories, with eleven burials in one group and nine in the other. There are 3 graves with substructures between 31 and 40 m² and 4 burials with substructures between 121 and 130 m². Thus, two different ‘size standards’ appear to have been employed when creating mastaba substructures.

The subsidiary graves of Den at Saqqara (see Figure A.70) exhibit a distribution pattern more commonly seen in non-subsidiary cemeteries such as Nag el-Deir 7000 and Abu Simbel 215 (see Figures A.22 and A.29, respectively). By contrast, the grave size distribution of the Den cemetery does not resemble previously graphed subsidiary cemeteries of Aha at Abydos shown in Figure A.32 and the Djer valley subsidiary graveyard shown in Figure A.33. These two cemeteries had graves that were highly clustered around a single peak, with a ‘long tail’ of larger graves. Instead, the areas of graves at the Den cemetery appear to mimic the size distribution of graves found in ‘normal’ non-sacrificial cemeteries such as Nag el-Deir 7000 and Abu Simbel 215. Seal impression burials in the Den subsidiary cemetery were significantly larger than the average tomb in this graveyard. This is similar to the distribution of sealings in burials seen in the ‘normal’ cemeteries of Nag el-Deir 1500 and Tell el-Farkha. Thus, even the allocation of sealed goods in this subsidiary graveyard seems to reflect trends seen in normal burial sites. Consequently, it appears that the Den cemetery graves may have been created as a simulacrum of a ‘normal’ cemetery, thus enabling the population of Egypt to symbolically accompany the ruler in death.

Given the burial evidence from this period, it appears Early Dynastic tombs found to contain seal impressions were frequently significantly larger than non-impression containing graves. The large area of many Dynasty 1–2 burials is an indicator that sealed goods bearing seal impressions were possibly associated with graves belonging

to individuals of higher status in the Early Dynastic. Many of these large burials were royal tombs or ‘mastabas’ with lavish superstructures attributed to elite owners, further corroborating this conclusion. Only one ‘common’ individual buried in a small grave in Nag el-Deir 3000 appears to have had access to sealed goods for their burial.

The subsidiary burials in the Den cemetery of Saqqara (see Table A.13) also corroborate this conclusion. All four impression-containing burials in this cemetery were located within a cluster of graves designated as Group E by Kaiser (1985, 55–57). This cluster consisted of burials that appear to have been larger and better appointed than graves in the other clusters (Morris 2007a, 24). Consequently, sealed containers were likely placed in these graves as prestigious burial goods.

3.3.3.3 Dynasty 3–6 cemeteries

Detailed data on seal impression-containing burials and non-seal impression-containing burials from cemeteries dated to the Dynasty 3–6 (Old Kingdom) era was available for Beit Khallaf in Upper Egypt (Reisner 1936, 172–179) and Pyramid Cemeteries 2100 and 4000 at Giza in Lower Egypt (Reisner 1942; Reisner and Smith 1955; Giza Archives 2014). All of these sites contained large tombs with mastaba superstructures (see Figure A.14). Giza Cemeteries G 1000, 2300, 5000, and 7000, as well as Abusir, and the single mastaba dated to Dynasty 3 at Saqqara were not included in this study since evidence from these cemeteries has not been completely published (see Table A.10).

As mentioned previously in Section 2.3.4, the average tomb substructure size appears to have decreased during the Old Kingdom (Dodson and Ikram 2008, 160). Figure A.71 shows that the Dynasty 3 mastabas from Beit Khallaf still exhibit sizes from 27 to 92 m², well within the range of substructure sizes attested in Dynasty 1–2 Saqqara mastabas (compare Figure A.71 to Figure A.65). The single Dynasty 3 mastaba from Saqqara not graphed here was also approximately 95 m² in size, showing that the Beit Khallaf mastabas were likely not an anomaly during that period (see Table A.14). However, the substructures of burials dated from Dynasty 4–6 at the two Giza Cemeteries 2100 and 4000 are clearly smaller than the areas of Dynasty 3 tombs. Consequently, the evidence examined here shows that a decrease in the size of non-royal tomb substructures appears to have occurred from Dynasty 4 onward.

As shown in Figure A.71, the mean grave size for both Giza cemeteries was very similar, at approximately 2.2 m² in cemetery G 2100, and 2.3 m² in cemetery G 4000. However, the only impression-containing tomb in cemetery G 2100 was approximately 21 m² in size. The impression-containing burials from G 4000 ranged between 7 and 18 m² in size, except for three burials: G 4430 A, at 4.5 m², G 4721 A, at 4.8 m², and G 4715 B, at 5.7 m². Aside from these three exceptions, all seal impression-containing

graves had greater surface areas than the mean and 1σ standard deviation of tomb substructures found in both cemeteries.

When the grave areas from the three cemeteries examined above are graphed as histograms, more trends can be detected. Comparing the sizes of the five Beit Khallaf mastaba substructures graphed in Figure A.72 to the Saqqara mastaba substructures in Figure A.69 shows that both have a significant gap between the smaller and larger impression-containing substructures. Thus, ‘size standards’ similar to the Saqqara substructures may also have been employed when building the Beit Khallaf mastaba substructures.

Figure A.73 clearly shows that the seal impression-containing tomb in cemetery G 2100 is an outlier, since the majority of grave substructures in this cemetery are under 2 m². By contrast, Figure A.74 shows that cemetery G 4000 displays a greater diversity of grave sizes. Far more tombs are located in the ‘long tail’ of this distribution than was the case for cemetery G 2100. As mentioned previously, three graves with impressions are found to be under 7 m². However, the histogram clearly also shows that most graves in cemetery G 4000 are under 2 m² in size. Thus, the three impression-containing graves found to have areas between 4.5 and 5.7 m² can also be considered as outliers.

Finally, it must be noted that many tombs with above-average sized substructures in the Giza cemeteries were apparently not found to contain seal impressions. Thus, grave size alone may not have been the determining factor for the use of sealed goods as part of the funerary equipment.

3.3.4 Combined analysis of data from impression-containing cemeteries from all periods

If the data from sections 3.3.2 and 3.3.3 are combined, as shown in Figure A.75, trends can be seen when analysing average grave areas over time. The average area of graves that were not found to contain seal impressions tend to fluctuate between 2 and 6 m². By contrast, the average area of graves that were found to contain seal impressions increases more than an order of magnitude from Naqada II to Dynasty 1–2. By Dynasty 3–6, the average area of impression-containing tombs decreases again to approximately the same level seen in Naqada III impression-containing burials. As mentioned in Section 3.3.3.3, this is likely due to the average tomb substructure decreasing in size during this period.

Thus, grave area evidence graphed in Figure A.75 appears to show that the status of individuals buried with seal impressions increased from Naqada II to the Early Dynastic. This corroborates what was previously concluded for the Abydos cemeteries in Section 3.3.2. Despite the decrease in tomb size during Dynasty 3–6, the graph clearly shows that seal impression-containing tombs continued to be larger than the average non-impression containing tomb during this period. Thus, tomb

sizes appear to show that individuals buried with seal-impressed goods were still of relatively high status compared to non-impression containing tombs during the Old Kingdom.

3.3.5 Graves found to contain seals impressions: detailed analysis

This section analyses the characteristics of only seal impression-containing graves. In the previous sections (see Sections 3.3.2–3.3.4), seal impression-containing graves were included in the analysis only if they were found in cemeteries where the rest of the tombs were well-documented. In Figure A.75, analysed in Section 3.3.3, the dimensions of all graves from well-documented cemeteries that were found to contain burials with impressions were compared to non-impression containing burials from these graveyards. By contrast, Figure A.76, analysed here, plots only seal-impression containing burials from graveyards throughout Egypt (see Tables A.11–A.14). It includes the impression-containing tombs that could not be included in Figure A.75 because the non-seal impression containing burials from these cemeteries were inadequately documented.

The area of each seal impression-containing grave is shown plotted in Figure A.76 according to the era attributed to each burial. The data was plotted on a logarithmic scale to display it more clearly. Subsidiary burials are included in the data plotted for the Early Dynastic. The line connecting the box-shaped dots on Figure A.76 represents the average grave area for each period, and the error bars represent the standard deviation 1σ . The averages and standard deviations are also summarized in Table A.17.

Figure A.76 shows that the average area of tomb substructures found to contain seal impressions throughout Egypt increases by more than an order of magnitude from Naqada II to Dynasty 1–2. The Dynasty 3–6 average decreases to approximately the same level seen in Naqada III impression-containing burials. The decrease in tomb substructure surface area during this period is likely due to changes in tomb design (Dodson and Ikram 2008, 160). Larger mastaba superstructures appear to have been prioritized over substructures as a means of displaying prestige during the Old Kingdom. All of these trends mirror what was shown in Figure A.75 when analysing seal impression-containing burials from select well-documented cemeteries. Thus, the seal impression-containing graves sampled in Figure A.75 appear to be representative of trends in seal impression-containing tomb areas throughout Egypt and Nubia.

The relatively standardized small areas of subsidiary burials (see Section 3.3.3.2) may skew the dataset. Figure A.77 shows that excluding the subsidiary burials from the analysis does not change the general trend of the data. In this graph, it is clear that while seal impression-containing burials are frequently less than

10 m² in Naqada II and III, only four non-subsidary graves are under 10 m² during Dynasty 1–2. Thus, non-subsidary impression-containing graves from the Early Dynastic tended to be larger, and were therefore possibly created for individuals of higher status.

From evidence scrutinized over the course of this analysis, it appears that seal-impressed goods were placed in burials with mastaba superstructures during the Old Kingdom²⁸. Given the association of mastabas with higher-ranking individuals (Dodson and Ikram 2008, 153; Quibell 1923; Verner *et al.* 2002; Bárta *et al.* 2009), the trend toward placing seal-impressed goods in elite burials appears to have continued during the Old Kingdom.

Similar to seal-containing burials, seal impression-containing tombs were infrequent in the earlier periods considered here, with 11 Naqada II and 18 Naqada III graves found to contain seal impressions, as shown in Table A.17. During Dynasty 1–2, this number increases to 59 tombs.

If the areas of all seal impression-containing burials from Naqada II–Dynasty 6 (ca. 3500–2181 BCE) are graphed on a histogram, as shown in Figure A.78 and A.79, it is clear that throughout all four periods, the area of only a few tombs (16 out of 122, or 13.1% of the total) is under 3 m². A somewhat larger number of tombs (28 or 23% of the total) are 3.01–8 m², and 78 graves (or 64% of the total) have dimensions greater than 8 m². Thus, based on grave size, most seal impression-containing burials appear to have belonged to individuals that had elite post-mortem status.

These trends in grave sizes are markedly different from those exhibited by the areas of seal-containing graves (see Figure A.49 and Section 2.3.4). The majority of seal-containing graves (80.5%) were found to be under 3 m², while most impression-containing graves (64.2%) were found to be over 8 m². A comparison of the average size of seal and impression containing burials from different periods (see Tables A.7 and A.17), shows that seal-containing burials are always smaller than 10 m² on average, while seal impression-containing burials are larger than 10 m² on average, with the exception of Naqada II burials, which have an average of approximately 7 m². Consequently, the evidence examined here and in Section 2.3.4 appears to show that seal impression-containing burials tend to be larger than seal-containing burials in Egypt from Naqada II to Dynasty 6.

It has been posited that separate pharaonic administrative bodies were responsible for supplying sealed goods to elite burials in Dynasty 1–2 (Müller 2012, 17; Engel 2013). With the exception of some sealings from smaller burials²⁹, most funerary good sealings from Dynasty 1–2 were sealed with royal insignia and elite titulary, which

²⁸No seal-impressed goods were found in the Old Kingdom cemeteries of Qau, Matmar, el Mustagidda, Nag el Deir, or Balat. Sealings with seal impressions have been found at Balat, but their context is frequently too disturbed. Thus, these burials have not been included in this study.

²⁹See references for Kubaniya South Grave P225, Nag-el Deir N1514 and N3023 in Table A.13. The sealing found in Farkha grave 50 has not been published to date.

may provide evidence for this claim (see references in Table A.13). Old Kingdom burials examined here were also found to contain seal impressions with royal names and titulary (see references in Table A.14), and in one case the seal impression bore the name of the buried official in addition to royal titles (Bárta *et al.* 2009, 246–247). Thus, pharaonic mortuary provisioning systems apparently continued to exist in some form during the Old Kingdom.

The presence of sealed mortuary goods in elite tombs during Naqada II–III may indicate that individuals and collectives producing such goods predate the advent of pharaonic kingship. From Dynasty 1 onward, these collectives may have been commissioned to create sealed grave goods on behalf of the pharaonic administration. Early Dynastic sealings apparently impressed with identical seals have been found in separate burials at Tura, Saqqara, Naqada, and Abydos (el Sadeek and Murphy 1983, 170–171). The logistics of stockpiling and delivery of these goods may have been overseen by individuals affiliated with the pharaonic state. However, the production of such goods likely remained the responsibility of private collectives and individuals (Bloxam 2015, 801–802). Seal carvers on commission to pharaonic officials may also have created the seals used to impress the clay sealings placed on funerary goods. In this scenario, it is possible that the logistics of delivering these seals to funerary good producers were also directed by officials.

The royal and elite motifs on dynastic era seal impressions may have served to display the relationship between the tomb owner and the royal house (Wengrow 2006, 187). Consequently, the status of the deceased individual was likely conveyed through the presence of sealed goods obtained from a pharaonic administrative system. Thus, at least one aspect of post-mortem funerary display by elites appears to have been controlled by the royal house. By bestowing post-mortem status on the deceased through sealed goods, the royal house may have emphasized that status was granted and displayed through means provided by the royal house, thereby establishing and exerting control over elites even in death. Given the relatively small quantity of seal impression-containing tombs from the Dynastic period examined in this chapter (see Figure A.76), it appears that not all high-status individuals were eligible for such grave goods.

Many sealings found in graves during the Early Dynastic bore seal impressions with the names of what are presumed to be high officials. Kaplony (1963a, 58–59, 112) assumed these officials sealed goods that were placed in graves. More recent studies continue to assume that officials named on seals were also the individuals who rolled seals on sealings (Boochs 1982, 74; Morris 2007b, 182; Müller 2012, 22, 26). However, many different seal images can bear the name of the same official. For instance, Hemaka is attested on at least five different seal images (Kaplony 1963a, 112). Thus, the use of these seals may have been delegated to ‘sealers’ (Engel 2013, 38–39; Nolan 2010, 66, Footnote 174) who rolled the cylinder seals on the clay sealings of goods

designated for elite funerary use. Consequently, individuals may have employed seals as commissioned agents carrying out a task for the pharaonic administration, but the seals featured only the names of the pharaoh, high-ranking officials, and the names of administrative sections. In future, fingerprint identification on clay sealings may help to establish how many officials or delegated sealers were involved in creating sealed funerary goods (Nolan 2010, 255–256). To date, it appears no Early Dynastic seal impressions from settlements have been found to bear the types of elite funerary seal motifs mentioned above.

Table A.14 also shows that 18 out of 30, or 60% of the seal impression-containing burials during Dynasty 4–6 were found to contain only one sealing. By contrast, in Dynasty 1–2, only 8 non-subsidiary burials out of a total of 42, or 19%, were found to contain only one sealing (see Table A.13)³⁰. Consequently, the quantity of sealed goods deposited in graves during the Old Kingdom from Dynasty 4 onward appears to have been significantly reduced, providing concrete numerical evidence for a previous statement by Engel (2013, 20) that elite tombs were provided with fewer funerary provisions in the Old Kingdom period. This process may already have begun during Dynasty 3, since most of the Beit Khallaf mastabas and Saqqara mastaba 2305 apparently only contained 1–4 sealings in total (see Table A.14). Based on available evidence examined here, it appears that during the Old Kingdom, access to sealed burial goods bearing pharaonic insignia was restricted and may have only been allotted to particular individuals.

3.3.6 Subsidiary Tombs: different depositional patterns

An examination of intact well-recorded Early Dynastic subsidiary graves reveals deposition patterns specific to these graves. Three intact seal impression-containing subsidiary burials that surrounded non-royal tombs were all found to contain fragments of sealings in the filling that covered the interments. One sealing fragment each was found in the debris of the burial pit in subsidiary burials 1 and 3, attached to Saqqara mastaba 3506 (Emery 1958, 46–47). The original context of the impression in burial 10 in the same complex is undetermined due to the disturbed nature of the grave (Emery 1958, 49). In the undisturbed Tarkhan subsidiary burial 2039, a seal impression fragment was apparently discovered ‘in the burial’ (Petrie 1914a, 11), but was not listed among the items found with the body of the deceased (Petrie 1914a, 5). Consequently, this sealing was likely also discovered in the grave filling of the intact tomb. A possible scenario to explain the presence of these impressions could involve ritual consumption of sealed goods prior to the filling of the burial. Before these graves were filled, a sealed container may have been opened and its contents

³⁰Subsidiary burials from Dynasty 1–2 also all only contained one sealing. The possible reasons for this phenomenon will be explored in Section 3.3.6.

consumed at or close to the burial pit. The seal impression closing the container would then have been thrown into the filling that covered the pit.

Other subsidiary burials displayed different trends. At Abydos, the northeastern subsidiary grave outside the Aha III valley enclosure contained a wine jar topped with an intact sealing bearing seal impressions (Bestock 2009, 84). In Saqqara mastaba 3504, subsidiary burial 14, a similarly intact jar was found (Emery 1954, 29–30). Both burials were reported as undisturbed. The body was buried lying on its left side, as is frequently the case in Pre- and Early Dynastic burials (Dodson and Ikram 1998, 167; Stevenson 2009a, 4). In both cases, the jar was deposited in a corner behind the back of the deceased (see Figure A.80). Since both burials can be dated to Dynasty 1³¹, it appears there was a practice during this period of placing a sealed jar behind the back of an interred body in a subsidiary burial.

From this evidence, two depositional trends for seal impressions in subsidiary tombs can be determined:

1. A sealed container was unsealed and the sealing deposited in the filling of the tomb, or
2. A single sealed jar was deposited in the tomb.

At Abydos, seal impressions were only found in subsidiary burials belonging to Aha and Djer, the first two rulers of Dynasty 1. Seals were also only found deposited in subsidiaries belonging to these rulers (see Section 2.3.7). Consequently, the practice of depositing seals or sealings in subsidiary burials at Abydos appears to have fallen out of use after the reign of Djer.

All 17 subsidiary burials documented here were only found to contain a single seal-impressed sealing (see Table A.13)³². As discussed previously in Section 2.3.7, seals were also only deposited singly in subsidiary tombs. The restricted number of subsidiary burials found to contain sealings throughout Egypt also indicates that sealed artefacts may have been considered a prestigious burial good. Since subsidiary burials were likely an integral part of royal and elite burial complexes, it is possible that the logistics of allocating sealed goods to specific sacrificed individuals may have been regulated by pharaonic officials (see Section 3.3.5). By tracing the depositional patterns of sealed grave goods and seals in subsidiary graves, this thesis provides concrete evidence for subsidiary burial provisioning systems (Morris 2014, 73).

³¹The sealing from the Aha subsidiary bore a seal impression of the ruler's name (Bestock 2009, 85) and seal impressions of Aha's successor rulers, Djet and Den were found in the Saqqara mastaba (Emery 1954, 114–120). Though precise dating by the means of seal impressions is not possible (Nolan 2010), all of these rulers are placed within the Dynasty 1 era.

³²Two sealing fragments with no trace of royal insignia were apparently uncovered in a subsidiary burial of Saqqara mastaba 3050 (Martin 1974, 23; Martin *et al.* 1979, 19, Plate 20.10,11). However, these fragments could conceivably originally have formed part of one and the same sealing. This data is not included here since the dimensions of the mastaba and its subsidiaries has not been published to date.

3.3.7 The status of individuals buried with seal impressions vs seals

In Chapter 2, burials that contained seals were examined and the depositional pattern of these artefacts was found to be relatively egalitarian. The analysis of grave areas in Sections 3.3.2–3.3.4 has shown that seal impressions are generally found in larger graves. Seals and seal impressions are both artefacts associated with administration. However, these two types of objects appear to exhibit different depositional patterns when employed as mortuary goods. The extent of this difference can be demonstrated by combining the data from Figure A.76 with the data from Figure A.47, as shown in Figure A.81.

The average grave area of seal-containing burials shown in Figure A.81 is consistently smaller than the average area of seal impression-containing burials. The relatively large interval between the two averages was maintained throughout all periods despite the reduction of grave sizes from Dynasty 1–2 to Dynasty 3–6. Thus, available burial data appears to demonstrate that seal-containing burials were significantly smaller than seal-impression containing burials, throughout the Egyptian Predynastic, Early Dynastic, and Old Kingdom.

Given the relatively standardized small areas of subsidiary burials (see Section 2.3.2.3 and 3.3.3.2), it is possible that the data from these graves skews the dataset. Figure A.82 shows that removing data on subsidiary Dynasty 1–2 seal and seal impression-containing graves from Figure A.81 does not skew the trends present in data examined here.

Closer examination of Figure A.82 reveals the following trends:

In Naqada II,

- Seal-impression containing burials were greater than 2 m² in all but one case, whereas
- Seal-containing burials were smaller than 2 m², in all but one case.

In Naqada III,

- Seal-impression containing burials were greater than 5 m² with only 4 exceptions, whereas
- Seal-containing burials were smaller than 5 m², with only 1 exception.

In Dynasty 1–2,

- Seal-impression containing burials were greater than 10 m² in all but 4 cases, whereas
- Seal-containing burials were smaller than 10 m², in all but two cases.

In Dynasty 3–6,

- Seal-impression containing burials were greater than 5 m² with only 5 exceptions, whereas
- Seal-containing burials were smaller than 5 m², with only 3 exceptions.

Sealings first appear in the archaeological record of cemeteries in Egypt at the elite Naqada II site of Cemetery U. From this era onward, seal impressions are rarely found in smaller burials. At times, even these smaller tombs may have been considered elite (Junker 1919, 31–32; Nordström 1972, 178–179). This trend is different from the depositional pattern exhibited by seal-containing graves, that are generally found to be much smaller. Given these findings, seals may have been a more accessible burial good despite the fine crafting required to manufacture a carved seal. The prestige of a seal impression on a sealed object likely exceeded the prestige accorded to seals in a funerary context.

Sealed goods impressed with royal and other elite titulary were found in almost all impression-containing burials from Dynasty 1 onward. It is possible that sealed goods were frequently provided to burials via distribution systems whose logistics were controlled by individuals affiliated with the pharaonic state (Müller 2012, 17; Engel 2013; Bloxam 2015, 801–802). The administrative framework responsible for the commissioning, stockpiling, and distribution of these sealed goods was likely initially implemented in late Naqada III with the advent of the earliest pharaohs. Evidence for Naqada III sealings with royal titulary has been found in the earliest royal tombs in Cemetery B at Abydos, mastaba grave 414 at Tarkhan, and the Naqada mastaba, which was not included in the present study due to a lack of substructures in the tomb (see references in Table A.12 and Kahl *et al.* (2001)). The sealed goods were frequently found in large burials that likely belonged to individuals of above-average status. Thus, sealed items may have been conceived as prestigious grave goods, meant to display the status of the deceased (Wengrow 2008, 10). Tombs in non-elite cemeteries found to contain seal impressed artefacts may have been provisioned with these funerary goods to display the post-mortem status of prominent local individuals. It is unclear at this stage whether the manufacturers of sealed goods could be commissioned privately to create or lay aside goods sealed with the royal seal, or whether such requests were channelled through individuals affiliated with the royal court who were ultimately responsible for directing the distribution of such objects.

By contrast, tombs found to contain seals are small and seals found in these graves display no evidence for the use of royal titulary after Naqada III (see Section 2.3.9). Consequently, no royal provisioning system appears to have existed for seals that were placed in graves. The deposition of seals in burials was likely not an indication of high status. However, a seal may have been employed to symbolize a heterarchical

difference in status between individuals buried with seals and those buried without them. Thus, if a comparison is made between the use of seals and seal impressions as funerary goods, it appears the prestige of commodity labels (seal impressions) may have exceeded that of the label-making device (seals) in early Egyptian funerary contexts³³. A previous study by Müller (2012, 17) has stated that few sealed jars in elite early Dynastic tombs were found to be impressed with seals. Evidence examined in Section 3.3.5 has also shown that access to sealed goods with elite and royal imagery impressed on the sealings was likely further restricted during the Old Kingdom. Given the rarity and prestige of seal-impressed containers in burials, this may be one of the first demonstrable instances where a label held greater value than the contents of the container it labelled.

Examining the distribution of cemeteries found to contain burials with seal-impressed goods demonstrates that seal impression-containing burials dated to Naqada II and III are generally located in Upper Egypt and Nubia as well as the east Delta site of Tell el-Farkha. By contrast, dynastic cemetery sites with sealings from Dynasty 1 onward tend to be located primarily in the Memphite region, close to the site of Saqqara, with the exception of Tell el-Farkha, Tarkhan, Nag el-Deir, Abydos, el-Kubaniya South, and Beit Khallaf. Given the proximity of many burial sites to the royal dynastic capital at Memphis, it is possible that elites of different ranks residing in the capital region had better access to elite sealed goods. It is also possible that manufacturing centres or storage centres for these goods were located in the Memphite region during the Early Dynastic. Thus, access to sealed grave goods in the remote regions of the Delta, Upper Egypt, and Nubia may have been a conspicuous sign of status from Dynasty 1 to 3. This is most evident in the Dynasty 1 royal burials at Abydos, where rulers were interred with large quantities of sealed goods possibly shipped in from the capital of Memphis. In Dynasty 2, a shift occurred that resulted in most royal tombs being constructed in the Memphite region until the end of Dynasty 6 (Dodson and Ikram 2008, 138, 177; Lacher-Raschdorff 2014, 199–200). If sealed goods were stockpiled in the Memphite region, this change in burial practice may also have simplified funerary logistics. From Dynasty 4 onward, sealed goods are only recorded as grave goods in burials from Giza and Abusir, located within the Memphite region. During this time, outlying provinces may no longer have had access to such goods. This evidence is in accordance with the previous statement that access to sealed burial goods may have been restricted in the Old Kingdom (see Section 3.3.5).

‘Elite’ funerary equipment deposited in graves from Naqada III to the Early Dynastic (for example: carved mace-heads and mace handles) is considered to evoke pre-state level Neolithic culture (Wengrow 2006, 174). Conversely, cylinder seals and cylinder-seal impressed goods may evoke state-level society due to their origin in the

³³The prestige of the contents of sealed containers is not examined here due to a lack of studies on this subject to date.

Uruk-era states of southwestern Asia (Pittman 2013, 324). Thus, the deposition of seal impressed goods in elite burials of Naqada III–Dynasty 1–2 may represent an ideological counterpoint to the world of the Neolithic past evoked by other archaising artefacts in these graves.

Of all the cemeteries examined in this study, only Helwan, Nag el-Deir 1500 and 3000 were found to contain tombs with seals as well as tombs with seal impressions. In no case was a seal impression and a seal ever found in the same tomb³⁴. Consequently, it is possible that some form of cultural convention existed that prevented an individual from being buried with both a seal and a sealed good.

3.4 Conclusion

The analysis of all currently available data on seal impression-containing burials, the temporal analysis of the Abydos cemeteries, and the analysis of select Naqada III, Dynasty 1–2, and Dynasty 3–6 sites found to contain seal impression-containing graves, all tend to indicate that seal impression-containing tombs increased in surface area over time, before decreasing to Naqada III levels during the Old Kingdom. Based on the grave area evidence, it appears that seal impression-containing graves were not necessarily all elite when first attested in Naqada II and III. However, the great increase in average surface area of impression-containing burials in Dynasty 1–2 appears to demonstrate that sealed goods became more exclusive to large elite tombs in this era. The increasingly elite nature of these interments becomes evident in the Early Dynastic with the appearance of ostentatious mastaba superstructures over large burials.

Subsidiary burials of the Early Dynastic were rarely found to contain seal impressions, and there appear to have been strict limitations on their deposition. Only one seal-impressed container was found deposited per burial. Different depositional practices were apparently present, one involving the placement of a sealing in the grave filling and the other involving the placement of a single sealed jar behind the back of the deceased individual.

Given the evidence reviewed here, it can provisionally be stated that seals and sealing technology may have been adopted in ancient Egypt due to the important function of seals as markers of containers, and not due to the ornamental functions of the seal. Though seals were likely first imported from southwestern Asia, they were apparently not used as elite grave goods in the majority of cases. Instead, it is seal impressed goods that are placed in higher-ranking graves.

³⁴A carved wooden cylinder seal was found in the royal tomb of Djer in Abydos. Sealings have also been found in this burial (Dreyer *et al.* 2011, 60, 63). However, the contents of this tomb were likely disturbed both in antiquity when it was venerated as the burial of Osiris as well as by more recent excavators (O'Connor 2009, 89, 133). Subsidiary burials around the tomb of Djer have been found to contain wooden seals (see Table A.4). Consequently, this seal may have originated from one of the subsidiary burials.

Table 3.4: Contingency table showing quantity of seal and seal impression-containing tombs as well as tombs not found to contain either artefact in cemeteries throughout Egypt from Naqada II to Dynasty 6, based on data gathered in Table A.1 and Table A.10.

	Tomb with seal	Tomb with seal impression	Row totals
Tomb with seal	109	0	109
Tomb with seal impression	0	107	107
Column totals	109	107	216

Seals and seal impressions do not appear to have ever been deposited together in the same tomb, as shown in Table 3.4. The tombs found in the cemeteries of Giza G 1000, G 2300, G 5000, G 7000, and Abusir (see Table A.10) could not be included in Table 3.4 since the total quantity of burials from these cemeteries is not known.

Under normal circumstances, many different grave goods, such as stone vessels and necklaces, can be found in the same grave. To conduct statistical tests on the data in Table 3.4, the null-hypothesis was presumed to be: ‘seals and seal impressions do occur together in the same tomb’. The program R was used to perform the tests (R Archive Network 2015). A chi-squared test of the data in Table 3.4 returns an χ^2 value of 216, with or without the use of Yates’ correction. Applying the quantile function demonstrated that the result is significant with 95% certainty (Crawley 2007, 304–306). These results indicate that the null hypothesis can be rejected, and that seals and seal impressions do not occur together in the same tomb. However, a Cramer’s V test (Drennan 2009, 188) of the data returned a result of 0.3535534. Since this value is considerably less than 1, it remains possible that seals and impressions were placed in the same tomb. Future publications of excavations both old and new may provide further evidence regarding this hypothesis.

Tombs containing sealed objects and tombs containing seals also rarely co-existed in the same cemetery. Only Helwan, Nag el-Deir cemetery 1500, Nag el-Deir cemetery 3000, and the subsidiary cemetery next to the Djer royal burial in Abydos were found to contain both burials with seals and burials with seal impressions. Additionally, impression-containing substructures were generally larger than seal-containing burials. Thus, the individuals that were entitled to have seals deposited in their tomb appear to have belonged to a different class from those individuals who were entitled to have seal impressions deposited in their tomb.

Most evidence examined tends to show that individuals buried with seals did not have their status displayed via a large tomb area. Given this conclusion, further research should investigate whether individuals buried with seals were heterarchically differentiated by their grave goods or mode of burial from other individuals buried without seals (Stevenson 2009c, 188). Such investigations may also reveal if ‘elite’

individuals buried with seal impressed goods in large tombs were differentiated from their fellow elites who did not have sealed grave goods.

Seals may have belonged to and been utilized by the grave-owner or other individuals before being deposited in a burial. By contrast, sealed funerary goods are artefacts that were possibly created by collectives on commission to pharaonic officials. The logistics of distributing these goods may also have been handled by pharaonic administrators. Sealed items were likely placed in burials as status-signifying grave goods. Thus, their presence in a burial is probably an indication of the degree of access the deceased and their associates had to administrative agencies and individuals that oversaw the creation of sealed goods.

Chapter 4

Case study of seal impression depositional trends in southwestern Asia and Egypt during the 4th millennium BCE

By adopting cylinder seals and sealed goods as grave offerings, Egyptians made use of imported cylinder seal technology in an innovative manner. Seal impressions deposited in tombs may also have been perceived as inherently prestigious in Egypt. However, it remains to be seen if southwestern Asia and Egypt differed in their use of cylinder seals in settlement-based administrative systems. To help answer this question, the present chapter examines and compares seal impressions deposited in two different 4th millennium settlements, one in southwestern Asia and one in Egypt. The southwestern Asian site of Chogha Mish and the Egyptian site of Elephantine were chosen to be investigated since material from these sites is relatively well published and both sites contained large quantities of sealed material. Both settlements included areas with well-stratified seal impression finds. These areas apparently did not contain cultic or elite structures. Maps and the find locations of sealed material in these areas were also available.

Other excavated sites principally found to contain cylinder seal impressions from southwestern Asia and Egypt were inadequately documented, or lacked recorded sealing find locations and maps. Find location data is important for the analyses carried out in this chapter. Consequently, Chogha Mish and Elephantine were chosen as the most optimally documented sites from both regions. They were found to contain seal impressions in settlement fill discard contexts that had been disturbed on occasion. This find deposition pattern allows discard patterns at the two sites to be compared. Chogha Mish and Elephantine were likely regional centres of importance that served as hubs of production and trade.

The sites scrutinized here belong to settlement types whose seal impression deposition patterns have yet to be thoroughly examined (see Section 1.3). Chogha Mish was located in the core area of the Uruk culture in the 4th millennium. The functioning of seal-based administration in settlements employing Uruk-style seals has not been thoroughly analysed to date (Matthews 1993). The analysis of Chogha Mish sealings conducted in the present chapter therefore provides an initial overview of how Uruk-style seal-based administration may have functioned in settlements. Also, no thorough analysis of seal impression discard patterns within a settlement from 4th millennium Egypt has been conducted to date. The analysis of material from Elephantine consequently provides an initial overview of early seal-based administration in Egyptian settlements during this period.

This case study of two sites also provides a template for future studies analysing and comparing impression discard patterns in both regions. To date, a study of this type has not been conducted on sealings from southwestern Asia and Egypt. Consequently, the present chapter provides a baseline of results that can be proven or disproven in future comparative examinations. The possible relations between administrative hierarchies in these settlements and central administration in both regions (see Section 1.4) are also scrutinized.

4.1 Methodology

By examining the disposal locations of seal impressions, this chapter analyses possible evidence for activity areas where sealed objects were stored and unsealed. Maps of the excavation sites are used to chart approximate find locations of sealed artefacts. A seal image attested more than once may provide evidence for an important ‘sealer’. Multiple instances of the same seal impressed on different sealings are therefore also scrutinized to determine possible administrative hierarchies.

The seal impressions on the clay sealings and administrative materials examined here were likely impressed by individuals. However, it cannot be ruled out that these individuals were merely acting as representatives of a collective, and did not own the seal they used. Instead, they may have been designated seal-users on particular occasions. Taking this into account, the actors who performed the act of sealing will be referred to as ‘sealers’, ‘individuals’ or ‘representatives’ in this analysis. In this chapter, each impression fragment was counted as a separate element, except when two or more fragments were noted to fit together in the original excavation publications. Sealings with imprecise recorded context were not included in the present analysis.

Sealings from Elephantine were included in the database based on whether they were classified as pre-Dynasty 3 material by Pätznick (2005). Dynasty 3 onward is

conventionally classified as the Old Kingdom (circa 2592–2153 BCE (Hornung *et al.* 2006, 491–492)), and material from a site dating to this era is analysed in Chapter 5.

Some material from Dynasty 1 (circa 3150–2732 BCE) was found at the site, but many sealings have been dated to Dynasty 2 circa 2730–2593 BCE (Hendrickx 2006, 92; Hornung *et al.* 2006, 491)). To study a body of sealed material of approximately equivalent size to Chogha Mish, it was necessary to include the early 3rd millennium material from Dynasty 2 Elephantine in this study. From the analysis in this chapter, it appears both Chogha Mish and Elephantine were at a similar level of administrative complexity. Thus, despite a temporal disjoint, it is still possible to compare sealing practices at the two sites.

The lack of published documentation on the Satet-South and East City find contexts mentioned in the catalogue by Pätznick (2005) also prevented the analysis of these areas in the present chapter. Vessel sealings classified by Pätznick (2005) as the unidentifiable type ‘Gv. 0’ were classified as vessel sealings. Similarly, string bulla sealings classified as the unidentifiable type ‘Tb. 0’ were classified as string sealings in the present analysis.

4.2 Site background

Chogha Mish is a substantial tell (mound) settlement located in modern Iran in the ancient Susiana region, (see Figure A.83). Principal occupation layers of the site are dated between the 6th to 4th millennium BCE, though there is some evidence for later occupation (Alizadeh 2008, 32). The general area covered by this 17 ha site is comparable to the 18 ha site of Susa (see Table 1.4). Additionally, the quantity of published cylinder seal-impressed clay sealings from the site is second only to Susa and Uruk, and the sealed material was published to more modern standards than much of the Susa material (Amiet 1972a,b). The present examination concentrates on the 4th millennium clay seal-impressed material, which includes artefacts such as container sealings, door sealings, bullae³⁵, sealed clay balls containing tokens occasionally marked with number signs, and clay tablets impressed with seals and number-signs. Impressions appear to be found in discard contexts, in pits and on floors as well as in refuse.

Elephantine is a comparatively smaller settlement initially established on two islands in the river Nile in the far south of Egypt, near the present-day city of Aswan (see Figure A.17). Both islands covered an area of roughly 5.76 ha in total (see Figure A.85 and Table 1.5). These two islands apparently merged into one when the Nile was not in flood (Kopp 2006, 25). Remains from the 4th millennium BCE onward have been uncovered at the site (Kopp 2006, 16), but it is not until the

³⁵Clay ovoid objects, occasionally faceted, impressed with seals. Frequently, but not always, bullae are shaped around a string whose ends ran out either side of the narrowest ends of the ovoid (Delougaz and Kantor 1996a, 119).

late 4th–early 3rd millennium that seal impressions are attested in the settlement on the larger island. Seal impressions are found on jar sealings, wooden box sealings, sealings attached to strings, door sealings, and various sealing bullae. Impressions are frequently found on floors or in settlement refuse within rooms. Sealings from sectors of the settlement that were not well-documented were not analysed here. These include the temple area and the eastern city area.

The largest quantity of sealings at Chogha Mish were uncovered in and around structures located on a lower eastern peak centred on square R16 (see Figure A.84), named the ‘East Area’ (Delougaz and Kantor 1996a, 127). This excavation sector had an area of approximately 1810.2 m² (Delougaz and Kantor 1996b, Plate 264). Smaller quantities of sealed material were also found in the ‘West Area’ (Delougaz and Kantor 1996a, 127), located on a small peak centred on square J14 (see Figure A.84). This excavation sector had an area of approximately 1259.9 m² (Delougaz and Kantor 1996b, Plate 265). Deeper, older settlement layers of the ‘East Area’ contained a few seal impressions. Other excavation areas yielded considerably smaller quantities of seal impressions (see additional circled areas on Figure A.84). No seal impressions were found in the only temple-like structure at Chogha Mish (Alizadeh 2008, 27), as opposed to Uruk, where many impressions were found near temples (Boehmer 1999). Thus, administrative sealing activity was not associated with cultic structures at this site.

Judging by available published maps, it appears a wide variety of sectors on the tell were sampled over the course of the excavations. Consequently, the aforementioned eastern zone may have been an area where administrative activities took place, if the seal impressions were discarded close to where they were unsealed/stored for administrative purposes. The excavators appear to have come to a similar conclusion (Delougaz and Kantor 1996a, 127).

Most of the seal-impressed sealings excavated at Elephantine that could be dated to the late 4th to early 3rd millennium were uncovered inside the west sector within the ‘fortress’ structure on the eastern island (see right-hand circle in Figure A.85). This excavation sector had an area of approximately 250 m². Less material was recovered from the structures in the outer city wall portion to the north of the Satet temple (Ziermann 2003, 32). This fort is presumed to have surrounded the settlement and was attached to the fortress (see left-hand circle in Figure A.85). This excavation sector had an area of approximately 342.3 m² (Ziermann 2003, Abb. 19).

In summary, the main seal impression-containing areas at Chogha Mish had a total measurement of 3070.1 m², while the main areas with seal impressions at Elephantine measured a total of 592.3 m². However, despite the size difference between the seal impression-containing areas at both sites, Chogha Mish was found to contain 181 well-recorded sealings, and Elephantine was found to contain 121 well-recorded sealings. Thus, seal-based administration was apparently taking place at

similar levels of intensity at these sites, enabling a comparison to be made between the two sites.

4.3 Sealings from Chogha Mish

All sealings from Chogha Mish were found to be impressed with pictorial anepigraphic seal images. The identifying images on these seals may simply have been memorised by individuals. Sealed administrative records at this site were only inscribed with numbers. Thus, administrators implicated in seal-based administration at the site may have been numerate, but not literate.

4.3.1 ‘East Area’ - Find context patterns

As mentioned in Section 4.2, most cylinder seal impressions found at Chogha Mish were located in an area centred on a smaller eastern peak, within building phase 3 attested in this area (see Figure A.86). Consequently, depositional patterns of sealings in this area are charted first. The find locations of sealings from building phase 2 of the ‘East Area’ and other locations will subsequently be examined. In the Chogha Mish publications, grid squares are assigned a letter-number designation, and each area of interest within these squares is numbered, leading to coordinates that are generally expressed as Square:Area (e.g. A1:101).

By charting the find location of seal impressions in Figure A.86, patterns can be observed. Seal impressions tend to be found in waste pits that are located within structure walls, or in pits that eradicate previous structures such as S17:202 and R17:305. The rubbish pits that are located in the south-eastern quadrant of square R18 were not found to contain any seal impressions. If seal impressions were discarded in proximity to the areas where they were used, it can be assumed this quadrant of R18 was not dedicated to administrative activities. According to the excavators, many of these pits were dug into the third building phase from a posterior fourth building phase of the area, now lost (Delougaz and Kantor 1996a, 127). However, distinguishing between sealed material from the fourth phase and the third phase remains difficult since sealings were rarely uncovered on the floors of rooms (Delougaz and Kantor 1996a, 128), and their deposition in debris layers and near features could theoretically have occurred at various points in the history of the settlement.

Sealed tablets were only found in the East Area in Chogha Mish. A total of only 6 tablets (Delougaz and Kantor 1996a, 127) bearing seal impressions were uncovered in the southerly waste pits of Q18:314 (Delougaz and Kantor 1996b, Plate 152:D), R18:305 (Delougaz and Kantor 1996b, Plate 33:B-C,G, 143:D,155:B), and the more northerly S17:202 (Delougaz and Kantor 1996b, Plate 33:E). All sealed tablets charted in Figure A.86 were found deposited in pits, while non-sealed tablets not included in the study were apparently also found in other discard locations (Delougaz and Kantor

1996b, 127). Since sealed tablets were only found in pits, the individuals throwing these artefacts away may have been concerned with disposing of the tablets in a definitive manner. Since these are the only locations in the entire site where sealed tablets were uncovered, this may also indicate that sealed tablet-based administrative records were initially kept within structures in the East Area. According to the excavators, the presence of sealed tablets in pits also indicates that they may have originally been used in the lost fourth occupation layer in this area (Delougaz and Kantor 1996b, 127).

Sealed bullae were also exclusively found in the East Area, and their distribution within this area is also restricted. The previously mentioned waste pits Q18:314 (Delougaz and Kantor 1996b, Plate 33:H) and R18:305 (Delougaz and Kantor 1996b, Plate 33:I-J) were found to contain one bulla each, and one further bulla fragment was found at Q18:318 (Delougaz and Kantor 1996b, Plate 42:K) in an occupational debris context. Thus, bullae were exclusively found in the southern area of the excavated East Area (see Figure A.86). Again, such a discard pattern could indicate that administrative activities involving bullae took place somewhere near these southern discard areas.

All of the 31 impressed door sealings whose location could be charted from maps provided in the excavation reports were also located in the East Area, with one found in the earlier Phase 2 occupation. The remaining non-chartable door sealings were:







- 1 from an unspecified location on the High Mound, and
- 1 from an unspecified location in Trench V, 1 found at S20:601.

The sealing from the High Mound (located in the circled area at the top of Figure A.84), and the sealing from S20:601 were both attributed to the Late Susiana period, dated to the late 5th millennium BCE (Alizadeh 2008, Figure 76). According to the general site map shown in Figure A.84, the other three sealings were all found in the immediate vicinity of the East Area.

In other settlement sites, door sealings have been found discarded close to the doors they likely sealed (Reichel 2002; Frangipane and Pittman 2007). Consequently, door sealings from Chogha Mish may have originally been attached to doors located somewhere within the East Area complex. The excavators noted that door sealings appeared to be discarded primarily in rubbish pits and pottery heaps (Delougaz and Kantor 1996a, 126). The only exceptions to this are Q17:202, a floor area, and the door seals found in occupational debris at R17:203, R17:207, R17:215³⁶, and R17:212. This may indicate evidence for a deliberate practice of discarding door seals in rubbish pits and pottery heaps.

³⁶The sealings found in this area are classified as originating from R17:215 and R17:215 West, neither of which are charted on the original map. Thus, the label on Figure A.86 points to the number R17:207 East, which is present on the map.

Table 4.1: Door seals with seal images depicting caprids from pit R17:208. Image numbers refer back to Delougaz and Kantor (1996b).

Seal image		Image #	Sealing #	Total	
		143:B	II-376	1	
		143:E	II-212a-b	1	
		143:I	II-206r II-206j	2	
			144:C	II-360c-d,f-g	1
		145:C	II-360a II-360b II-360e II-360i	4	
				Total: 9	

The largest single deposit of door seal impressions was found in a rubbish pit at R17:208, with a total of 14 sealings, bearing 10 different seal images. Of these impressions, 9 or roughly 64% bore motifs that featured caprids (see Table 4.1). Only seal images 145:C and 143:I were attested more than once on sealings, possibly indicating that the individuals bearing these seals were important. Thus, pit R17:208 may have been used as a dump for door sealings that were impressed by individuals or representatives belonging to the same administrative ‘section’, as indicated by the similar style of motifs on the impressions. Since these sealings were not found in primary discard contexts, it is not possible to determine whether they were all employed to seal the same door on different occasions.

Of the remaining 5 door sealings from R17:208 (see Table 4.2), 2 were impressed with two different seal images depicting people carrying staffs/cloth (II-209a,b), and possibly also skins (II-288a,b-c,d). The remaining 2 consist of a very distorted image of seated figures and cloth (II-396) and rows of abstract animal depictions (II-289). Other door sealings bearing the image of a banquet with musicians (Delougaz and Kantor 1996b, Plate 155:A) were found discarded in different contiguous locations. According to Delougaz and Kantor (1996a, 130, Footnote 25), two sets of three

Table 4.2: Door seals with other types of seal images from pit R17:208. Image numbers refer back to Delougaz and Kantor (1996b).

Seal image		Image #	Sealing #	Total
		145:B	II-316b	1
		147:B	II-396	1
		152:G	II-209a-b	1
		153:B	II-288a-d	1
		157:B	II-289	1
				Total: 5

fragments likely formed two door sealings originally³⁷. These sealings were found in three different depositional locations: the occupational debris at P18:301 and Q18:318, as well as pit Q18:314. Another incidence of scattered fragments that were possibly originally part of a single door sealing were fragments III-869a-b sealed with a ‘cloth-carrier’ motif, found in sifting material from Trench V A, which are said to join up with III-869c found north of Q18:308 (Delougaz and Kantor 1996b, Plate 153, F).

An earlier layer of occupation of the East Area also yielded several seal impressions when excavated (see Figure A.87). Three jar sealings, and one door sealing were found. Finally, a more unusual sealed fragment was also found. It was tongue-shaped and impressed with a long, thin cylindrical or rectangular seal and featured an abstract design that was apparently impressed lengthwise rather than being rolled (Alizadeh 2008, 79, Figure 76:FF).

³⁷As indicated by their consecutive numbering in the publication.

4.3.2 ‘West Area’ - Evidence For Administrative Practices

The large excavated ‘West Area’ on the western subsidiary peak in Chogha Mish (see Figure A.88) yielded fewer seal impressions than the East Area, and almost all of these impressions were found on clay balls or fragments of clay balls. A total of 8 clay balls and 5 fragments of balls were found, with only 1 jar sealing and 2 unidentified flat sealings rounding out the sealing evidence from this sector. Clay bullae and tablets were not found in this sector, perhaps indicating that bulla and tablet-based administration was not carried out in this area.

There does not appear to be any discernible pattern in the distribution of sealed clay balls and ball fragments. Delougaz and Kantor (1996a, 33) state that the built structures in this area were not as well preserved in comparison to those of the East Area. Consequently, the context of the West Area may have been more disturbed. The lack of container sealings and door sealings may indicate that balls were stored in this area for administrative purposes.

None of the uncovered balls in this area bear the impression of the same cylinder seal, potentially supporting the idea that the administrative records found in this area were brought in from other communities. This stands in contrast to evidence from the East Area, where seals employed on door sealings were also found impressed on balls. Thus, the West Area may have been an sector that was more concerned with administering trade. If so, the lack of jar, bale, and basket sealings in the West Area could indicate that traded goods bearing seal impressions were not stored and opened in this area on a regular basis. Delougaz and Kantor (1996a, 127, 130) speculated that the different quantities and types of sealed material found in the East versus the West Area might indicate that different types of activities took place in these areas. By examining the deposition patterns of these sealings more closely, it appears that the East Area was more concerned with storing and unsealing sealed goods, while sealed administrative records appear to have been stored in the West Area.

In the published analysis of the Chogha Mish site, the excavators noted that intact balls tended to be found only in rooms. Their conclusion was based on the examination of sealed and unsealed balls (Delougaz and Kantor 1996a, 127). By examining the location of only the sealed balls, a different conclusion can be drawn. Aside from the one ball found in the ‘tower’ on the High Mound at N9:302 (located in the circled area at the top of Figure A.84), the largest quantities of intact balls were found in rooms in the East Area. Four balls were found in room area R17:212, 6 balls and 5 fragments of balls in room R18:312, and 2 balls in room R17:714, as well as half of a ball found in R17:206/714 that was classified under R17:714 in the diagram for convenience. However, many other intact balls were found in the West Area, with one ball each found in occupational debris at H14:Trench IX, H14:Trench IX West, J15:Sounding C, J15:Sounding C South, J15:403 Southeast, K14:Trench VI,

H14:304, and H14:310 (see Figure A.88). Thus, judging by the distribution of intact balls throughout the settlement, it appears intact sealed balls were preferentially deposited in rooms in the East Area, but discarded in debris in the West Area. It remains possible that the debris in the West Area was originally deposited in rooms, but there is no conclusive evidence to support this hypothesis.

The excavators stated that broken fragments of balls were only found in rubbish pits (Delougaz and Kantor 1996a, 127), since the balls lost their function as records once opened and could then be discarded. However, it remains unclear whether intact balls found in rooms were placed there for archival purposes or were simply discarded in these locations.

4.3.3 Frequently attested seal images from Chogha Mish

The same seal was occasionally used on different sealings at Chogha Mish. These sealings can provide evidence for administrative practices. In total, 18 incidences of multiply attested seal images on sealings were found at Chogha Mish. All of these sealings came from the East Area, providing further evidence for the intensity of seal-based administrative activities in this area.

In Frangipane's study of the Arslantepe material (2007b, 470), she theorized that 'officials' entitled to seal both containers and doors had a higher status than individuals only entitled to seal containers. Consequently, it can be theorized that the higher the number of different sealing types a sealer was entitled to seal, the higher their rank. Following this logic, an important status may have been attributed to individuals entitled to seal doors, containers, and administrative records such as clay balls at Chogha Mish.

Evidence for only one such sealer exists at the site. The individual(s) employing seal image 153:A sealed clay balls, door sealings, and container sealings (see Table 4.3). If individuals sealing balls, doors, and containers possibly represent the highest rank of administrators present at the site, the rank immediately below them may have been occupied by individuals entitled to seal only two of the three types of sealed objects. Seal image 149:E provides a possible example of such an administrator, since the seal with this image was apparently only impressed on ball fragments and door sealings (see Table 4.3). Other such individuals may be represented by seal images 143:I and 145:B, found both on door sealings and container sealings, and seal image 138:I, found on clay balls and container sealings. Thus, the sealer employing a seal with image 153:A can be theorized to have held the highest rank, and those employing 149:E, 143:I, 145:B, and 138:I, may have held the second highest rank.

Finally, multiple incidences of the same seal image found on the same sealing type provide evidence for seal-holders only entitled to seal one type of sealing. Multiple incidences of ball sealings with seal images 136:F, 138:H, 148:B, 149:C, and 156:B, door sealings with multiple incidences of seal images 139:C, 145:C, 152:G, and 155:A,

Table 4.3: Seal images with multiple incidences at Chogha Mish. All of the sealings bearing these images were found in the East Area. Plate numbers refer back to Delougaz and Kantor (1996b).

Sealing type	136:F	138:H	138:I	139:C	143:I	144:C	145:B	145:C	146:E	148:A	148:B	149:C	149:E	152:C	152:G	153:A	155:A	156:B	Total
Balls		3										3						2	8
Ball fragments	3		5								5		1			1			15
Door sealings				2			1	4					1		1		1		10
Door sealing fragments					2	2									1	1	1		7
Jar sealings			2																2
Jar/bale sealings																1			1
Bale sealings										1				1		1			3
Basket sealings					2				1					1		1			5
Cloth sealings							1												1
String sealings							1												1
String & stick sealings							1												1
Fragments			2			1	1												4
Flat base sealing			1																1
Conical sealings						1													1
Total	3	3	10	2	4	4	5	4	1	1	5	3	2	2	2	5	2	2	60

and container seals with multiple incidences of seal images 146:E, 152:C, and 148:A were found. Seal image 144:C was found on door sealing fragments as well as one conical fragment and another fragment of unknown type. Conical sealings at Chogha Mish are likely fragments of door sealings (Delougaz and Kantor 1996a, 116), so this seal may have been impressed only on doors.

Thus, some form of hierarchical administration may have existed at Chogha Mish. The previously mentioned seals, possibly used by individuals that held higher rank within an administrative system, also provide evidence refuting the theory that more ornately carved seals must have belonged to higher-ranking individuals (see Nissen (1977, 19–20), and Dittmann (1986)). Seal image 153:A was an elaborately carved depiction of cloth-carriers that was carved vertically instead of horizontally on the cylinder. Meanwhile, seal image 149:E was a more schematic depiction of a row of domed ‘granaries’. Seal image 143:I was a rougher, partially drilled depiction of animals, plants and other elements. By contrast, image 145:B, was a well-carved depiction of humans grasping oxen by the tail and carrying various jars. Finally, seal image 138:I bore three rows of abstract ‘ear-shapes’ in the so-called Jemdet Nasr style.

Consequently, the status of an administrative official may not have been conveyed by the style used to carve the seals they employed, but was instead communicated by the recognizable motifs on the seals. Furthermore, it is also possible that the rank of individuals was not designated by the type of seal they employed, but by the type of objects they were entitled to seal. Thus, sealers may have held different ranks depending on the types of artefacts they sealed.

A ‘stopper’ type of clay jar sealing with a seal image seemingly arranged in an identical pattern to the ‘ear-shaped’ seal image 138:I has also been discovered roughly 1000 km away at the settlement site of Hacinebi in Anatolia. This seal impression was apparently discovered in the context of an urukian trading colony within the settlement (Pittman 1999, 50). Pittman (2001, 433) notes that this seal is similar to the seal image from Chogha Mish, but does not remark on the identical arrangement of the ear-shapes on both the Chogha Mish and the Hacinebi sealings. The similarity of the images impressed on sealings from both sites might indicate they were created by the same seal. If this is the case, it can be theorized that the individual or individuals employing the seal with this image were affiliated with trade and commerce to this outlying region. Since impressions of the ‘ear-shapes’ seal were only found on portable objects (jar neck sealings, ‘stopper’ sealings, and clay balls) at Chogha Mish and Hacinebi, it is also possible that the sealers were traders who transported sealed goods and deposited sealed records of transactions in the form of clay balls. Further research should re-investigate the sealings from Chogha Mish and Hacinebi to conclusively determine if they were created by the same seal. Other sealings with Uruk-style motifs from Hacinebi were apparently impressed on

clay from the Susa region (Blackman 1999). Comparing the fabric of the Hacinebi jar stopper with the Chogha Mish sealings may yield similar results. Even if the jar sealing from Hacinebi was created by a different seal, it remains possible that different individuals associated with trade and commerce were entitled to wield seals bearing a specific motif.

4.3.4 Sealed objects inscribed with number signs

As shown in Table 4.4, out of a total of 181 sealed clay objects found at the site, four tablets, and one flattish sealing bearing string and cloth imprints from the East Area were found to be inscribed with numbers. A tablet from the West Area, and a single countersealed ball from the High Mound area were also found to be inscribed with number signs. Finally, nine balls were found to contain tokens, which may have been used for counting purposes (Delougaz and Kantor 1996a, 124). Thus, very few of the sealed clay objects found at Chogha Mish were inscribed with numerical signs or found to contain tokens, and no evidence for cuneiform writing was found on sealed objects. Consequently, some of the administrators employing seals may have been numerate, but literacy does not seem to have been a requirement for seal-based administration at Chogha Mish. Countersealed objects also occurred at Chogha Mish, and will be discussed in Chapter 6.

4.3.5 Conclusions

Available evidence tends to indicate that administrative activities during the 4th millennium at Chogha Mish were primarily restricted to the East Area with some activity taking place in the West Area. Though the settlement lacks sealings found in primary context (ie: door sealings next to a door threshold, jar sealings found inside a storeroom), evidence does indicate that doors, containers, and clay balls serving as administrative records were sealed on-site. Thus, containers with controlled contents, storerooms with doors whose access was controlled, and sealed administrative records were all employed in a complex system that appears to have administered goods at Chogha Mish. Sealed tablets and clay bullae were also present at the site. Literacy was apparently not a requirement for employing sealed records, since only numbers or tokens were used. A system with different tiers of responsibility for sealing containers, doors, and clay balls can be envisioned from available evidence.

By comparing the evidence for seal impressions from Chogha Mish to evidence for 4th millennium stamp seal impressions from the settlement sites of Arslantepe and Tepe Gawra, a template for future analyses of other settlements with seal impressions can be established. As shown in Table 4.5, the percentage of total sealings identified as door sealings at Chogha Mish is comparable to the quantity of door sealings identified to date at Arslantepe, despite the smaller total number of

Table 4.4: Sealings from Chogha Mish found to bear numbers or tokens.

Numbers		
Catalogue no.	Sealing type	Locale no.
III-854	Tablet frag.	R18:305
III-818	Tablet frag.	Q18:314
II-432a-b	Tablet frag.	S17:202
III-937a-b	Tablet fragments	H14:306
II-344	Tablet fragment	S17:201 Northern periphery
II-394a	String/cloth sealing	R17:208
III-752	Ball	N9:302
Total: 7		

Tokens		
Catalogue no.	Sealing type	Locale no.
II-348	Ball	R17:212
II-349	Ball	R17:212
III-766	Ball	R18:312
III-754a-b, III-776	Ball	R18:312
III-745a-b	Ball fragment	J14:305
III-841a-c	Ball fragment	North of Q18:308
III-925a	Ball fragments	R18:312
II-369b	Ball fragment	R17:215
II-370	Ball fragment	R17:215 West
III-761	Ball	R18:312
Total: 10		

Table 4.5: Comparison of Chogha Mish with Arslantepe and Tepe Gawra. Total area of sites converted from hectares to m² for comparative purposes. Note that total given for Arslantepe is only for the published sealings from Layer VII analysed in Frangipane (2007a, 29). For the Tepe Gawra, all excavated levels dated to the 4th millennium BCE were included (Rothman 2002, 3, 69).

	Total site area (m ²)	Area excavated (m ²)	Percent of total area excavated	Density of sealings per m ²	Total sealings	# of door sealings	% of door sealings
Chogha Mish	170000	1676.2	1%	0.1	181	31	17%
Arslantepe	40000	5456.1	14%	0.4	2145	207	10%
Tepe Gawra	10000	4000	40%	0.1	410	12	3%

sealings excavated at Chogha Mish. Thus, both Chogha Mish and Arslantepe appear to have employed door sealing as a regular administrative practice. By contrast, the Tepe Gawra sealings found in several layers spanning the 4th millennium show little evidence for door sealing practice. Differential preservation may be a factor in this case, but the possibility that sealing systems evolved differently over time in different locales should also be considered. The 2145 Arslantepe sealings were excavated from a restricted area of 2000 m². By contrast, most of the 181 sealings from Chogha Mish were found in the East and West Area, which had a combined surface area of 3070 m². Thus, given present evidence, it is possible that administration involving seals was practiced on a less intense scale at Chogha Mish. However, the lost fourth occupation layer of Chogha Mish may have contained more sealings (Delougaz and Kantor 1996b, 127), and preservational issues and excavation methodology may also have prevented the recovery of some sealings at Chogha Mish.

Finally, only one countersealed jar sealing impressed with more than one seal image from Arslantepe has been published to date (Frangipane 2007a, 489), while 21 countersealed record balls are known from Chogha Mish (see Chapter 6, Table 6.2). Some clay records in the form of tablets are known from Arslantepe, but these are not sealed (Frangipane 2007a, 148–157). Thus, both sites may have employed different types of techniques when using seals for administrative purposes.

Previous studies have outlined general trends in seal images and seal use (i.e. Pittman (2001)). Such studies may conceal hidden variability in the implementation of seals on a site-by-site basis. In future, an expanded analysis of the type employed here should be performed to determine the variability of sealing practices over time and space in different communities of southwestern Asia.

4.4 Sealings from Elephantine

The 121 sealings from Elephantine examined here were sealed with seals bearing hieroglyphs. Consequently, the seal-based administrative systems at Elephantine may have been utilized by literate individuals. However, the essentially pictorial nature of hieroglyphs may also have facilitated their use by illiterate individuals capable of pattern recognition. Evidence for partly literate individuals participating in seal-based administration may be found in the incidence of seal images combining pictorial motifs and hieroglyphs. For example, four sealings found to bear pictorial motifs and hieroglyphs can be found in the material from Elephantine analysed here (Patznick catalogue no. 104, 184, 208, 228). Such composite seal motifs may have been employed by or ‘read’ by individuals who were only partially literate.

Only two sealings from the material examined here were found to bear royal titulary (Ziermann 2003, 54; Pätznick 2005, 374). Thus, the central pharaonic administration may not have intervened directly in seal-based administration at

the site on a regular basis. The use of hieroglyphs on the non-royal seal images may have been a practice of elite imitation (Baines 2007, 130–1). In other cases, hieroglyphs may have indicated that the seal user was ultimately responsible to the central government in some fashion (see Section 4.4.4).

One important distinction between Chogha Mish and Elephantine lies in the southwestern Asian use of sealed clay balls and sealed tablets as recording devices. These devices do not seem to have been employed in Egypt. The absence of Egyptian sealed clay recording devices may be attributable to cultural differences. Clay balls with tokens and numerical signs and tablets inscribed with numerical signs appear to have evolved prior to writing (Boehmer 1999, 120–121). Writing on clay tablets (Pittman 2013, 326) may therefore have evolved as an extension of sealed recording devices. By contrast, instead of being associated with seal impressions on a clay medium, Egyptian writing appears to have evolved separately as symbols written in ink on jars, carved as symbols into elite funerary tags (Regulski 2008, 992–993), or presumably written on papyrus (Pätznick 2005, 65).

4.4.1 Fortress buildings

Most of the published sealings found at Elephantine that could be dated to the late 4th–early 3rd millennium were concentrated in a built-up area in the western sector of a rectangular ‘fortress’ located on the eastern island. An earlier occupation layer of the fortress buildings at Elephantine was in use until the middle of Dynasty 1 (see Figure A.89). This layer had evidence for only three sealings: two string sealings found in areas close to the city wall, and one jar sealing found in an alleyway. Consequently, administrative functions related to sealing or unsealing containers were apparently not located in this area during the earlier part of Dynasty 1. This situation changes when examining the later occupation layer of the fortress buildings, dated to the second half of Dynasty 1 to early Dynasty 2 (see Figure A.90). This section examines the find locations of seal impressions in this area and what clues to administrative activities can be derived from this evidence.

Door sealings are extremely rare at Elephantine in comparison to Chogha Mish. Sealings formerly attached to doors were only attested in the fortress buildings, and were found in only 3 identifiable instances: one in room IVa³⁸, one in area XIb, and one in room XIV. The sealing found in room XIV was discovered along with other artefacts located between the two layers of mudbricks forming a wall of the room (Pätznick 2005, Cat. 257). Consequently, this sealing may have been transported here from elsewhere. The other two sealings come from refuse on the floors of room IVa and XIb. While sealed doors may have existed in the fortress

³⁸The original catalogue entry of Pätznick (2005, Cat. 127) gives the findspot only as room IV in the fortress area. It was therefore assumed this corresponded to IVa, the only attested room with a similar number in the diagram of the early fortress buildings.

precinct, there was apparently no regular practice of door sealing implemented, contrary to the practices evidenced at Chogha Mish.

Examining the distribution of seal impressions in this area (see Figure A.90), it is evident that vessel sealings are apparently more abundant in this Egyptian settlement than they were at Chogha Mish. The largest quantities of impressed jar sealings were found in the courtyard area labelled XIb (5 sealings), the adjacent court XXVII (5 sealings), the area encompassed by court XXX and room XIa (12 sealings)³⁹, and room XIV (7 sealings). Lesser quantities of jar sealings were also found in zones adjacent to these areas.

Black triangles on the map in Figure A.90 indicate that rooms XIa and XIV were both connected to area XIb and court XXVII via doors, and room XIa was also connected to court XXX. These five areas may have formed part of a larger activity area, where jars may have been stored and unsealed. Archaeological evidence exists to support this theory on the movement of sealed goods. Imprints of vessels buried in the ground as storage containers and the remains of one buried storage vessel still in situ were found in room XIV (Kaiser *et al.* 1993, 139). Adjacent to this building, but not directly connected, was room XIII, referred to as a vessel storehouse due to the large quantity of ceramic vessels it was found to contain (Kaiser *et al.* 1980, 250). An entrance that was blocked off at an undesignated point in time did link room XIII to room X, from which room XIV could be directly entered. Consequently, jars from room XIII may have been sealed and subsequently stored in room XIV. These sealed jars may at times have been carried out and unsealed in the area formed by XIb and XXVII, thus accounting for the presence of jar sealings in these courts. Evidence for an oven and impressions in the ground that served to keep vessels upright were found in XXVII. Thus, this area could have been employed to prepare food that may have been served with the sealed beverages stored nearby. It is unknown whether the individuals consuming such meals were temple officials, administrators, or lower-class individuals. The jar sealings were not found to bear Pharaonic motifs, so the consumption of these beverages may not have been restricted to a particular class of individual.

Chamber XIa was previously split into smaller chambers that were presumed to be living quarters (Kaiser *et al.* 1993, 138–9), but were later united into a single chamber as shown on Figure A.90. Unfortunately, no further published information on chamber XIa is available. Thus, the unusually high quantity of jar sealings found in the immediate vicinity of this chamber could theoretically indicate its use as an area where vessels were unsealed, or simply indicate that the room had been used as a dump for sealings at one point in the settlement's history. One jar sealing bearing the name of the ruler Peribsen was also found in this area (Pätznick 2005,

³⁹The sealings in Figure A.90 located on the wall between court XXX and room XIa had a recorded location of 'court XXX room XIa' in Pätznick (2005). Given the uncertainty of their exact provenance, the arrow for these sealings points to the wall between the two locales.

374). This indicates the central pharaonic administration did occasionally provide local settlements with sealed supplies. Given the possible existence of a pharaonic administration that provided sealed goods to elite burials (see Section 3.3.5), these containers may have been considered inherently prestigious, and may have been reserved for consumption on special occasions. The exact find location for this sealing was not given, and therefore the sealing could not be charted on Figure A.90.

Large numbers of wooden box sealings were also found in area XIb (6 sealings), room XIa (4 sealings), and room XIV (2 sealings). One box sealing each was also found in the adjacent areas of room IVa and room X, as well as alleyway VIII. Given that box sealings are predominantly found in area XIb and room XIa/courtyard XXX, it is possible that boxes were unsealed in these areas. Theoretically, these boxes could have been stored in room XIa.

Triangular bullae formerly attached to strings were only found in room XIV, indicating that objects sealed with these sealings could have been stored in this room. Clay sealings or ‘bullae’ of indeterminate shape attached to strings, were found discarded in many different areas of the fortress buildings. Unlike jars and boxes, these bullae may not have been unsealed from objects and processed in specific locations. Unidentifiable bullae were also found in several locations. These likely belonged to one of the other categories of sealings mentioned previously, but were too fragmentary to be identified in the publication that listed them (Pätznick 2005).

The fortress buildings examined here appear to have been an administrative hub where containers may have been sealed and unsealed. These containers were principally jars and boxes, and do not appear to have been stored in sealed rooms for the most part, due to the lack of evidence for door sealings. Evidence for sealed administrative records is also absent. Consequently, the seal-based administrative systems of the 4th–early 3rd millennium BCE settlement of Elephantine in Egypt seem to have been less complex than those employed in Chogha Mish.

4.4.2 Fortress buildings - Evidence For Administrative Practices

Only six instances of seal impressions bearing hieroglyphs that can be interpreted as duplicates produced by the same seal were found in the areas of Elephantine examined here (see Table 4.6). Of these sealings, 5 were wooden box sealings, 5 were string sealings, and 4 were jar sealings. Additionally, all jar sealings had imprints of linen on the back (Pätznick 2005, 34). All but two sets of duplicate sealings were found in the area encompassed by court XXX and room XIa. Consequently, goods bearing the impressions of 5 different seals may have been brought to this area before being unsealed. Almost all other duplicate sealings were found in the adjacent rooms IV/XXII and area XIb. It appears that goods sealed with duplicate seals may have been processed in the area ranging from room XXII to court XXX (see

Table 4.6: Duplicate sealings from Elephantine fortress

Duplicate instance #	Pätznick (2005) catalogue no.	Find location	Sealing type	# of seal images
1	159	court XXX/room XIa	String	1
	160	court XXX/room XIa	Jar	1
	161	court XXX/room XIa	Wood box	1
2	168	court XXX/room XIa	Jar	1
	170	court XXX/room XIa	Jar	1
	171	court XXX/room XIa	String	1
3	164	court XXX/room XIa	Wood box	1
	165	court XXX/room XIa	Wood box	1
4	175	court XXX/room XIa	String	1
	176	court XXX/room XIa	Jar	1
5	138	room IV/XXII	String	1
	139	room XIb	String	1
6	196	room XIb	Wood box	1
	144	room XXVIII	Wood box	1
Total:				14

Figure A.90). Finally, one of the wood box sealings listed in Table 4.6 was found in room XXVIII. This area is not indicated on Figure A.90. Thus, current data seems to show that two seals (instances 3 and 6 in Table 4.6) may have been exclusively used on wooden boxes, while one seal (instance 5 in Table 4.6) may have only only been used to seal strings.

In addition to the multiple incidences of identical seal imprints listed in Table 4.6, Pätznick (2005) also catalogues sealings bearing imprints of similar ‘names’ and ‘titulary’ as ‘multiple occurrences’. As shown in Table 4.7, 31 incidences of seal impressions exhibiting similar names and titulary appear to have occurred in the material under scrutiny here. Pätznick (2005, 271) took this phenomenon as an indication that individuals with certain titles held more than one seal. However, an alternate theory can be proposed for the existence of these seals. It is possible that different individuals were granted the use of these seals, and acted as agents for the individual bearing the ‘title’ on the seals. Slight variations in the arrangement of name and titulary hieroglyphs may be due to design choices of possibly illiterate seal-carvers. It is also possible that the slight variations in a similar inscription placed on different seals could also have served to identify the seal-bearing individual responsible for each seal. According to Pantalacci (2013, 209), this type of practice can also be seen in currently unpublished material from the later 3rd millennium settlement of Balat.

Given these findings, it is now possible to examine the nine cylinder seals found in Nag el-Deir tomb N1605 in a new light. Many of these seals bore identical hieroglyphs that were arranged differently on each seal, or had one different sign added to an otherwise identical set (see Table A.4). These seals may have been delegated to different sealers by the individual in tomb N1605. They may have been rendered unusable on the individual's death and therefore been deposited in the grave. Alternately, these may have been seals used by this single individual during their lifetime when fulfilling different administrative duties. Additionally, the seal found in tomb N1604 bore a similar inscription to one of the N1605 seals. Consequently, the person buried in N1604 may have held an administrative 'title' similar to one also evidenced in N1605.

The deposition of sealings bearing specific types of names and titulary was apparently frequently restricted to certain rooms (see Table 4.7 and Figure A.90). Thus, type 2 was only found in court XXX/room XIa, type 8 was only found in room XIa, types 9, 10, and 11 in room XIb and type 6 and 7 only in room XIV. Others were somewhat more widely distributed: type 5 was found in the two adjacent rooms X and XIV, while type 1 was found in the non-adjacent room IV and court XXX. Type 3 was found in the non-adjacent areas of court XXX/room XIa and room XXVIII. Type 12 was found on one sealing each from room XXII and room XXXVII, two areas that were only linked by a circuitous route according to the excavation findings (see Figure A.90) Type 13 was found in the area of room X (room Xc was not charted on available maps) and room XXX. Both these rooms were located in fairly close proximity to one another. Finally, type 4 was found both in the semi-adjacent rooms XXVIII and X, as well as within the temple area not under examination here. Thus, some sealers may have been responsible for sealing goods opened in the room XIa area. However, others individuals bearing seals with different images could have been responsible for sealing goods that may have been opened in the region of rooms XIV and X. Pätznick (2005) catalogue numbers 111, 124, and 134 (titulary type 1 in Table 4.7), were found exclusively attached to strings. Catalogue numbers 212 and 214 (titulary type 7 in Table 4.7), and catalogue numbers 183 and 234 (titulary type 12 in Table 4.7) were found attached exclusively to wood boxes. Finally, catalogue numbers 199 and 258 (titulary type 13 in Table 4.7) were found attached exclusively to jars. Other than these three seal image types, the different names and titulary on seals do not appear to have been associated with specific types of sealings.

Multiple incidences of the same seal impressed on different sealings and seal images with duplicate titulary were only found impressed on string sealings, jar sealings, wooden box sealings, and door sealings. Court XXX/room XIa contained most of the evidence for identical seal imagery. Consequently, containers sealed with certain seals may consistently have been processed in this zone. Court XXX/room XIa, room XIV, and room XIb also contained sealings with similar titulary. Therefore,

Table 4.7: Sealings with similar titulary from Elephantine fortress. Sealing 191 is listed twice since it was found to be countersealed with two different seal images (see Figure A.99).

Titulary type #	Pätznick (2005) catalogue no.	Find location	Sealing type	# of seal images
1	111	room IV	String	1
	124	room IV	String	1
	134	court XXX	String	1
2	158	court XXX/room XIa	String	1
	163	court XXX/room XIa	Jar	1
3	169	court XXX/room XIa	Wood box	1
	146	room XXVIII	Jar	1
4	148	room XXVIII	Jar	1
	004	Satet temple: bldg. III room VIII	String	1
	254	room X	Jar	1
5	201	room X	String	1
	255	room XIV	Jar	1
6	113	room XIV	Jar	1
	257	room XIV	Door	1
7	212	room XIV	Wood box	1
	214	room XIV	Wood box	1
8	187	room XIa	Wood box	1
	189	room XIa	Jar	1
9	192	room XIb	Jar	1
	193	room XIb	Wood box	1
	245	room XIb	Door	1
10	142	room XIb	String	1
	191	room XIb	Wood box	1
11	191	room XIb	Wood box	
	192	room XIb	Jar	1
	193	room XIb	Wood box	1
	245	room XIb	Door	1
12	183	room XXII	Wood box	1
	234	room XXXVII	Wood box	1
13	199	Raum XXX	Jar	1
	258	Raum Xc	Jar	1
Total:				30

the zone surrounding court XXVII may have been the central zone where sealed goods were frequently processed in the fortress area. Countersealed objects also occurred at Elephantine, and will be discussed in Chapter 6.

4.4.3 City Wall North of Satet Temple

The previously mentioned lack of administrative complexity is also apparent when examining the evidence from the city wall north of the Satet Temple on Elephantine's east island (see left-hand circle in Figure A.85). Though only two building phases were discerned in the fortress area (see Figure A.89 and A.90), many more were found in this area. As shown below, only one sealing was found in each building phase:

- A single string sealing was found in open area LXVI in building phase III/IV, dated from early to mid Dynasty 2 (see Figure A.91).
- One jar sealing in open area LXII was found in building phase V(1), dated to the middle of Dynasty 2 (see Figure A.92).
- Two jar sealings in court LI were found in building phase V(2), again dated to the middle of Dynasty 2 (see Figure A.93).
- Two jar sealings and one string sealing were found in room L in building phase V(3/4), also dated to the middle of Dynasty 2 (see Figure A.94).
- One jar sealing and one string sealing were found in building phase VI(1) in room XVIII, also dated to the middle of Dynasty 2 (see Figure A.95).
- One wooden box sealing was found in building phase VI(2) in room XXIV, also dated to the middle of Dynasty 2 (see Figure A.96). This room was posited to be a storeroom (Ziermann 2003, 53), and was located next to a possible production area in room XVIII that contained an oven that had been used to fire objects to a high heat, and a cavity in the ground used to hold a large pottery vessel in place (Ziermann 2003, 52).
- One papyrus scroll document sealing bearing the royal name of the ruler Peribsen was found in building phase VI(3/4) in room XLIVb, also dated to the middle of Dynasty 2 (see Figure A.97). However, it appears that this sealing was found in room fill, and can therefore not be said to have been discarded in this area originally (Ziermann 2003, 54).
- Finally, one jar sealing was found in a kitchen area in room VI in building phase VII(1,2), dated to mid to late Dynasty 2 (see Figure A.98).

All sealings tend to be found in the same general area, regardless of the building phase they are attributed to. Thus, the processing of sealed objects may have been restricted to this zone throughout the Dynasty 2 period use of the city wall area.

The uncontextualized find of the papyrus seal shows that sealed administrative documents were not unknown in Elephantine at this time, though it is not possible to determine whether the seal impression and the document it was formerly attached to was manufactured on site or brought in from elsewhere.

Generally, the city wall area appears to have been a zone where sealed containers were not frequently in use. Thus, the fortress area previously examined in Section 4.4.1 may have been a sector where administrative activities took place, as opposed to a zone like the city wall where few sealed containers appear to have been in use. Consequently, it appears that a specialized division of administrative areas similar to that evidenced at Chogha Mish was in place at Elephantine.

As shown in Figure A.90, only 4 door sealings were found in well documented contexts in the fortress area at Elephantine. From this evidence, it appears that controlling the opening and closing of storerooms was not a priority in seal-based administration at Elephantine. However, 1 door sealing from the fortress area and 2 from the city wall north of the Satet temple could not be included here due to their unclear provenience. Additionally, the less well documented Satet-South and East City areas were apparently found to contain 8 and 14 door sealings respectively (Pätznick 2005, 60). Given the lack of documentation, these sealings could not be studied here. However, the grand total of 29 door sealings given by Pätznick (2005, 60) for the early material at Elephantine is comparable to the 31 provenanced door sealings found at Chogha Mish. Thus, the practice of sealing doors is well attested at Elephantine. Future publications of the Satet and East City material should provide more detailed evidence of these practices.

4.4.4 Duplicate ‘titles’: evidence for administrative practices

In his study, Pätznick (2005) mentions that the two ‘titles’ *rnw.tj* and *nfr m3' jz.t* (see Figure A.100) frequently occur on seal impressions as well as cylinder seals found at Elephantine (Pätznick 2005, 128, 150–151). A study by Regulski (2011, 23) has found that these titles also occur on sealings from Abydos, Beit Khallaf, El Kab, and Kubaniya South⁴⁰. A jar sealing from the settlement at Hierakonpolis also bears the hieroglyphs *nfr m3' jz.t* (Quibell and Green 1902, 16, 17, Plate LXX, 18; Fairservis 1986, 24). Pätznick interprets these hieroglyph sequences as titles belonging to individuals, whereas Regulski interprets them as names. All of these seal impressions and seals technically fall into the category of objects bearing ‘similar titulary’ according to Pätznick’s criteria. Since these artefacts have been found

⁴⁰Regulski (2011, 22) follows the precedent set by Kaplony (1963c, 1139) by transcribing *nfr m3' jz.t* as *nfr-ḳd-m3'.t*.

in many different locations in Egypt, they may provide evidence for overarching administrative norms. Regulski presumes such norms were influenced by a central pharaonic administrative system (Regulski 2011, 26). By examining the types of sealings and cylinder seals carved with *rnw.tj*, and/or *nfr m3' jz.t*, as well as the find locations of these artefacts (see Tables A.18 and A.19), evidence for administrative norms can be identified.

The seals that bore these sequences were apparently all impressed on Nile mud clay⁴¹ The sealings were frequently used to seal strings, bags, or vessels. At Elephantine, these sealings also sealed other objects. Seven door sealings bore impressions of seals with the legend '*rnw.tj*', two door sealings bore the legend '*nfr m3' jz.t*', and two door sealings were sealed with a seal carved with both '*rnw*' and '*nfr m3' jz.t*'. Two papyrus sealings also bore seal impressions with the legend '*rnw.tj*'.

The 4 cylinder seals bearing the sequence *rnw.tj* or variants thereof found in Elephantine (Pätznick 2005, 128) were all made of wood. Of these, Pätznick no. 005 was said to bear the same seal image as the sealed clay sealing no. 006. Previously, Section 2.3.7 speculated that wooden seals were employed for higher-ranking administrative purposes during the Early Dynastic period. Thus, individuals wielding seals with the legend '*rnw.tj*' within Elephantine during this period may have used wooden seals as an indication of their status.

One cylinder of clay impressed with positive impressions from a single cylinder seal (see Figure A.101) was also found (Pätznick 2005, 11). This may be one of the earliest attested incidences of positive seal impressions on a piece of clay that may have been used for a limited number of times as substitute 'seals' that left behind negative impressions⁴².

Aside from sealings of *rnw.tj* found at the settlements of Elephantine and El Kab, and the sealings of *nfr m3' jz.t* at Elephantine, sealings bearing these sequences were also found at mortuary sites. A sealing from Kubaniya South Grave P225 bore the name *nfr m3' jz.t*, the royal Dynasty 2 burial of Khasekhemwy was found to contain a seal impression bearing the legend '*rnw.tj*', and seal impressions of seals with both names were found at the Dynasty 2 mortuary enclosures of Peribsen and Khasekhemwy at Abydos (Bestock 2009, 47, Fig. 15). At Elephantine and El Kab, the seal impressions were occasionally found together with other non-royal seal impressions on countersealed sealings. At the Khasekhemwy grave and the Khasekhemwy enclosure, they were frequently found together with royal seal impressions (Kaplony's no. 269, 314, and 801) on countersealed sealings.

Given currently available evidence, it appears that the individuals employing seals with the sequences *rnw.tj* and *nfr m3' jz.t* were involved in sealing activities that took place within settlements. Other individuals employing these types of seals appear

⁴¹Available data seems to show that the currently unpublished Hierakonpolis sealing was also impressed on Nile mud (Bussmann Pers. Comm.).

⁴²A more detailed discussion of such copied seals can be found in Section 5.4.1.

to have sealed goods that were placed in burials and mortuary complexes. Further analysis of the exact seal image patterns is necessary to determine whether certain seal-bearers were active both in settlement-based contexts and in the fabrication of mortuary goods.

Since royal burial complexes have been found to contain seal impressions bearing these ‘titles’, it seems some individuals employing *rnw.tj* and *nfr m3’ jz.t* seals were involved in providing prestigious sealed goods to burials (see Chapter 3, 6). In Section 3.3.5, it was stated that seal impressions found in burials bearing legends identifying the king, high officials, and administrative institutions, are apparently not attested in settlement sites. However, the use of seals bearing the legends *rnw.tj* and *nfr m3’ jz.t* in settlement contexts and on elite funerary goods provides evidence for overlap between the use of specific types of seal images in settlements and the use of other seal images to seal mortuary goods in the Early Dynastic. Seals bearing the ‘titles’, *rnw.tj* and *nfr m3’ jz.t* were only countersealed with royal seal images when used in mortuary contexts. They were apparently only used on smaller types of sealings made of Nile mud, and not on the larger, possibly more prestigious vessel sealings, which were frequently made of finer potter’s clay (Engel and Müller 2000, 33–34). Large vessel sealings of Engel & Müller type G1 were apparently in evidence in the settlement of Elephantine, but further investigation of the appearance of these sealings is required to determine whether mortuary G1 sealings had an equivalent in settlements⁴³. Thus, sealings bearing the sequence *rnw.tj* or *nfr m3’ jz.t* in mortuary settings may have been sealed by individuals belonging to a ‘second tier’ of funerary good manufacturers. These individuals may not have been responsible for creating large vessel sealings made of fine clay.

Unlike impressions, cylinder seals bearing the sequence *rnw.tj* or *nfr m3’ jz.t* have apparently not been found in mortuary contexts (Regulski 2011, 26). This lends credence to the idea that administrative seals of particular types bearing names or titulary were not considered appropriate grave goods, as previously theorized in Section 2.3.7. Seals used for mortuary goods that bore explicitly royal motifs and the names and titulary of highly placed officials have never been found in any discard contexts, indicating they may have been specially disposed of. In contrast to this, available evidence from Elephantine indicates seals inscribed with ‘*rnw.tj*’ were not specially disposed of, but simply discarded when no longer in use. This further supports the idea that a ‘second tier’ of mortuary good manufacturers may have existed during the Early Dynastic period.

Since a large quantity of sealings have been found to bear the legends *rnw.tj* or *nfr m3’ jz.t*, it is possible these hieroglyph sequences were titles indicating the seal-bearers were responsible for certain duties. Alternatively, they may have been the names of individuals who were ultimately responsible for certain sectors of administration.

⁴³The typology established by Engel and Müller (2000, 31–32) was based on the sealings found in the royal burials of Abydos by recent excavations.

The widespread find locations of the hieroglyph sequences *rnw.tj* and/or *nfr m3' jz.t* are an indication that these seal images may have been copied from templates used by the central pharaonic administration (Regulski 2011, 26). The degree to which a central pharaonic system controlled the individuals employing these seals is unknown (Garcia 2013, 3). In the Early Dynastic, individuals bearing seals with these inscriptions may have belonged to a particular category of administrative employees that was officially recognized by higher authorities. A similar system appears to have been in place in the later Old Kingdom settlement of Balat (Pantalacci 2013, 209). Again, the differences in the arrangement of the hieroglyphs (Pätznick 2005; Regulski 2011, 26) on many of the sealings and seals bearing the legends *rnw.tj* and/or *nfr m3' jz.t* may indicate a degree of personalization that may have served to identify the seal-bearing individual.

4.4.5 Overview of general trends in seal impressions in early Egyptian settlements

Royal names were only attested once on sealings at Elephantine in the 4th–early 3rd millennium data surveyed here. As mentioned previously, the only other early royal sealing found at the site was not precisely provenienced and was therefore not included in the material studied in this chapter. Currently available evidence from other settlements and Egyptian trading sites of the Levant from the same period shows this trend is not isolated (see Table A.20). To date, pre-Dynasty 3 sealings bearing royal names have only been found in very small quantities in settlements. In total, only 13 have been found in the settlement sites of Elephantine (Pätznick 2005, 311, 374), Buto (Hartung *et al.* 2012, Abb. 21a), Hierakonpolis (Fairservis 1986, Figure 13-128; Bussmann Pers. Comm.), and Mendes (Redford 2010, Figure 3.5e). Though the sealings from settlement sites mostly bear hieroglyphs, significant quantities of sealings with pictorial motifs have also been found at sites such as Hierakonpolis (Bussmann 2014a; Bussmann 2014b; Bussmann Pers. Comm.) and 'En Besor (Schulman 1995a,b,c). Even when inscribed with hieroglyphs, seal impressions are not always 'readable' per se (Regulski 2014, 230). Finally, the combination of hieroglyphs and images on some seal images would also seem to indicate that writing may at times not have sufficed to convey meaning on cylinder seals. Thus, a significant quantity of illiterate or partially literate individuals, for whom the legibility of hieroglyphs would not have been a concern, may have participated in seal-based administration in the settlements surveyed here (Engel 2013, 38–39; Bussmann 2013, 23–24). Some sealings with hieroglyphs bear legends indicating that the owner may have interacted with pharaonic administrators (see Section 4.4.4), but these sealings presumably did not have to be read in order to be used by their owners.

Finally, it is possible that different types of sealings were deposited or disposed of in different activity areas in settlements, according to the activity spheres of different

sealers. Thus, sealings with obviously royal motifs may have been deposited in a quarter concerned with pharaonic administration, and more informal seals may have been deposited in other areas. Thus, the presence or absence of sealings with royal motifs in settlements may simply be due to the choice of areas that have so far been excavated in these ancient settlements. One example of such a practice was recently uncovered at the ‘planned settlement’ of the Old Kingdom Giza pyramid builders at Heit el-Ghurab, where one sector contained a discard heap of sealings bearing royal seal images, while another sector contained a midden with pictorial seal impressions (Ali Witsell 2015b,a). While it can be argued that such depositions were as artificial as the settlement itself, future investigations and publications of material from the sites listed in Table A.20 may well show that such separated discard areas also existed in the Early Dynastic.

4.4.6 Conclusion

Data on seal impressions from Elephantine show that administrative activity related to sealings may have been restricted to a certain sector or sectors in the settlement, as was the case in Chogha Mish. Door sealings appear to have been less plentiful at this settlement, indicating that the practice of sealing storeroom doors may not have been widespread in Elephantine. However, the widely distributed container sealings provide evidence for certain activity areas where containers may have been unsealed. Duplicate seal images on different sealings were uncovered within a restricted area, as were sealings bearing similar, but not identical, titulary. Identical seal images provide evidence that certain sealers from inside or outside the community may have been more actively engaged in sealing activities. The incidence of seals with similar titulary may also indicate that different delegates with different seals may have been working on the behalf of ‘officials’ with these titles at Elephantine.

4.5 Comparison of sealing practices at Chogha Mish and Elephantine

The early sealings from Elephantine examined here only rarely exhibited evidence for duplicate impressions derived from the same seal. Three door sealings found at Elephantine likely provide evidence for sealing activities within the settlement. Almost all other sealings were attached to portable goods. These goods may have been produced and sealed inside or outside the settlement. Thus, it is difficult to judge the intensity of sealing activity taking place within the settlement of Elephantine. However, the variety and diversity of seal impressions uncovered in Elephantine does attest to thriving cylinder-seal based administrative systems implemented at this Egyptian settlement. Roughly 150 different seal motifs were identified over

the course of this study. If each seal was employed by a different person, roughly 150 seal-bearing individuals may have participated in seal-based administration at the site of Elephantine during the Early Dynastic. This compares favourably to the approximately 200 unique seal images present at Chogha Mish, in spite of the fact that Early Dynastic Elephantine in Egypt was barely one third the size of the Chogha Mish site in southwestern Asia.

A great variety of cylinder seal impression motifs were attested in both Chogha Mish and Elephantine. Consequently, many individuals potentially residing inside and outside the settlements appear to have made use of cylinder seal-based administrative systems in both regions.

The present study of two sites in southwestern Asia and Egypt has shown that although both regions employed cylinder seals, the manner in which they were used appears to have been significantly different. One sealing system employed anepigraphic seals (Chogha Mish) and the other employed seals carved with hieroglyphs (Elephantine). Sealed administrative devices, as well as container and door sealings were found at the southwestern Asian site of Chogha Mish. By contrast, the Egyptian site of Elephantine primarily contained evidence for sealed containers and doors.

As discussed in Section 3.4, Dynasty 1–2 Egypt appears to have developed sealing systems for elite funerary goods. By contrast, the Dynasty 1–2 settlement-based use of seal impressions seen at Elephantine appears to have developed as a non-elite practice. Though sealed jars and papyrus documents presumably originating from royal central administration were evidently known, royal motifs do not otherwise appear on the early Elephantine sealing material (Ziermann 2003, 54; Pätznick 2005, 374). Thus seal-based administration was apparently primarily local at Elephantine. The site may show evidence for a system that uses similar imagery or written ‘titles’ found on different seals as indicators of possible affiliation with a higher official. In such a system, individuals bearing seals may have served as representatives of an official. At times, such individuals may have been affiliated with the pharaonic administration to some degree.

Unlike the site of Uruk, administrative waste was apparently not found near temple structures at Chogha Mish. Consequently, norms governing the use of administrative documents were likely not enforced by a top-down colonial imposition of the Urukian polity (see Section 1.5.1). Uruk-style administrative devices such as cylinder seals and sealed balls may have been adopted at Chogha Mish to facilitate communications with traders from other sites. The cultural influence of Susa, the pre-eminent site in the region (Alizadeh 2008, 23), may also have led to the adoption of Uruk-style administrative devices at the site of Chogha Mish to facilitate regional and intra-regional trade.

Both Chogha Mish and Elephantine show evidence for possible stratified hierarchies of individuals involved in administration, and the use of seals on containers and

doors. Aside from the presence of sealed clay balls used as records in Chogha Mish, it appears that both sites displayed similar levels of administrative intensity with regard to seal use. However, since much of the Elephantine material analysed here comes from the early 3rd millennium, seal-based administration may have developed somewhat later in Egypt. Future publications of sealings from other settlements dated within the 4th millennium in Egypt, as well as publications of more recent unpublished sealings from Elephantine, may reveal further details about the earliest Egyptian seal-based administrative systems. Comparisons between the sealing evidence from different southwestern Asian settlements may also reveal cultural differences in the use of administrative practices involving seals in this region. The seal-based administrative systems employed at Chogha Mish are said to have been based on local administrative traditions of the Susiana region (Alizadeh 2008, 28). Further differences between seal-based administration at Chogha Mish and other cities employing Uruk-style seals and sealing techniques are investigated in Chapter 6.

Prior to the present analysis, sealing systems at sites belonging to the Uruk culture and Egyptian sites from the 4th millennium BCE have not been subject to a thorough scrutiny. Comparative analyses of the sealing systems used in both regions have also not been conducted. The analysis of a sample site from each region in this chapter provides an initial basis from which further analyses of this type can proceed.

Chapter 5

Case study of seal impression depositional trends in southwestern Asia and Egypt during the 3rd millennium BCE

During the 3rd millennium BCE, the use of writing as an administrative tool spread throughout both southwestern Asia and Egypt. This chapter examines whether the increased use of writing changed how seals were employed in settlement-based administrative systems in both regions. The development of seal-related administrative practices is also investigated, with particular attention given to instances of change and continuity in seal use practice between the 4th and 3rd millennium BCE. The results of these investigations are compared with the findings of Chapter 4 to scrutinize how seal-based administration developed and changed from the 4th to 3rd millennium.

To investigate these questions, the present chapter examines seal impression deposits from two settlements that date to the 3rd millennium: Tell Brak from southwestern Asia and Balat from Egypt. These two sites were chosen since the large quantity of sealed artefacts found in these settlements is relatively well documented. Both settlements included areas with well-stratified seal impression finds. Maps and the find locations of sealed material in these areas were also available. In both cases, the excavated sealings were found in the vicinity of cultic structures, but not within the sanctums themselves. The different relationship between the sealed objects and these structures is investigated in this chapter.

Other excavated sites from southwestern Asia and Egypt were inadequately documented, or lacked recorded sealing find locations and maps. Find location data is important for the analyses carried out in this chapter. Consequently, Tell Brak and Balat were chosen as the most optimally documented sites from both regions. They were found to contain seal impressions in probable discard contexts and fill

that had been disturbed on occasion. This find deposition pattern allows discard patterns at the two sites to be compared. Tell Brak and Balat were likely regional centres of importance that served as hubs of production and trade.

The sites scrutinized here belong to settlement types whose seal impression deposition patterns have yet to be thoroughly examined. Tell Brak was located in modern Syria, on the periphery of the Mesopotamian heartland in southern Iraq–Iran. The functioning of seal-based administration in settlements outlying the central Mesopotamian region has not been thoroughly examined to date (Charvát 2005). The analysis of Tell Brak sealings conducted in the present chapter therefore provides an initial overview of how seal-based administration may have functioned in settlements outlying the central Mesopotamian region. Also, no thorough analysis of seal impression discard patterns within a settlement from 3rd millennium Egypt has been conducted to date. The analysis of material from Balat consequently provides an initial overview of early seal-based administration in Egyptian settlements during this period.

This case study of two sites also provides a template for future studies examining and comparing impression discard patterns in both regions. To date, a study of this type has not been conducted on sealings from southwestern Asia and Egypt. Consequently, the present chapter provides a baseline of results that can be proven or disproven in future comparative examinations. The possible relations between administrative hierarchies in these settlements and central administration in both regions (see Section 1.4) are also scrutinized.

5.1 Methodology

To ensure comparability with the results of the 4th millennium BCE settlement study presented in Chapter 4, the methodology employed in this chapter is functionally identical to that described in Section 4.1.

5.2 Site background

5.2.1 Tell Brak

Tell Brak is a 48 ha tell (mound) settlement (McDonald *et al.* 2002, xxvii) located in modern Syria (see Figure A.83), with occupation layers that date between the 6th millennium BCE and the 4th century CE (McDonald *et al.* 2002, xxx). Seal impressions were frequently found discarded in and around built structures (see Figure A.102). It is considered to have been a large regional centre, and has also been theorized to be the ancient city of Nagar (McDonald *et al.* 2002, 379). The evidence examined here appears to have been deposited at a time when the city was controlled as an important outpost of the Akkadian empire. Door sealings, container sealings,

and bullae of various types, occasionally moulded around strings, were found in the 3rd millennium layers of the site. In particular, Brak is a site that displays evidence for the evolution of the use of sealed bullae. The frequent use of number signs and the rare use of cuneiform inscriptions on the bullae from this site indicate that the practice of utilizing sealed pieces of clay as administrative devices (see Section 4.2) appears to have continued into the 3rd millennium at Brak (McDonald *et al.* 2002, 140). However, based on evidence from the excavations, it appears these bullae were employed differently from their 4th millennium counterparts. These differences are discussed in Sections 5.3.1 and 5.3.4.

The largest quantities of sealings at Tell Brak were uncovered in areas labelled FS and SS (see Figure A.102). Since they were located at opposite corners of the settlement mound, such areas may have served to process the flow of goods entering and leaving the city. Small fragments of sealings that were pressed onto string or other unidentifiable goods were classified as bullae fragments by Matthews (1997). This classification was kept for the Brak material in the present analysis since no further information was available on these fragments. Bullae were also occasionally referred to as ‘dockets’ by Matthews (1997). These artefacts are classified as bullae in the present analysis. When examining sealings bearing impressions of different seal images from Tell Brak, seal image catalogue numbers given by Matthews (1997) are employed. Matthews (1997, 217) uses the word ‘design’ to refer to the pictures left behind by seals on sealings. These pictures are referred to as ‘seal images’ in the current analysis.

Only earlier, well-preserved 3rd millennium Early Dynastic IIIb–Akkadian period settlement layers of Brak were examined in this chapter. Specifically, the ‘Main Level’ of Area SS and Level 5 of Area FS, judged to be contemporary occupations, were examined (McDonald *et al.* 2002, 388–389). Area SS had a surface area of approximately 7239 m² (McDonald *et al.* 2002, 74), and Area FS had a surface area of approximately 2222 m² (McDonald *et al.* 2002, 42). Despite the presumed hegemony the Akkadian empire held over the site, these layers provide ample evidence for local styles of administration. This enables a comparison to be made between the Early Dynastic IIIb–Akkadian period layers at Brak, circa 2500–2154 BCE (Brisch 2013, 118, 120; McDonald *et al.* 2002, 391), and the local administration of the settlement at Balat during the Old Kingdom, in Dynasty 6 circa 2305–2153 BCE (Hornung *et al.* 2006, 491–492).

5.2.2 Balat

Balat is a 40 ha site located in the Dakhla Oasis in the western desert of Egypt (see Figure A.109). It contains principally 3rd millennium BCE material, although 2nd millennium BCE remains have also been found at the site (IFAO 2014), as well as burials from the 1st millennium BCE (Castel and Pantalacci 2005, 58).

Many seal impression fragments were found in the ka-sanctuary complex of the oasis governors (Soukiassian *et al.* 2002), as well as a sector referred to as the administrative ‘palace’⁴⁴ from the 3rd millennium, located adjacent to the sanctuaries (Pantalacci 1996, 359). The seals from the core administrative area have not been completely published to date. Hence, the present chapter focuses on door sealings and container sealings found in the area of the sanctuaries and the service rooms adjacent to them. The sanctuary enclosure, encompassing both sanctuaries and service rooms, had an area of approximately 1000 m² (Castel and Pantalacci 2005, 10).

These sanctuaries were apparently erected as cults to the ‘souls’ of governors during their lifetime, by special permission of the ruler (Soukiassian *et al.* 2002, 310, 521). The cults then continued to function for some time after the death of the governors (Soukiassian *et al.* 2002, 521).

Balat was an oasis town (IFAO 2014) that would have been removed from the centre of pharaonic power. The unusual use of unsealed clay tablets instead of papyrus for written administration during the Old Kingdom at Balat has been documented (Soukiassian *et al.* 2002, 331). Consequently, local forms of seal-based administration may also have developed in this setting. Available evidence is investigated to determine whether this was the case.

The ka-sanctuary complex at Balat contained relatively large quantities of Old Kingdom seal impressions despite having suffered from a fire. The sanctuary structures were subsequently reused, leading to further context disturbance. Consequently, only layers deposited prior to the burning of the area of the complex and the burnt layers themselves are included in the present analysis. Patterns in seal impression deposition can still be observed in these layers, providing insight into local administration and discard patterns. At Balat, most sealing types (jar sealing, door sealing, etc.) could no longer be identified. However, it was frequently still possible to determine whether they had been sealed with cylinder or stamp seals. It has been theorized that upper class individuals employed cylinder seals while lower class individuals employed stamp seals in the Old Kingdom (see Pantalacci (1996, 360) and Section 2.3.9). However, Pantalacci (1996, 361) also notes that large stamp seals are used for door sealings in the currently unpublished administrative palace sealings from Balat, indicating that stamp seals may also have been used by individuals of a higher rank. Thus, find locations of cylinder and stamp seal impressions are examined to determine whether a hierarchy can be discerned in sealing discard patterns in the ka-sanctuaries at Balat.

In summary, the main seal impression-containing areas at Tell Brak had a total surface area of 9462 m², while the main areas with seal impressions at Balat measured a total of 1000 m². Tell Brak was found to contain 346 well-recorded sealings, and

⁴⁴Large administrative centres that contain no trace of royal living quarters are generally referred to as palaces in the literature.

Balat was found to contain 86 well-recorded sealings. Thus, both settlements apparently provide examples of different scales of administrative activities.

5.3 Sealings from Tell Brak

Very few of the 346 sealings from Tell Brak examined here had writing as part of the seal images impressed on them. The identifying imagery on seals may have been memorized by illiterate administrators. Cuneiform writing was only inscribed on a few sealed artefacts. Thus, most of the individuals involved in seal-based administration at this southwestern Asian site could have been illiterate.

5.3.1 Area SS

Area SS is located in the southwest of the city mound of Brak (see Figure A.102). Large quantities of seal impressions were discarded inside and outside buildings in Area SS during the main occupation level of this zone (see Figure A.103). This occupation level is judged to be contemporary with Area FS level 5, which is examined in Section 5.3.4. Thus, material from this area is easily compared to the remains from Area FS, providing insights on the differential functions of two important administrative areas within the city.

The sealings catalogue given by Matthews (1997, 160), can be used to divide the seal images found on impressions from the SS Main Level into three categories:

1. 'Main level' - Seal images found on impressions deposited inside and around buildings.
2. 'Ritual deposit' - Seal images found in the ritual deposit in Court 8, outside the entrance to the temple court, East Courtyard 7.
3. 'Trample layer' - Seal images that were only found on impressions deposited within the deliberate, so-called 'trample' fill in the eastern half of Room 18.

As shown in Figure A.103, seal images found in the ritual deposit could also be found elsewhere throughout the complex. In Table 5.1, sealing types found in all areas other than the ritual deposit and the eastern area of Room 18 are referred to as 'All other areas', sealing types found in the ritual deposit are referred to as 'Temple entrance deposit' sealings, and sealings from the eastern 'trample' of Room 18 are referred to as 'Eastern part of Room 18' so as not to confuse the sealings classification with Matthew's seal image classification.

Comparing the types of sealings found in these categories demonstrates clear differences between the types of seal impressions chosen to be deposited in the temple entrance deposit and those that were not found in this locus. Peg sealings, jar

Table 5.1: Sealing types from Area SS

All other areas	#	Temple entrance deposit	#	Eastern part of Room 18	#
Peg	7			Peg	4
Jar/Peg	1				
Mat/Basket	1				
		Bag	1		
		Cloth	4		
Rectangular Bullae	20	Rectangular Bullae	2	Rectangular Bullae	124
Triangular Bullae	20	Triangular Bullae	8	Triangular Bullae	39
Bullae	13	Bullae	12	Bullae	34
		Fragments	1	Fragments	41
Total	63	Total	28	Total	242

sealings and mat/basket sealings were not found in the deposit. By contrast, all sealing types aside from bag/cloth sealings could be found in the Main Level and Trample layer. Bag sealings and sealings bearing cloth imprints⁴⁵ were only found in the ritual deposit. The remainder of the ritual deposit consisted of bullae with rectangular, triangular, and undetermined cross-sections, a string sealing⁴⁶, and one unidentified fragment. Clearly, peg sealings⁴⁷, jar sealings, and mat/basket sealings may not have been considered appropriate for placement in the ritual deposit. Aside from two exceptions, sealed bullae and sealings attached to cloth or bags were the only sealings found in this special deposit. Consequently, these types of sealings may have been viewed as more significant.

Peg, mat/basket, and jar sealings found in the Main Level and Trample layer were occasionally impressed with the same seal images used on bag/cloth sealings and bullae in the ritual deposit. Thus, sealings may have been selected for placement in the ritual deposit based on sealing types, rather than seal images. The lack of door sealings at Brak may be an anomaly, since sealings bearing the mark of a peg or bolt were nominally classified as ‘peg sealings’, due to difficulties in distinguishing between sealings attached to pegs that closed boxes versus door bolt sealings (Matthews 1997, 178).

The ritual deposit near the entrance to temple Courtyard 7 (see Figure A.103) may have been part of the ‘decommissioning’ process Area SS underwent at the end of the Main Level use phase. This process also appears to have involved wall

⁴⁵One sealing, REG 4009/TB 10015a, was found to bear string imprints and possible cloth imprints. The sealing was included under the category of cloth sealings.

⁴⁶String sealings may originally have been fragments of bullae formed around strings, or sealed strings stretched around vessel necks. Hence, string sealings from all areas may originally have been classifiable as bullae or jar sealings, but were rendered unidentifiable when broken.

⁴⁷Peg sealings likely used to close boxes are called peg sealings, and sealings used to seal doors are called peg/door bolt sealings.

levelling and infilling of structures (McDonald *et al.* 2002, 90). It is notable that this ritual deposit can be divided into two distinct deposits found adjacent to each other. Both were classified as belonging to a single locus: SS 549 (Matthews 1997, 242; McDonald *et al.* 2002, 584, 619). One deposit contained trade goods and luxury items, and another, separate deposit contained sealings (McDonald *et al.* 2002, 90, 231, 296, 344).

The site excavators of Tell Brak have theorized that Area SS contained out-buildings that were attached to a temple. This included areas likely dedicated to commerce (Oates 1993, 293). Thus, the creation of two separate ritual deposits, one containing luxury goods and the other, seal impressions, may have served to symbolically represent two vital aspects of commerce: the items being exchanged, and the administrative tools used to record such exchanges. Sealings bearing identical seal images were found in the ritual deposit and in the administrative buildings. Thus the ritually deposited sealings may have been selected from discard piles in the administrative sectors (see Figure A.103)⁴⁸. As a result, the luxury goods deposit may have contained items selected to be representative of trade goods that passed through this administrative centre. Some categories of trade items were perhaps excluded from this deposit, in the same manner that certain types of sealings were excluded from the sealings deposit. Cylinder seals were found in the depression that contained luxury goods, but not in the deposit that contained seal impressions (McDonald *et al.* 2002, 90). Thus these cylinder seals were perhaps meant to represent trade goods, and were therefore not eligible for deposition with the seal impressions.

Room 18 in Area SS contained the largest number of seal impressions in the entire complex (see Figure A.103) (Oates 1993, 293). Thus, it was judged to be an administrative hub (McDonald *et al.* 2002, 82). The layers created when the decommissioned Room 18 was filled in were also found to contain scattered luxury items (McDonald *et al.* 2002, 136). There is a degree of overlap between the type of luxury objects found in these layers and the luxury objects found in the ritual deposit of Court 8, as shown in Table 5.2. Consequently, the luxury artefacts found in the ritual deposit may have originally been stored in Room 18.

5.3.2 Area SS - The most frequently attested seal images

Two shapes of bullae were frequently found in Area SS: bullae with triangular sections (see Figure A.105), and bullae with rectangular sections (see Figure A.106). Bullae with triangular sections almost never show evidence of string holes. Many of the triangular section bullae were found in Room 18. Mass-produced bowls found in this administrative chamber could theoretically have held rations (Oates 1993, 295). Consequently, the non-string hole exhibiting triangular bullae have been interpreted

⁴⁸Only one sealing from the ritual deposit, REG 4046, bore an image not evidenced on sealings found outside the ritual deposit (Matthews 1997, 285).

Table 5.2: Objects in SS Room 18 and SS ritual deposit

Room 18	#	Ritual deposit, Courtyard 8	#
bone bead	1		
'alabaster' statue	1		
ostrich egg shell	2+		
copper/bronze objects	2+	copper/bronze objects	100+
frit bead	1	frit beads	7
worked lapis lazuli	1	lapis inlay	26
cylinder seal	1	cylinder seals	3
		silver pendant	1
		beads of indian ocean shell	26
		beads of shell	6
		beads of faience	32
		lapis lazuli beads	6
		bead of rock crystal	1
		beads of carnelian	21
		bead of jet	1
		gold leaf	2+
		stone bowl, fragmentary	1
		elements of sting ray skeleton	7
Total	9	Total	240

as ration tokens. Aside from two exceptions⁴⁹ bullae with rectangular sections were found to exhibit string holes. These bullae have been interpreted as sealings attached to strings tied around containers (Oates and Oates 1995, 492). It is also possible that these sealings were attached to strings looped around the handles of several jars and tied with a knot, as a means of sealing a shipment.

All of the seal images found impressed on triangular and rectangular bullae were anepigraphic. Only one seal was ever impressed on each bulla, and no evidence for countersealing of bullae appears to have been recovered. Triangular bullae frequently bear counting marks and other incised signs that were presumably legible to individuals using these bullae. Bullae with rectangular sections also bore these types of signs (McDonald *et al.* 2002, 133–134). Thus, both types of bullae can be considered as administrative devices.

The three most commonly attested seal images found impressed on bullae are shown in Table 5.3. Matthews (1997, 252–253) image 242 is almost exclusively found on bullae with triangular sections. A total of 60 sealings bearing this seal image were found in Area SS. Aside from the 6 bullae found placed in the ritual deposit, seal image 242 was only attested in Room 18. A total of 53 triangular section bullae and 1 bulla of unknown type impressed with seal image 242 were discovered in this room (see Table 5.3). Thus, the sole known discard location for seal image 242 was Room 18, since the ritual deposit was presumably deliberately created and cannot be perceived as a rubbish dump.

⁴⁹Classified with registry numbers REG 7209/TB 14090 and found in the yellow-brown trample layer SS 949 of Room 18 (Matthews 1997, 255).

Table 5.3: Frequently attested seal images from Area SS

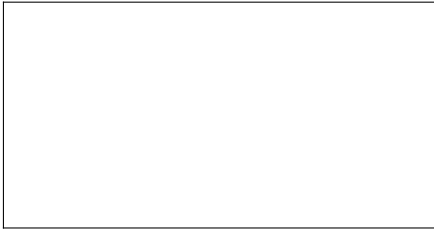
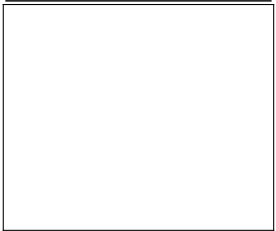
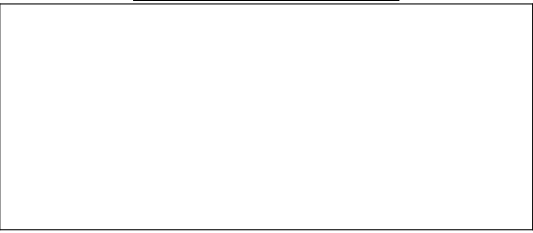
<p style="text-align: center;">Seal Image #242</p>  <p>Where attested: Ritual deposit, SS 549 Room 18, SS 813 Room 18 eastern Trample, SS 945 Room 18 eastern yellow-brown tram- ple, SS 949 Top of Area SS fill, SS 223</p>	<p>Total # of times attested: 60 Source: Matthews (1997, 252–253) Image from Matthews (1997, XXI)</p> <p>On what sealings attested: 5 Triangular cross-section bullae, 1 fragment of same 19 Triangular cross-section bullae 33 Triangular cross-section bullae 1 Bulla 1 Triangular cross-section bulla</p>
<p style="text-align: center;">Seal Image #245</p>  <p>Where attested: Ritual deposit, SS 549 Room 18, SS 813 Room 18 eastern Trample, SS 945 Room 18 eastern yellow-brown tram- ple, SS 949 Courtyard 8 floor, near Room 30, SS 585 Room 5, floor, SS 675 Sargonid floor of Naram-Sin's Palace, room 10</p>	<p>Total # of times attested: 158 Source: Matthews (1997, 253–255) Image from Matthews (1997, XXI)</p> <p>On what sealings attested: 2 Rectangular cross-section bullae, 1 Triangular cross-section bulla, 1 bulla, 2 fragments of same 19 Rectangular cross-section bullae, 1 rectangular cross-section inscribed bulla fragment, 1 inscribed bulla frag- ment 57 Rectangular cross-section bullae, 52 fragments of same, 4 triangular cross-section bullae 12 Rectangular cross-section bullae, 2 bullae 2 Bulla fragments 1 Peg sealing 1 Peg sealing</p>

Table 5.3: Frequently attested seal images from Area SS - (continued)

Seal Image #346	
	<p>Total # of times attested: ca. 20 total (see McDonald <i>et al.</i> (2002, 144)) Source: Matthews (1997, 269–270) Image from Matthews (1997, XXVIII)</p>
<p>Where attested: Ritual deposit, SS 549</p> <p>Room 18 fill, SS 812</p> <p>Room 18 eastern Trample, SS 945 Room 18 eastern yellow-brown trample, SS 949 Courtyard 8 floor, near Room 30, SS 585 Courtyard 8, fill adjacent to niched facade on north side, SS 502</p>	<p>On what sealings attested: 2 bulla fragments, ca. 6 bulla fragments, 4 cloth sealings, 1 sealing fragment</p> <p>1 sealing with string, reed/wood marks</p> <p>1 sealing fragment 1 sealing fragment</p> <p>3 peg sealing fragments</p> <p>1 mat/basket sealing</p>

Matthews (1997, 253–255) seal image 245 was generally found on rectangular-sectioned bullae that were frequently originally attached to strings (see Table 5.3). However, this seal image could also be found rolled onto peg sealings, as well as one rare triangular-sectioned bulla from the ritual deposit that exhibited string holes (REG 3984/TB 10013). Seal image 245 was attested a total of 158 times in Area SS. It was principally found on rectangular bullae in the ritual deposit and in Room 18. Two bulla fragments bearing this image were also found in Courtyard 8 near Room 30. One peg sealing bearing this image was found in Room 5. Notably, a peg/door bolt sealing bearing impressions of seal image 245 (Mallowan 1947, 79, Footnote 3, 149–150; McDonald *et al.* 2002, 73; Matthews 1997, 253) was also found in the Akkadian ‘palace’ located not far from Area SS (see Figure A.102). The ‘palace’ of Naram-Sin seems to post-date the main level of Area SS under examination here (McDonald *et al.* 2002, 391; Brisch 2013, 120). Consequently, this peg sealing may have been intrusive, and could have been deposited in this location as a result of construction activities that dug up remains from earlier layers.

Given the large quantities of bullae found to bear seal images 242 and 245, excavators have surmised that two individuals separately wielding seals bearing these images were important officials responsible for the administrative systems employing

triangular and rectangular-section bullae (McDonald *et al.* 2002, 137). It appears there were the two main ‘sealers’ involved in the bulla-based administrative systems:

1. The bearer of seal 242, who only sealed triangular bullae, and
2. The bearer of seal 245, who mainly sealed rectangular bullae but also triangular ones on occasion, including one rare triangular bulla with string holes. This official also sealed pegs/door bolts.

Of the two, the individual with seal 245 apparently had greater authority, since they sealed doors and both types of bullae. Traces of writing were also found on two bullae fragments (REG 4396/TB 11027a, REG 4397/TB 11027b (Matthews 1997, 254)) impressed with seal 245. Thus, the individual making use of this seal may have been literate.

It is possible that the seals bearing image 242 and 245 could also have been delegated to different individuals at different times. Thus, a seal image cannot necessarily be associated with a single individual. Also, the individuals marking the bullae with number-signs, symbols, and writing may not have been the same as the person who rolled seal impressions on the bullae.

Some impressed bullae were found squeezed together (see Figure A.107). The excavators surmised that such objects were intended to be ‘recycled’ and reused by re-wetting. Unmarked squeezed pieces of clay and ‘sling bullets’ roughly shaped like bullae also found in Room 18 were judged to be ‘blanks’ that could be used for fabricating bullae (Oates and Oates 1995, 495). However, it is unclear whether simply moistening dried pieces of clay would have sufficed to make them usable as surfaces for seal impressions and markings (Oates 1993, 302). Further experimental investigations are required to establish whether these pieces of clay were ‘blanks’. Thus, it remains unclear whether the bullae found in Room 18 were created in Room 18, or simply discarded there after use. It is also possible that blank bullae-shaped pieces of clay were used as generic blank tokens.

The third common seal image found on sealings is image type 346 (Matthews 1997, 269–270). Approximately 20 sealings bearing this seal image were found in total (McDonald *et al.* 2002, 144). The majority of sealings bearing this seal image (ca. 13 sealings) were found in the ritual deposit. Only 3 sealings bearing image 346 were found in Room 18. Three peg/door bolt sealings bearing image 346 (REG 4553/TB 11026) were also found near the entrance to Room 30 in Courtyard 8. Finally, a single mat or basket sealing bearing this image was found next to the temple facade in Courtyard 8 (see Figure A.103, Table 5.3). Consequently, sealings with this image were likely deliberately removed from their original discard location and placed in the ritual deposit. This illustrates a possible intent to remove traces of this seal image from the complex. By consecrating these sealings as part of the ritual deposit, individuals may have designated the importance of the sealer in administrative systems.

In cases where the type of objects being sealed could be determined, it appears that the holder of seal image 346 was responsible for sealing cloth bales/bags, baskets, or wooden boxes. The peg/door bolt sealings found close to room 30 indicate that the seal-bearer of seal image 346 may also have been responsible for sealing the door to this chamber. Both room 30 and room 18 were found to have inner benches to the south and east of the room (McDonald *et al.* 2002, 84). Room 30 may therefore also have served some type of administrative function.

Seal image 346 has been considered important by scholars due to the presence of an inscription on the seal identifying it as the property of a scribe named Muriš (McDonald *et al.* 2002, 137). The Akkadian seal design has been judged as indicative of the individual's adherence to the Akkadian empire. This empire held sway over the frontier city located on Tell Brak before and after the 'decommissioning' of the structures in Area FS and SS (McDonald *et al.* 2002, 391). Consequently Muriš has been considered the foremost administrator of the SS complex (McDonald *et al.* 2002, 147).

Established theories state that individuals capable of sealing doors were likely of higher status since they may have controlled access to the rooms they sealed (Frangipane 2007b, 470). However, comparing the seal image use patterns of the anepigraphic seal images 242 and 245 with the inscribed seal images 346, 211, 240, and 241 reveals another trend. As shown on Table 5.4, seal image 346 was used to seal amorphous bullae fragments, mats/baskets, cloth, and string, and was not used to seal triangular or rectangular cross-section bullae, as was the case for seal images 242 and 245. This trend continues when examining the only three other seal images inscribed with writing, 211, 240, and 241. Here, the most commonly identifiable sealed pieces of clay were peg sealings, with occasional incidences of amorphous bullae and string sealings, as shown in Table 5.4. It appears that individuals with the anepigraphic seal 245 and the epigraphic seals were entitled to seal pegs or doors. Amorphous bullae could also be sealed by both anepigraphic and epigraphic seals. Thus, the status of individuals employing seals 242, 245, and 346 were perhaps not dependent on the anepigraphic/epigraphic nature of the seal. Instead, the ability to seal bullae (images 242, 245) or cloth bales/bags (image 346) in addition to more common objects such as pegs and amorphous bullae may have helped to define the administrative status of individuals wielding these seals.

Seal image 211 is said to bear the same name as the Akkadian-style seal image 346. The excavators of the site theorized that these two belonged to a single individual named Muriš, who used two types of seals (McDonald *et al.* 2002, 137–138). However, it is also possible that both seals were used by sealers whose sealing authority was delegated to them by Muriš, in a similar fashion to what has been speculated to occur at Elephantine (see Section 4.4.2). The similarity of the motifs on seal image 240 and

Table 5.4: Multiple incidences of anepigraphic vs inscribed seal images at Tell Brak. Image numbers refer back to Matthews (1997).







Anepigraphic seal images		Inscribed seal images			
Image 242	Image 245	Image 346	Image 211	Image 240	Image 241
					
58 Triangular bullae 1 Triangular bulla fragment 1 Bulla	5 Triangular bullae 90 Rectangular bullae 53 Rectangular bulla fragments 3 Bullae 5 Bullae fragments 2 Pegs	2+ Bullae fragments 3 Pegs 3 Fragments 1 Mat/Basket 1 String, reed/wood 4 Cloth ca. 8 String	1 Peg ca. 26 String	6 Bullae fragments 2 Pegs	3 Pegs 14 Fragments
Total: 60	Total: 158	Total: 22	Total: 27	Total: 8	Total: 17

Table 5.5: Less frequently attested seal images with multiple incidences at Tell Brak, Area SS. Image numbers refer back to Matthews (1997).

Sealing type	143	201	207	233	255	261	258	249	259	300
Triangular bullae		2					1			
Triangular bulla fragment							1			
Rectangular bullae								3		
Bulla fragment	1									
Peg sealings			1	1						
String sealings			1	1	1				1	1
Fragments	19				12				1	1
Test strip sealings						2				
Total	20	2	2	2	13	2	2	3	2	2


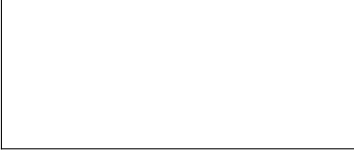
241 may also result from such an arrangement, where two seal-bearing individuals used seals with similar imagery to fulfil administrative functions of the same type.

The most frequently attested seal images in Area SS occur within the Court 8 ritual deposit and Room 18. Seal images found in the ritual deposit also occur in other areas within the complex. Thus, the most active seal-bearing individuals within the Area SS complex are well represented in the ritual deposit. These sealings may have been placed in the deposit as a means of acknowledging the important contributions of these individuals within the administrative functioning of the complex.

5.3.3 Area SS - Less frequently attested seal images on cloth sealings and bullae

Less frequently occurring incidences of duplicate seal images not included in Table 5.4 have been summarized in Table 5.5. These sealings provide evidence that other, possibly less important seal-bearing functionaries may have operated within the Area SS complex. Most of these sealings are found either on bullae or string sealings. Seal images 207 and 233 are found on pegs as well as strings. In no case is there an overlap between the bulla sealers and the peg sealers, as was the case for seal images 245, 346, and 240 (see Table 5.4). However, there are two seals that were found on peg and string sealings (seal image 207 and 233), similar to images 346 and 211 in Table 5.4. It appears that administrative responsibility over peg and string sealings was more common than jurisdiction over bullae and peg sealings. Consequently, individuals entitled to seal bullae and pegs may have had a higher status within seal-based administration at the site. Collating the data from Table 5.4 and 5.5 demonstrates that seven out of twelve individual seal images attested more than once in Area SS were found to seal bullae. Thus, only a certain number of sealers appear to have made consistent use of bullae for administration in this area.

Table 5.6: Seal images with multiple incidences at Tell Brak, Area FS. Image numbers refer back to Matthews (1997).

Image 172	Image 257
	
1 Rectangular bulla 2 Rectangular bullae, inscribed	1 Rectangular bulla fragment 1 Peg sealing fragment
Total: 3	Total: 2

5.3.4 Area FS

Sealings from Area FS, level 5 in the north-east of the mound of Brak were less numerous than those discovered in Area SS, but remain relevant for the information they provide on administrative practices. Of the structures located in level 5, only court area 43 was found to contain substantial sealing evidence. Five bullae with rectangular cross-sections, four bulla fragments, and one peg sealing (see Figure A.104) were found as a group in the court. Also found in Courtyard 43 was a ritual deposit of raw metal and artefacts made of copper, bronze, silver, gold, and electrum, as well as carnelian beads and pendants made of lapis lazuli (McDonald *et al.* 2002, 45). Similar to Area SS, all these artefacts appear to have been deposited as part of the ‘decommissioning’ of the area. Thus, the seal impressions found in Courtyard 43 can also be designated as a ‘ritual deposit’. Again, as in Area SS, the seal impressions were placed separately from the luxury artefacts (McDonald *et al.* 2002, 45). However, the ritual deposit in Area SS was found outside the entrance to a temple court (Courtyard 7, see Figure A.103), while the deposit from Area FS was found inside a temple court (Courtyard 43, see Figure A.104). Thus, the Area FS deposit may have symbolized a closer relation between administrators and the temple in Area FS.

Several sealings from Court 43 were found to be impressed with the same seal images, as shown in Table 5.6. One ‘set’ of three bullae with rectangular cross-sections was impressed with seal image 257. Two of these bullae bore cuneiform inscriptions presumed to refer to a type of donkey hybrid (McDonald *et al.* 2002, 118–119). Donkey skeletons, marked with the designator ES by the excavators on Figure A.104, were found in apparent ritual burials in Area FS (McDonald *et al.* 2002, 43–44). The excavators concluded that these skeletons were likely associated with rites performed prior to the ‘decommissioning’ of the area after the end of the level 5 occupation (McDonald *et al.* 2002, 389). Prior to this, the court area adjacent to Courtyard 43 and numbered from 5–7 on Figure A.104 was apparently used as an

enclosure for live donkeys (McDonald *et al.* 2002, 44). The two inscribed bullae may have been used to record the import or export of such animals (McDonald *et al.* 2002, 119, 280). However, it is also possible that the inscribed bullae were used to record the import of donkeys from elsewhere prior to their exportation to other communities ‘further down the line’. The third, non-epigraphic bulla which bears number markings as well as impressions from the same seal as the other two epigraphic bullae, could theoretically have represented a record of a similar transaction. All three bullae appear to have been shaped around strings, whose ends protruded from two holes in one side of the bullae (Matthews 1997, 256). Thus, each bulla may originally have resembled a pendant on a string ‘necklace’.

Only one other seal image occurred more than once on a sealing in Area FS. As shown in Table 5.6, two sealings bore impressions of seal image 172: a bulla fragment, and a peg-sealing fragment that could have been attached to a box. Thus, the individual(s) who employed seal image 172 may have been capable of sealing different types of objects as part of their administrative functions. Given their ability to seal bullae and pegs, this sealer may have been of higher status (see Section 5.3.3).

All other bullae and bullae fragments found in Courtyard 43 bore different seal impressions. One rectangular-section bulla was found to bear a cuneiform inscription possibly naming an individual and designating their profession as a smith (Matthews 1997, 242; McDonald *et al.* 2002, 119).

Given the proximity of Area FS to the northern gate, the material found in Court 43 was not necessarily made in situ. It could also have been brought in from outside as documents recording different shipments. Since multiple sealings bearing the same seal images were found discarded in this location, it is possible the sealings and/or the objects they were attached to were originally stored somewhere nearby. Finally, a jar sealing and a bulla fragment in room 6, as well as a tongue-shaped tablet were located within debris caused by deliberate destruction of the area’s buildings (Matthews 1997, 240, 243, 248). Again, these were all seal impressions attached to mobile objects, likely indicative of the function of this area (see Figure A.104).

5.3.5 Comparison of sealed bulla-based administrative practices from the 4th to 3rd millennium BCE

It has been theorized that bulla-based anepigraphic administrative systems may have remained in use from the 4th to 3rd millennium BCE at Tell Brak (McDonald *et al.* 2002, 140). Consequently, comparing evidence for bullae from 3rd millennium BCE Tell Brak with data from earlier 4th millennium sites may provide evidence for the evolution of bulla-based administration over time. The bullae from areas FS and SS and the three bullae found at Chogha Mish (Delougaz and Kantor 1996a, 126) were impressed with rollings from one seal per bulla, and no incidences of countersealed bullae were recorded at either site. Given the frequent incidence of triangular cross-

section bullae without string holes in Area SS of Brak (see Section 5.3.2), it may be significant that one bulla with a five-sided cross-section from Chogha Mish also had no string holes (see Figure A.108). The evidence from Chogha Mish shows that a 4th millennium precedent existed for the possible administrative use of bullae without string holes. The numerical markings found on some Tell Brak bullae also have earlier 4th millennium precedents, as follows:

- A bulla from Susa was inscribed with numerical markings (Amiet 1972b, 97, no. 599; Amiet 1972a, Pl. 75), and
- Further 4th millennium bullae inscribed with numerical markings were also found at Habuba Kabira (Rittig 2014, 348).

The majority of sealed administrative recording devices at both Habuba Kabira (Rittig 2014, 348–351) and Tell Brak (Oates 1993; Oates and Oates 1995; McDonald *et al.* 2002) consisted of bullae. Since Habuba Kabira and Tell Brak were both settlements located in the upper reaches of the Euphrates river (see Figure A.83), it is possible that bulla-based administration was a traditional practice in this region. Future excavations may shed more light on this hypothesis.

Differences in the systems used at Chogha Mish, Habuba Kabira, and Tell Brak can also be detected. The most common sealed recording devices at Chogha Mish were sealed clay balls that frequently contained tokens. Sealed tablets inscribed with numbers were also occasionally used. The three sealed bullae from Chogha Mish were not inscribed with any markings (see Section 4.3.1). The bullae at Habuba Kabira were occasionally countersealed with more than one seal. Numerical markings were used, but these bullae bore no traces of pictographic signs or writing (Rittig 2014, 348). By contrast, the bullae at Tell Brak were never sealed with more than one seal, but were inscribed with numbers and/or pictographic signs. Isolated incidences of written inscriptions also occurred. Thus, the bulla-based administrative system at Brak may have evolved from a system that was somewhat different from those employed at Chogha Mish and Habuba Kabira.

5.3.6 Conclusions

Areas FS (McDonald *et al.* 2002, 41) and SS (McDonald *et al.* 2002, 73) both appear to have contained large buildings. Since the two areas contained temples, it is possible that these seal impression-containing areas represent examples of 3rd millennium ‘temple-based administration’ in the ancient Near East (Zagarell *et al.* 1986, 415). However, a close examination of ritual deposit locations reveals other trends. Most of the seal impressions found in Area FS were discarded in the courtyard of the temple complex, but not within the temple itself. The Area SS sealings were found in the court adjacent to the temple or in buildings whose exits led to this court. The ritual deposit of sealings outside temples in areas SS and FS may have highlighted a

special relationship between the temple and administrators employing these sealings. In the case of Area FS, the deposition of sealings in the temple court may indicate a closer relationship between the administration and the temple than that exhibited in Area SS. However, it is important to note that these sealings were deposited just outside temples, and not within the temple chambers. Thus, administration may have been affiliated with temples, but the cultic chambers were kept free of sealings.

The excavators currently hypothesize that the administrative ‘palace of Naram-Sin’ was built close to Area SS not long after the decommissioning of the area (McDonald *et al.* 2002, 392). It is conceivable that the administrative functions fulfilled by areas FS and SS were re-routed into the new, much larger administrative ‘palace’ (see Figure A.102).

Tell Brak showed evidence for two clearly defined types of bullae: triangular and rectangular cross-section bullae. Aside from bullae, almost no other sealed recording devices were in evidence in areas FS or SS. The only sealed inscribed tablet from Area SS dated to the Main Level occupation was located in decontextualized fill (McDonald *et al.* 2002, 114). From available evidence, it appears that the status of sealers may not have been determined by the imagery on the seals they employed, but by the types of objects they were entitled to seal. Evidence for sealers acting on behalf of a higher authority may also be present at the site. By comparing seal-based administration at Chogha Mish and Habuba Kabira with Tell Brak, it appears that Brak was employing a previously known administrative tool. Future research should help to clarify how Tell Brak initially developed the use of sealed bullae as a recording device. A total of 15 out of 43 seal images were attested more than once on clay sealings in area SS and FS, indicating that 15 different ‘seal-wielders’ were particularly active in administration at the site. Thus, despite the quantity of sealings attested, the total number of putative individuals using seals at the site was relatively low.

5.4 Sealings from Balat Ka-sanctuary complex

The largest currently published collection of sealings found in Balat was excavated in the ka-sanctuary complex of the governors located beside the central administrative ‘palace’. Due to the fire that burned down the complex and the attached administrative palace near the end of the Old Kingdom, the seal impressions were frequently located in secondary discard contexts. In many cases, it was not possible to identify the type of object the sealings were originally attached to. However, both ‘high-status’ cylinder seals and ‘low-status’ stamp seals were used to create sealings, and general trends can still be distinguished from available evidence. Only layers deposited prior to the burning of the complex and the burnt layers themselves are included in the present analysis. A total of 86 sealings, 45 with impressions

created by cylinder seals, 39 with impressions created by stamp seals, and two with impressions from seals of indeterminate type, were examined here.

Many seal images from this site are pictorial and do not employ hieroglyphs. All non-royal hieroglyphic seal impressions were found to be illegible. The only legible sealings found in the material examined here were 4 royal seal impressions. Consequently, many of the individuals involved in administration at Balat may not have been literate, and could have memorized seal images as identifiers. Many seal images from impressions at the site also resemble the images found carved on seals from the Qaw region cemeteries (see Table A.5). Thus, there may have been no distinction between motifs used on seals found in tombs and seals employed in administration in Egypt during the Old Kingdom. The Qaw seals could therefore theoretically have been used in administration before being deposited in burials.

5.4.1 Western gate

Three areas were found to contain seal impressions in the western gate area at the top left of Figure A.110:

1. A layer of burnt material above area 268 (Soukiassian *et al.* 2002, 21),
2. A layer of burnt material above area 292 (Soukiassian *et al.* 2002, 23), and
3. A clay floor labelled as 275, found to contain one sealing of unknown type (Soukiassian *et al.* 2002, 21).

Area 268 and 292 contained a total of three door sealings impressed with a cylinder seal and one stamp-impressed door sealing. Of the door sealings found in the western gateway area, two cylinder sealings⁵⁰ were found to be inscribed with pharaonic titulary, indicating that individuals associated with pharaonic administration could have been responsible for sealing doors in this area. The other two door sealings were impressed with a non-epigraphic stamp seal (3492) and a cylinder seal with unclear imagery (3781) (Soukiassian *et al.* 2002, 403, 405). Consequently, more than one door may have required sealing in the vicinity of the gateway. As shown on Figure A.110, the door sealings were found in direct proximity to the door that led outside the complex. Sealings found in this area may have been used to seal the main door or the doors of chambers directly adjacent to the entrance.

Other types of sealings found in the western gateway were: a ‘tablet fragment’ sealed with a large cylinder seal bearing pharaonic titulary, a cylinder sealing attached to a mat-like object that bore a fragmentary hieroglyphic inscription of possibly royal nature (no. 3480), three cylinder sealings of unknown type, and three stamp sealings of unknown type. The artefact deemed to be a tablet fragment (sealing

⁵⁰Sealing no. 3481, found in layer 244 above layer 268 (Soukiassian *et al.* 2002, 402), and 3782, found in layer 280 above layer 292 (Soukiassian *et al.* 2002, 406).

3639) can be re-classified as a tongue-shaped clay fragment (see Figure A.110). This object is similar in shape to artefacts found in southwestern Asia (see Section 4.3.1 for an earlier example). It has been speculated that these tongue-shaped fragments were tokens that were representative of and could be exchanged for goods (Matthews 1997, 182). However, it is also possible that the positive impressions left behind by seals on such tongue-shaped fragments could in turn be used a limited number of times as substitute ‘seals’ that left behind negative impressions. These ‘seals’ may have been used by individuals of lower status who were delegated the authority to carry out a specific administrative duty (Pantalacci 1996, 363).

In total, nine well-provenanced sealings impressed with cylinder seals and four sealings impressed with stamp seals were found in the Old Kingdom western gatehouse layers. Thus, sealings impressed with cylinder seals appear to have been prevalent in this area.

5.4.2 Ka-Sanctuaries

The outer rooms of the ka-sanctuaries of the complex were found to contain large quantities of seal impressions. However, the sanctuaries themselves appear to have been kept clear of administrative debris prior to the general destruction of the sanctuaries by fire. Figure A.110 shows all the sealings found in forecourt 14 of the complex. The sealings displayed in the figure belonged to four separate layers of burnt material found in forecourt 14, numbered as layers 88, 89, 107, and 111. Of these, layers 89 and 107 were noted as concentrations of discarded administrative material that may previously have been stored in the vicinity for archival purposes (Soukiassian *et al.* 2002, 393). A total of 8 cylinder seal impressions and 13 stamp seal impressions were found in layers 89 and 107. If the sealings from layers 88 and 111 are included in the tally, the number of cylinder impressions increases to 13. Assuming that impressions from all four layers were not displaced from other areas of the complex, there appears to have been an equal balance between stamp-sealed and cylinder-sealed goods brought to the sanctuaries. One unidentifiable cylinder-impressed sealing (no. 3329) from layer 88 (Soukiassian *et al.* 2002, 411–412), seems to have been impressed with a seal inscribed with hieroglyphic royal titulary.

Due to damage, the original function of the sealings found in forecourt 14 could only be determined in four cases: one cylinder seal-impressed door sealing, one cylinder-impressed bag sealing, one stamp seal on a jar sealing (artefact no. 3260), and another on a cloth bale. Consequently, available evidence seems to indicate that sealed containers were broken open in this area. These containers may have held offerings of food and drink for the shrines. A few duplicate seal images were also found in the forecourt layers as shown in Table A.21. A jar sealing, 3260, bore the same stamp seal image as artefact no. 3267, another stamp sealing of unidentified type (Soukiassian *et al.* 2002, 407–408). Sealings 3248 and 3272 also bore an identical

stamp image of a lizard. Again, the type of sealing was undetermined (Soukiassian *et al.* 2002, 406, 409). All four of these sealings were found in administrative deposit layer 89. Finally, sealing no. 3298, from administrative deposit layer 107, was said to possibly bear the same image as sealing 3770, discovered in the south-western ‘house’ in Zone 1 (Soukiassian *et al.* 2002, 411, 420). Thus, all sealings with duplicate seal images from the forecourt of the ka-sanctuaries themselves were found in the two layers designated as administrative discard.

5.4.3 Zone 1 service quarters

Four different built areas under the ka-sanctuaries were labelled as zones (travées) by the excavators. These zones had distinct entrances leading to inner rooms, and existed as separate units (see Figure A.110). Food preparation areas, food storage areas, and housing areas for individuals affiliated with the sanctuaries were apparently located in many of these zones. Consequently, most of the zones were designated as service areas (Soukiassian *et al.* 2002, 97–102).

Service area Zone 1 lay just underneath and adjacent to the sanctuaries. The final pre-burning phase renovation of the northern extension of Zone 1 (see rooms 10–12 in the dark green sector on Figure A.110) enabled direct access to the sanctuaries. Rooms 10 and 12 were the only rooms in the entire complex that were found to contain shell-shaped sealings impressed with cylinder seals. An anepigraphic cylinder seal image showing motifs of animals was impressed on all three shell-shaped sealings found in rooms 10 and 12 (see Table A.21). Another fragment catalogued as 3326 from room 12 was also found to bear this imprint, but was too fragmentary to classify (Soukiassian *et al.* 2002, 413). Given available evidence, fragment 3326 was likely once part of another shell-shaped sealing. Thus, one sealer may have been responsible for rolling impressions onto shell-shaped clay sealings. This sealing type may have been used as a bulla or token. Unfortunately, the type of object these sealings may have been attached to was not recorded. Thus, currently available evidence does not allow for further interpretation of these artefacts.

The bakery in room 5 contained one cylinder and one stamp-impressed sealing, and room 6 contained one cylinder-impressed sealing. The type of sealing these impressions were found on could not be determined. Room 2 was designated by excavators as the central space around which the other rooms were distributed (Soukiassian *et al.* 2002, 101). Eight sealings, the largest number found in a single space in Zone 1, were uncovered in room 2. Two door sealings were among the 8 sealings excavated here (see Figure A.110). Both were found to bear impressions from the same stamp seal, which depicted two tête bêche lizards (see Table A.21)⁵¹. This seal image was also found on door sealing 3440 in Zone 1 and an unidentified sealing from

⁵¹Lizards whose heads faced each others tails.

the alley close to Zone 2. However, these sealings came from post-burning layers that were not included on Figure A.110.

The south-western ‘house’ rooms, coloured pale green on Figure A.110, only contained two stamp sealings of unknown type. Both were found in post-incendiary fill layers (Soukiassian *et al.* 2002, 130). One of them, 3770, was impressed multiple times with the same stamp seal image. This image is apparently identical to the one found on sealing 3298 from the forecourt of the sanctuaries, also of unidentified type (see Table A.21). Thus, transactions related to sealed goods or other sealed objects likely did not take place in this area.

In total, twelve cylinder seal impressions and eleven stamp seal impressions were located in Zone 1. Thus, cylinder and stamp sealed objects may have been employed with equal frequency in this area. The duplicate stamp seal images of the tête bêche lizard stamp seal found in zone 1 appear to indicate that a single seal-holder may have been responsible for sealing a door or doors in this sector. The area of the sanctuaries and Zone 1 appear to be the only areas in the complex found to contain duplicate seal images on sealings in pre-burning layers or post-burning fill. One stamp seal image was possibly attested in both the forecourt of the sanctuaries and Zone 1 (see Table A.21).

Of the sealings examined here, almost all duplicate seal images were found to have been derived from stamp seals, not cylinder seals. The only exception to this rule were the shell-shaped sealings impressed with the animal-motif anepigraphic cylinder image (see Table A.21). Even the sealings from Zone 1 that were excluded in this analysis only contained two further cylinder sealings (3452 and 3454) impressed with the same image (Soukiassian *et al.* 2002, 416). It appears that individuals with stamp seals were more administratively active than individuals with cylinder seals in the sanctuaries and Zone 1.

The sanctuaries were likely the central focus of the complex (Soukiassian *et al.* 2002, 9). Zone 1 comprised the immediately adjacent service quarters for these sanctuaries. Despite possible post-burning displacement of rubble, evidence for duplicate seal images also seem to indicate that the sanctuaries and Zone 1 were the focus of administrative activity at the site. Thus, these areas provide important evidence regarding the management of the complex.

5.4.4 Zone 2 service quarters

The Zone 2 service quarters are coloured tan on the map in Figure A.110. Only one sealing was found in this zone: a cylinder sealing of unspecified type in room 3, another baking area.

5.4.5 Zone 3 house

One cylinder and one stamp sealing were found in room 1, the entrance/antechamber area for this large unit, designated as a large housing unit. Area 6–7, a food preparation and storage chamber, was also found to contain one cylinder sealing. Five sealings were found in corridor 4, including one door stamp sealing. Unidentifiable stamp sealing no. 3754 was found to bear a motif identical to 5 duplicate seal image impressions from the administrative palace area (Soukiassian *et al.* 2002, 395, 423).

Stamp sealing 3382 was uncovered in a cooking ash layer in court 5, and apparently bore an identical seal image to sealing 6377 from the administrative ‘palace’ (Soukiassian *et al.* 2002, 422). Consequently, sealers bearing stamp seal image type 3754 and 3382 may have been active in administration inside and outside the ka-sanctuary complex.

5.4.6 Zone 4 service quarters

Only one stamp sealing was found in dumped burn debris in one of the chambers in this area (Soukiassian *et al.* 2002, 19, 200, 429). The context of sealings found in the corridor running past Zones 1–3 was not sufficiently well-recorded to examine here.

5.4.7 Conclusions

In the ka-shrine complex of Balat, cylinder and stamp seal impressions were generally not found in segregated discard locations. Thus, no clear hierarchy of cylinder and stamp seal users can be determined from discard patterns at this site. In total, 39 cylinder seal impressions, 34 stamp seal impressions, and one unidentified seal impression were found in pre-burning and burnt fill Old Kingdom contexts in the ka-sanctuary complex at Balat. No preference for the use of cylinder seals or stamp seals can be detected. Out of the 34 stamp sealings examined, 9 were found to have duplicate impressions of four different seal images. Thus, the total number of different stamp seal images found to be in use at the site was 29. By contrast, out of a total of 39 cylinder sealings, 4 were found to have duplicate impressions of the same seal image. Hence, the total number of different cylinder seal images found to be in use at the site was 36. Given this evidence, it appears there were slightly fewer stamp seal users than cylinder seal users evidenced in material from the ka-sanctuary complex. However, duplicate stamp seal images occur more frequently than duplicate cylinder seal images on sealings from Balat. Thus, stamp seal users were perhaps more actively involved in the administration of the complex.

None of the cylinder or stamp seals impressed on more than one clay sealing were found to bear inscriptions. Instead, the images on these seals consisted of abstract designs and depictions of animals. Thus, the most administratively active individuals

in the ka-sanctuary complex did not display their affiliation with the pharaonic government on their seals, and may not have been literate in at least some cases.

The material from the ka-sanctuaries provides evidence for the loosely structured nature of seal use in administration at Balat in the Old Kingdom. It has been theorized that cylinder seals were considered more ‘prestigious’ in the this era (Pantalacci 1996, 360). However, the Western Gateway was the only area where cylinder impressions greatly outnumbered stamp impressions. Cylinder and stamp sealings were present in almost equal quantities in the sanctuaries and in service Zone 1 adjacent to the sanctuaries. Since stamp seals were present in the ostensibly ‘prestigious’ space of the sanctuaries, it is possible that the larger quantities of cylinder impressions in the Western Gateway was due to a proportionally higher number of cylinder seal users active directly or by proxy in this area. By contrast, cylinder seal impressions bearing putative royal titulary only occur in the gateway area and in the forecourt of the sanctuaries. Since royal seals inscribed with hieroglyphs were not in evidence in the service quarters, these areas were perhaps not ‘privileged’ to process objects sealed with these sealings.

Thus, within the ka-sanctuaries of Balat, seal-based administration was apparently not structured around the distinction between the ‘prestige’ of cylinder versus stamp seals. However, a distinction appears to have been made between the cylinder seals inscribed with royal motifs (Soukiassian *et al.* 2002, 395) and all other non-royal seals incised with unreadable hieroglyphs or pictorial motifs. Different activity areas may also have been distinguished. Since only four sealings were found to bear readable titulary, it can be surmised that the status of ‘pharaonic’ seal-bearers was known (Soukiassian *et al.* 2002, 402, 405, 406, 412), but these individuals only participated in the administration of certain areas. Available evidence from the Balat ka-sanctuaries therefore does not support the idea that cylinder seals were reserved for ‘high-status’ individuals. Instead, it appears that all seal users bearing cylinder or stamp seals not decorated with royal titulary may have been on roughly the same administrative ‘level’. The status of stamp seal users in the Balat sanctuary administration of the Old Kingdom cannot be determined, but they appear to have been more administratively active.

Aside from four seal impressions inscribed with pharaonic titulary, no other direct sealing evidence for central pharaonic administration (Soukiassian *et al.* 2002, 522) was found within the Balat ka-sanctuaries. However, evidence provided by 20 written clay tablets from the sanctuary area seem to show that higher pharaonic officials were involved in the administration of this sector (Soukiassian *et al.* 2002, 355). Thus, a predominantly non-elite seal-based administration appears to have existed in parallel with the use of written documents in the day-to-day running of the sanctuaries. Since none of the non-royal seals had legible inscriptions, illiterate individuals would likely have been able to participate in seal-based administration

(Section 2.3.9, see also Pantalacci 2013, 40), while written tablets were probably reserved for the use of literate functionaries. These literate individuals may also have participated in seal-based administration at times. No systematic use of hieroglyph sequences possibly affiliating the seal user with central administration was noted with regard to the sealings examined here, but such evidence is present among other currently unpublished sealings from the site (Pantalacci 2013, 209). Thus, at least some of the individuals with seals inscribed with hieroglyphs may have participated in the workings of the central government to some degree, though the level of their participation can not be speculated on until these unpublished sealings have been published.

5.5 Comparison of sealing practices at Tell Brak and Balat

In both Brak and Balat, the areas found to contain large amounts of seal impressions also frequently adjoined ritual complexes. In the case of Brak, a loose association between administration and temples may have been the norm. By contrast, the sealings from the ka-sanctuaries at Balat likely formed part of the administrative system of the sanctuaries. Thus, Tell Brak shows evidence for administration taking place in the vicinity of temples, while Balat seems to provide evidence for administration of temple sanctuaries. In both cases, sealings were not found deposited in the temple sanctums, indicating that these areas were not considered appropriate locations for discard. However, the ‘discarded’ sealings found in the vicinity of the temples at Tell Brak were apparently ritual deposits, while the sealings in the forecourt of the sanctuaries at Balat were likely cultic detritus. Thus, both cultures observed possible interdictions involving ritual purity. However, sealed goods only seem to have been commonly used in cult service at the Egyptian site of Balat, while the ritual deposits at Brak in southwestern Asia were possibly placed in the vicinity of temples to ritually ‘close’ the administrative areas they were associated with.

Very few door sealings were found at the Egyptian site of Balat. The previously examined 4th millennium Egyptian site of Elephantine (see Section 4.4) also contained few door sealings. Thus, both the 4th and the 3rd millennium sites may not have used door sealings frequently as part of their administration. However, many sealings at Balat were damaged and unidentifiable, and evidence for door sealings at Balat may have been lost due to the fire at the site.

The use of bullae at Tell Brak can be related to similar 4th millennium artefacts from Chogha Mish and Habuba Kabira. The most significant difference between Brak bullae and the 4th millennium examples is the use of pictographic symbols and the lack of countersealing on Brak bullae. (see also Section 5.3.6). Thus, Tell Brak clearly possessed a unique type of administration based around sealed objects.

However, the essential principles underlying the use of these sealed objects may have remained similar to those employed at Habuba Kabira and Chogha Mish.

Almost all of the Tell Brak bullae were apparently impressed with ‘local-style’ seal images. Thus, these bullae were likely the product of local administration and did not originate from the Akkadian empire that ruled over the site (Matthews 1997, 180). Evidence appears to show that only one of several prominent bulla sealers at the site bore a seal with clearly Akkadian motifs. Aside from four impressions bearing royal titulary found in well-recorded contexts (Soukiassian *et al.* 2002, 402, 406), none of the Balat sealings under examination here were found to bear legible inscriptions. Thus, it appears royal pharaonic administration may not have had direct control over sealing systems in place at the ka-sanctuaries of Balat. Instead, administrative control was likely in the hands of the local owners of the anepigraphic and illegible seals used on almost all sealings found in the complex. Consequently, administrative systems in both 3rd millennium settlement areas examined here appear to have been primarily local.

A total of only 7 inscribed objects, both sealed and unsealed, were found at Tell Brak in the layers under examination here. Of these, five sealed clay bullae incised with cuneiform inscriptions were included in the analysis. The other two inscribed objects (TB 14077, TB 13004) (McDonald *et al.* 2002, 114) were not included in the analysis, since they were either unsealed or found in decontextualized fill. However, it is possible that administrative sectors responsible for creating written documents were located elsewhere in Brak during the pre-Sargonic period under analysis. Future excavations may show that the seal-based and writing-based systems of administration existed in parallel at Brak, as they did in Balat.

In Balat, 20 unsealed inscribed clay tablets, some fragmentary, were found in the ka-sanctuary complex (Soukiassian *et al.* 2002, 331). Thus, for the periods and layers under scrutiny, Balat appears to have employed writing-based administration to a much larger extent than Tell Brak. The Balat tablets were not impressed with seals. Consequently, there appears to have been no overlap between seal-based and writing-based administrative systems at the Balat ka-sanctuaries.

Many different sealings and bullae at Tell Brak showed instances of duplicate seal images. Based on the types of objects they sealed, some sealers may also have held higher status. The seals used by these seal-bearers were generally anepigraphic, aside from three instances of seals bearing legible writing on their surface. Some sealers may also have acted on behalf of a higher authority. It cannot be proven whether the seal-users could read what was inscribed on the seal surface. This skill may not have been necessary since seal-based administrative systems at Brak were essentially anepigraphic. However, the rare use of cuneiform writing to mark sealed objects may testify to the literacy of some participants in the seal-based administrative system at Brak.

Duplicate seal images on sealings at Balat frequently consisted of two or three instances of the same seal image on different sealings. Some evidence for duplicate sealings at Balat may have been destroyed by the great fire and subsequent overturning of debris at the site. Nonetheless, the activities of some seal-bearers could be traced. Evidence for seals used exclusively for doors or shell-shaped sealings was uncovered, and a few seal images were duplicated on sealings that were found in both the ka-sanctuary complex and in the neighbouring administrative 'palace'. Seals attested more than once could be cylinder or stamp-shaped. However, the majority of duplicate seal images found came from stamp seals. None of the duplicate seal images bore legible inscriptions.

In total, well-contexted layers gave evidence for 43 different seals in use at Tell Brak areas FS and SS. Balat, meanwhile, gave evidence for 65 different seals. However, as mentioned previously, Brak showed more evidence for instances of multiple use of the same seal in comparison to Balat, especially in Area SS. Thus the Brak administrative areas may have been under the control of fewer seal-bearing individuals. The Balat establishment, meanwhile, shows evidence for a far wider range of seal-using individuals. The sealings were almost always too damaged to establish the type of object they were attached to. It can be theorized that many of the seal impressions found in the ka-sanctuaries were originally attached to goods delivered to this establishment, but the lack of preservation foregoes a definite conclusion. Available evidence does show that many different individuals appear to have participated in the seal-based administrative system in place at Balat. The frequent lack of duplicate sealings may indicate that only a few individuals had regular administrative sealing duties related to the complex. Based on the number of seal impressions found at Tell Brak and examined here (346), more administrative activities were taking place at the site in comparison to Balat, where 86 sealings were examined. However, fewer seal images were found in Brak in contrast to Balat. Consequently, fewer 'sealers' may have participated in administration at Tell Brak in comparison to Balat.

Similar to the previously studied sites in Chapter 4, the southwestern Asian site showed evidence for the use of sealed administrative recording devices in addition to sealings formerly used on containers and doors, while the Balat site only showed evidence for sealed containers and doors. The present study of two sites in southwestern Asia and Egypt has shown that the use of locally distinct forms of seal-based administration appears to have continued in the 3rd millennium in both regions. Subsequently, the introduction of Akkadian imperial forms appear to interrupt this tradition at Brak (Matthews 1997, 181), but other evidence from this period indicates that ideosyncratic 'local' forms of administration continued to exist (Matthews 1997, 179).

Many other sites in southwestern Asia generally appear to have discontinued the use of sealed bullae in the 3rd millennium (Pittman 2013, 329). However, evidence for string bullae sealed with one seal per bulla has been found in Tell Beydar, a site located in modern Syria like the site of Tell Brak (Jans and Bretschneider 2011, 108–109). Thus, seals apparently continued to be employed on bullae in settlements located in the Syrian region during the 3rd millennium. However, the practice of countersealing is not in evidence at these settlements. Further research is required to investigate whether the use of seals on bullae in 3rd millennium southwestern Asian sites was a regional phenomenon.

No sealings with royal titulary were found in post-burning levels at the Balat ka-sanctuaries (Soukiassian *et al.* 2002, 431–445). Thus, the limited post-Old Kingdom sealing evidence from Balat also appears to show that the essentially local character of administration was preserved.

Thus, Tell Brak, a city-state of the third millennium in southwestern Asia (see background in Section 1.5.1) shows evidence for the development of regional administrative cultures after the collapse of the Uruk culture in the Jemdet Nasr period (Pittman 2013, 327). The development of new seal motifs after the collapse of the Uruk culture (Pittman 2013, 327) is well known, but close examination of the site of Tell Brak shows that different administrative systems also appear to have developed in the wake of this collapse. Ancient Egypt is generally considered a centralized state. The ka-sanctuaries at Balat were ostensibly dedicated to the deceased governors of the oasis, who were part of the central pharaonic administrative system at the site (Soukiassian *et al.* 2002, 521). However, pharaonic intervention is only minimally evidenced by sealings at the Balat ka-sanctuaries. Thus, based on the Balat evidence, the status of Egypt as a territorial state (see Section 1.6.1) apparently did not imply the central government was always involved in local matters.

Prior to the present analysis, sealing systems at sites peripheral to Mesopotamia in southwestern Asia and Egyptian sites from the 3rd millennium BCE have not been subject to a thorough scrutiny. Comparative analyses of the sealing systems used in both regions have also not been conducted. The analysis of a sample site from each region in this chapter provides an initial basis from which further analyses of this type can proceed.

5.6 Comparison of 4th and 3rd millennium BCE evidence

In Chogha Mish, 18 multiple incidences of seal images impressed on different types of sealings have been uncovered. Tell Brak also contained 18 multiple incidences of the same seal images. Multiple incidences only occur in the East Area at Chogha

Mish (see Table 4.3), while all but two seal images (see Table 5.6) found in multiple incidences were discarded in area SS at Brak (see Table 5.4 and 5.5).

Two seal images were found on both clay balls and doors at Chogha Mish, while three seal images were found both on bullae and possible door sealings at Tell Brak. As discussed in Sections 4.3.3 and 5.3.3, evidence seems to show that individuals employing these seal images may have been of a higher status than those not entitled to seal administrative records and doors. Thus, when comparing these two sites from different millennia and assuming the seal impressions uncovered at these sites are representative of variations present in seal impression use at the site, it appears the number of possible important individuals capable of sealing both clay recording instruments and doors did not vary greatly over time in southwestern Asia. A preliminary report on seal impression data from a later 2nd millennium settlement at Tell Sabi Abyad seems to corroborate this finding, since only two seals were apparently used to seal both doors and containers at the site (Tsouparopoulou and Casties 2014, 49). By contrast, evidence from the settlement of Arslantepe seems to show that far more sealers at this site (approximately 35) were entitled to seal both doors and other objects (Frangipane 2007a, VII.11, Table 3). However, 5–8 individuals logged the highest incidence of door and object sealing at any given time (Frangipane 2007a, Fig. VIII.1). Assuming that the seal impressions uncovered at these sites are representative of seal-based administrative practices at each site, seal use practices primarily employing stamp seals at Arslantepe may have differed from the systems that primarily employed cylinder seals at Chogha Mish, Tell Brak, and Tell Sabi Abyad. However, higher administrative positions at Arslantepe were apparently still restricted to only a few ‘sealers’.

Future studies should investigate whether other southwestern Asian settlements from all periods also show evidence that only a few ‘sealers’ may have been entitled to seal different objects. Evidence for such a practice would indicate that ‘sealers’ entitled to seal more than one type of object may have held a special status in southwestern Asia throughout most of its history and prehistory.

At Brak, several seal images were attested with a much higher frequency than any seal image found at Chogha Mish to date (see Table 5.4). However, preservation conditions may simply have preserved more sealed objects at Tell Brak than at Chogha Mish. The excavated areas found to contain sealings at Brak examined here (9462 m² in total), were also somewhat larger than the areas at Chogha Mish (3070 m² in total). Thus, the larger total number of sealings found at Brak may also be due to the larger areas excavated at that site. Further research on other settlements in southwestern Asia is necessary to determine whether administrative activities intensified over time.

At Elephantine, duplicate seal images were apparently only found on string, jar, and wooden box sealings (see Table 4.6). By contrast, the identifiable duplicate seal

image-bearing sealings at Balat (see Table A.21) consisted of a jar sealing, shell-shaped sealings, and door sealings. A sealing bearing images of lizards was apparently exclusively used to seal doors. Some door sealings were found at Elephantine (see Figure A.90), but multiple incidences of the same seal image on a door sealing were apparently not present in the data examined in Chapter 4. Substantially more door sealings from Elephantine (Pätznick 2005, 60), as well as door sealings from the ‘palace’ area at Balat remain to be published (Pantalacci 2008, 146; Pantalacci 2013, 208). Thus, door sealing appears to have been a fully developed practice at both sites, even if most of the evidence for this practice could not be analysed here.

Comparing the sealings from the earlier settlement of Elephantine to those from Balat shows that the Elephantine sealings always bore hieroglyphs, while most of the Balat seal images were purely anepigraphic images. The presence of hieroglyphs on the Early Dynastic Elephantine seal images may be due to local imitation of the newly invented elite practice of writing. However, this trend may have fallen out of fashion by the time of the Old Kingdom, as evidenced by the predominantly pictorial seal images from Balat. Future studies should also investigate whether this is a general trend that can be traced in other Egyptian settlements over time.

Chapter 6

Countersealing practices employing cylinder seals in the early complex societies of southwestern Asia and Egypt

Countersealing, or sealing an object or administrative device such as a clay tablet with different seals (Pantalacci 1996, 362), was a known complex administrative practice employed in 4th and 3rd millennium BCE southwestern Asia and Egypt. Some evidence for the practice of countersealing exists prior to the 4th millennium in southwestern Asia. However, the appearance of complex society and the development of the cylinder seal may have brought this administrative technique to the fore. In Egypt, the use of cylinder seals likely began after the technology was introduced from southwestern Asia (see Section 2.1). As a result, the Egyptians may also have imported countersealing practices specific to southwestern Asia. No extensive study of countersealing employing cylinder seals in the early complex societies of southwestern Asia and Egypt has been undertaken to date. Thus, this chapter examines countersealing practices employing cylinder seals from both regions at the time when complex societies first emerged. Differences between the practices employed by southwestern Asia and Egypt are highlighted.

6.1 Methodology

All sealings and sealed administrative devices found to have been impressed with more than one seal are considered ‘countersealed’ artefacts. For southwestern Asia, data from the Late Chalcolithic 3/Early Middle Uruk period to the Jemdet Nasr/Uruk III period (3600–2900 BCE) was included in the analysis (Brisch 2013, 115–116; Pittman 2001). A bulla from Chogha Mish whose location could not be pinpointed on the maps used in Chapter 4 is included here for comparative purposes (Alizadeh 2008,

209). Earlier material is mentioned only for comparative purposes. For Egypt, data from Naqada III to Dynasty 3 (circa 3350–2544 BCE (Hendrickx 2006, 92; Hornung *et al.* 2006, 491)) is included to trace trends in countersealing practices. Contrary to previous chapters examining Egyptian material, Dynasty 3 is included here since the trends charted in sealed grave goods appear to have continued into that period. Thus, a full overview of early grave good countersealing practices is provided in this chapter.

This chapter compiles evidence on all known objects countersealed with cylinder seals from southwestern Asia to analyse trends in the use of countersealing practices. Data on all known countersealings created with cylinder seals from Egyptian tombs and settlements is also compiled and statistically analysed. The incidence of countersealed versus non-countersealed artefacts in both regions is examined. The incidence of numerical marks and writing on southwestern Asian countersealed and non-countersealed artefacts is also studied.

6.2 The employment of sealed and countersealed balls and tablets in southwestern Asian communities

In southwestern Asia, the practice of countersealing is first attested in the 6th millennium BCE on clay sealings affixed to strings that were tied around baskets (Duis-termaat 1996, 342). In the 5th millennium, seal impressions from multiple stamp seals have been found on a sealing of unknown type (Sb 6934) from Susa (Amiet 1972a,b, 26, Pl. 1, 46), and a flat bulla from Susa (Sb 6943) that was formerly attached to a string (Amiet 1972a,b, 42, Pl. 2, 50). Countersealing practices also appear on 5th millennium bullae formed around strings and flat pieces of clay from Arpachiyah (von Wickede 1990, Taf. 54–59, 60–66; Campbell 2000, 17, Fig. 11). In the early half of the 4th millennium, countersealing practices using stamp seals are found on a sealing of unknown type (Rothman 2002, 971, plate 35) at Tepe Gawra in the XI/XA layer. A countersealed jar sealing (Rothman 2002, 2929, plate 58) from layer VIII (Pittman 2001, 418–419) was also found at Gawra. Finally, several jar sealings found at Tell Majnuna near Tell Brak, dated from the earlier half of the 4th millennium (LC3), were countersealed with different stamp seals (McMahon *et al.* 2007, 149, 164).

Based on current data, it appears each of these early sites display the use of different types of countersealing practices. With the emergence of the cylinder seal and Uruk culture (Pittman 2001, 419), a relatively uniform set of countersealing practices seems to have been developed and used for administration on an intraregional basis for the first time in southwestern Asia. Clay bullae, balls, and tablets bearing impressions

of multiple cylinder seals have been found at a wide range of sites in southwestern Asia as shown in Figure A.83. In the sites examined here, (see Table 6.1) sealed bullae, frequently formed around strings, are occasionally attested. Though many of these artefacts were originally attached to strings that could conceivably have been attached to other objects, the occasional incidence of countersealing and number markings on such objects indicates that they likely also functioned as administrative records.

Evidence compiled in Table 6.2 shows that clay balls may have been the principal countersealed objects during the 4th millennium. These balls were also frequently found to contain numerical tokens (Delougaz and Kantor 1996a, 115). Tablets sealed with more than one seal are also attested in smaller numbers. Bullae, balls and tablets can be considered as administrative devices that existed primarily to record transactions. Thus, these objects differed significantly from the countersealed container sealings found at sites from the 6th to early 4th millennium, though the flat pieces of clay from Arpachiyah may provide an antecedent to tablets.

The widespread find locations of countersealed bullae, balls, and tablets show that Urukian cultural practices were employed in many different regions of southwestern Asia. Thus, the rise of the Uruk culture may have seen the establishment and use of a relatively uniform set of administrative norms in the region for the first time. The use of new administrative devices (bullae, balls, and tablets) was likely closely associated with the development of these norms.

On rare occasions, all three of these artefact types can be found to bear a large, round imprint, provisionally classifiable as a ‘cancellation mark’. However, these markings occur infrequently and are not always documented. However, they likely constitute another step in the administrative procedures that led to the creation of these clay documents. Evidence for countersealing on other types of clay sealings has rarely been uncovered in Uruk culture settlements to date. One conical seal fragment possibly from a door sealing (Delougaz and Kantor 1996a, 116) at Chogha Mish (Delougaz and Kantor 1996b, Plate 44:E), was found to be countersealed. A countersealed jar sealing attributed to the Uruk culture was uncovered at Nineveh (Campbell Thompson and Mallowan 1933, LXV, 36; British Museum 2016a), and a countersealed jar ‘stopper’ (catalogue no. M II:109) was also found at Habuba Kabira (Rittig 2014, 360). Since further evidence for door and jar sealings countersealed with cylinder seals is necessary for a thorough analysis, these sealings are not examined here.

Bullae, balls, and tablets were excavated from sites whose cultural makeup and size appears to have varied considerably (see Section 1.4). These sites were located in many different regions of southwestern Asia (see Table 6.1 and Figure A.83). Evidence from these sites is assembled to examine how sealing practices related to bullae, balls, and tablets varied from settlement to settlement. The site of Uruk is

Table 6.1: Sources for southwestern Asian data on sealed and countersealed balls and tablets.

Site	Site type	Source
Uruk	Urukian regional centre	Englund and Boehmer (1994); Englund <i>et al.</i> (2001, 2005); Boehmer (1999)
Jemdet Nasr Susa	Urukian regional centre Culturally Urukian regional centre	Matthews (1993) Vallat (1971); Amiet (1972a,b); Le Brun and Vallat (1978)
Chogha Mish	Culturally Urukian regional centre	Delougaz and Kantor (1996a,b); Alizadeh (2008)
Godin Tepe	Uruk trading colony inside native settlement	Weiss and T. Cuyler Young (1975)
Habuba Kabira	Uruk colony	Rittig (2014)
Jebel Aruda	Uruk colony	Van Driel (1982, 1983)
Tell Sheikh Hassan	Uruk colony	Boese (1995)
Hacnebi	Uruk trading colony inside native settlement	Stein <i>et al.</i> (1996)
Tepe Farukhabad	Native settlement	Wright (1981)
Nineveh	Possible Uruk colony	Campbell Thompson and Hutchinson (1931) British Museum (2015, 2016b)
Tepe Sialk	Possible Uruk trading colony inside native settlement	Ghirshman (1938)

considered the centre of Urukian culture, and Jemdet Nasr was likely an important settlement of the Urukian culture (Meyers 1997a, 212). Both sites are located in southern Iraq (see Figure A.83). Artefacts and motifs characteristic of Urukian culture are found in significant numbers at Susa and Chogha Mish. These sites, located in modern day Iran (see Figure A.83), were cultural centres in their own right for the local ‘Elamite’ culture (Alizadeh 2008, 29). Rothman and Badler (2011, 119–120) suggested that local elites at Godin Tepe exchanged locally produced items with Uruk traders for small quantities of Uruk prestige goods. However, this does not explain why Uruk-style administrative devices were found at the site. Thus, Godin Tepe is categorized as a possible incidence of an Uruk trading post located within a native ‘Elamite’ settlement in Iran in Table 6.1. Habuba Kabira, Jebel Aruda, and Tell Sheikh Hassan are considered to be colonial establishments of the Uruk culture in the region of modern Syria (Schwartz 2001, 248). Hacnebi, located in the Anatolian region, was likely an Uruk trading colony embedded within a native settlement (Schwartz 2001, 255). Tepe Farukhabad was a small ‘Elamite’ settlement. The single clay ball sealed with three stamp seals found at the site seems to predate any other incidences of sealed administrative documents in southwestern Asia found to date (Meyers 1997b, 182). Only two Uruk-style recording devices were apparently found in the underexcavated deeper levels at Nineveh. However, the large quantities of bevel-rimmed bowls found at the site (Campbell Thompson and Mallowan 1933, 168) may demonstrate it was also an Uruk colony in northern Iraq since this artefact was characteristic of the Uruk culture (Goulder 2010, Table 1). Tepe Sialk was found to contain Uruk-style ceramics, sealings, and a single Uruk-style tablet. Native ‘Elamite’ ceramics were also uncovered (Amiet 1985). Thus, Tepe Sialk may have been a native site located in modern Iran that was culturally Urukian to some degree, though further investigations are needed to confirm this hypothesis.

Countersealing may have only been employed under certain circumstances, since many bullae, balls, and tablets bearing impressions of a single seal have also been found. To determine how widespread the use of countersealing was in southwestern Asia, evidence for bullae, balls and tablets with impressions of a single seal or several different seals was compiled on a site by site basis in Table 6.2. Close examination of the data assembled in Table 6.2 indicates that different sites appear to have preferentially employed varying types of sealed and countersealed administrative devices. Of the sites examined here, Uruk, Susa, Chogha Mish, and Habuba Kabira were found to contain both sealed balls and tablets, but countersealed balls were only uncovered in Uruk, Susa, and Chogha Mish. Sealed bullae were uncovered in Susa, Habuba Kabira, and Nineveh, but countersealed bullae were only attested in limited numbers at Susa and Habuba Kabira. Countersealed tablets were restricted to Uruk and Susa. Consequently, Susa was found to contain evidence for the widest variety of countersealing practices.

Table 6.2: Sealed recording devices from southwestern Asia

	Uruk	Jemdet Nasr	Susa	Chogha Mish	Godin Tepe	Habuba Kabira	Jebel Aruda	Tell Sheikh Hassan	Hacinebi	Tepe Farukhabad	Nineveh	Tepe Sialk	Total no.
Bullae impressed with													
1 seal			18	1		27				1			47
1 seal, bearing numerical markings			1			1							2
2, 3 or 4 seals			6			8							14
2, 3 or 4 seals, bearing numerical markings						1							1
Balls impressed with													
1 seal	18		51	6			1						76
1 seal, bearing numerical markings			10			1							11
2, 3 or 4 seals	6		26	20			2	1	1				56
2, 3 or 4 seals, bearing numerical markings			4	1		1							6
Tablets impressed with													
1 seal	15		13	3	1	5						1	38
1 seal, bearing numerical markings	36		42	5	8	6	3				1		101
1 seal, bearing writing	8	5											13
1 seal, bearing numerical markings and writing	26	75	2										103
2, 3 or 4 seals						1							1
2, 3 or 4, bearing numerical markings	7		6		2								15
2, 3 or 4, bearing numerical markings and writing	2	1											3
													487

The practice of countersealing balls appears to have been fairly widespread. Seven of the twelve sites listed in Table 6.2 (58%) were found to contain balls with multiple seal impressions. By contrast, tablets sealed with multiple seals were only present at four out of twelve sites, or 33%. Finally, countersealed bullae were only attested at Susa and Habuba Kabira, or 17% of the sites. Of these, Susa was the only site where countersealed balls, tablets, and bullae were excavated.

The use of numerical markings on bullae, clay balls and tablets also varied greatly. Numerical markings were only attested on bullae from Susa and Habuba Kabira. Balls containing tokens, sealed with one seal or countersealed, were only found to bear numerical markings in Susa and Chogha Mish. Thus, the most complex ball-based recording system, involving tokens, seals, and number marks, appears to have been in use at these two sites. Tablets sealed with only one seal and marked with numbers were found at six sites: Uruk, Susa, Chogha Mish, Godin Tepe, Habuba Kabira, and Jebel Aruda. Countersealed tablets with numerical markings were only found at Uruk, Susa, and Godin Tepe. Finally, tablets bearing one or multiple seals also inscribed with numbers and writing were only found at Uruk and Jemdet Nasr.

In conclusion, available evidence for sealing or countersealing practices on Uruk-style clay administrative devices from southwestern Asian communities appears to vary greatly. Thus, there does not appear to have been an administrative system that was employed in all communities using Uruk-type administration devices. This provides further evidence that the shared administrative systems of these communities do not imply a colonial Urukian system as suggested by some previous scholars (see Section 1.5.1). Instead, a shared Urukian administrative culture appears to have sprung up and been employed in a variety of settlements. This shared system may have facilitated communication between traders from different regions. However, the lack of certain types of administrative devices at particular sites (i.e. the lack of sealed clay balls at Jemdet Nasr) may be due to excavational biases. Thus, future investigations of settlement sites should make every reasonable effort to uncover all types of sealed recording devices. The evidence shown on Table 6.2 indicates that the use of countersealing was apparently fairly widespread, always existing in conjunction with single-sealed balls or tablets. Thus, countersealing was likely an administrative technique used in ball and tablet based administrative systems.

6.3 Countersealings on clay balls and tablets: methods and applications

Clay ball countersealing practices in southwestern Asia in the 4th to 3rd millennium BCE have previously been examined by Delougaz and Kantor (1996a, 125–126, 131). Their study suggests an ‘equatorial’ seal would be rolled across the middle of the ball first, and ‘polar’ seals were rolled on the arbitrary ‘top’ and ‘bottom’ surfaces

of a clay ball. However, the equatorial impression on some clay balls seems to have been more strongly rolled than the polar impressions, as shown in Figure A.111. Consequently, some polar seals may have been rolled first before the equatorial seal was applied. Further study of extant clay balls is needed to establish the order in which seals were rolled on clay balls. Such practices may also have varied from site to site.

Different seals were sometimes used to impress the top and bottom poles. In other cases, the same seal was impressed on both poles. Seals that were rolled across the ‘equator’ were never used on the ‘poles’ (Delougaz and Kantor 1996a, 125–126). Rarely, numerical markings are found impressed on the surface of the balls. Stamp seals were also used to counterseal clay balls. In some cases, the impressions on balls were sufficiently well recorded to show that stamp counterseals were only impressed on the ‘polar’ surfaces of the ball (see Table 6.3). Thus, a consistent set of administrative practices may have been applied when creating these artefacts. Future re-examinations of balls that were insufficiently recorded may also reveal further instances of this practice.

As shown in Table 6.2, countersealed clay balls occurred in 8 settlements. As discussed by Boehmer (1999, 116) the greatest quantity of balls were discovered in Susa and Chogha Mish. Thus, the use of clay balls as an administrative technology may have first developed in the ‘Elamite’ region where Susa and Chogha Mish were located.

To date, countersealed balls inscribed with numerical markings have only been found at Susa and Chogha Mish. It is possible that more than one individual may have been responsible for placing the tokens in the ball, applying seals, and inscribing numbers on the ball. Thus, the most sophisticated ball-based administrative system in southwestern Asia was likely located in Susa and Chogha Mish. However, it is also possible that countersealed clay balls with numerical markings at other sites have yet to be uncovered or published.

Evidence for the use of multiple seals on tablets marked with numbers exists in Uruk, Susa, and Godin Tepe. Tablets with multiple seals that were inscribed with numbers and writing have only been found in Uruk and Jemdet Nasr. The lack of widespread evidence for countersealed tablets that were inscribed may indicate that the practice was restricted to these two sites. Presumably, at least one of the individuals involved in the creation of the tablets would have to be literate to some degree. This was not the case for systems involving countersealed numerical tablets and clay balls. It has been suggested that clay tablets evolved after clay balls as a recording device (Boehmer 1999, 120–121). Balls and tablets appear to have been marked with the same types of numerical markings (Nissen *et al.* 1993, 127). Both balls and tablets could also be countersealed. A single tablet from Jemdet Nasr (U12548b) also bears a stamp countersealing (Matthews 1993, 68). Thus, balls and

Table 6.3: Stamp seals found on countersealed objects. Rows highlighted in gray indicate clay balls sealed with stamp seals in ‘polar’ areas.

Site	Artefact no.	Artefact type	Source
Uruk	W 20987,26	Ball	Boehmer (1999, Tafel 99, Nr. 51)
Uruk	W 20987,16	Ball	Boehmer (1999, Tafel 100, Nr. 54)
Uruk	W 20987,17	Ball	Boehmer (1999, Tafel 100, Nr. 55)
Jemdet Nasr	Ashmolean 1926.654	Tablet	Matthews (1993, 60)
Susa	Sb 1939	Ball	Amiet (1972a, 66, 95); Amiet (1972b, Pl. 61, 71)
Susa	Sb 1942	Ball	Amiet (1972a, 66, 92, 94); Amiet (1972b, Pl. 61, 71)
Susa	Sb 6340	Ball	Amiet (1972a, 66); Amiet (1972b, Pl. 61)
Chogha Mish	II-379	Ball	Delougaz and Kantor (1996b, Plate 34, 144)
Chogha Mish	II-97	Ball	Delougaz and Kantor (1996b, Plate 135A–C)
Tell Sheikh Hassan	(Boese 1995, 104, Figure 8c)	Ball	Boese (1995, 96, 104)
Tell Sheikh Hassan	(Boese 1995, 104, Figure 8d)	Ball	Boese (1995, 96, 104)
Tepe Farukhabad	(Wright 1981, Figure 75d, Plate 16e)	Ball	Wright (1981, 151, 156, 457)

tablets may have been used for similar administrative purposes. Writing appears only on tablets (Pittman 2013, 326), which may support the idea that these administrative devices were developed after the anepigraphic balls.

For example, ball-based and numerical tablet-based administrative systems appear to have been connected at Susa. Table 6.4 summarizes instances at Susa where the same seals appear to have been used to impress multiple different types of artefacts. By examining seal use patterns, it can be seen that certain seals were used on clay balls, while others were used on clay balls as well as tablets. When the same seal was used multiple times on different tablets and balls, these recording devices were also found to bear incised numbers. However, in the two cases where two different seal images were only used on clay balls or other clay objects (Le Brun and Vallat 1978, Figure 7:3 and 7:6), no numerical markings were found. This evidence tends to point to the theory that particular groups of individuals were involved in the creation of sealed balls and tablets with numerical markings at Susa. These individuals were likely numerate, but possibly not literate. Conversely, individuals that only sealed balls, bullae, and other clay objects apparently did not make use of number signs when creating these objects. Thus, such individuals ostensibly did not participate in number-sign based accounting systems present at Susa. Finally, the two different seals countersealing Ball 10 (Le Brun and Vallat 1978, Figure 5:2 and 6:7) also appear singly impressed on tablets. Thus, two individuals acting as independent administrators may have come together to seal Ball 10 as a symbol of an administrative transaction.

It remains to be investigated whether certain classes of seal motifs tended to be used in conjunction with numbers on balls or tablets. At present, available excavated artefacts that fall into these categories of data are too limited to draw definitive conclusions on this question. However, it should be kept in mind for future research.

The use of written sealed tablets indicates a possible overlap between seal-based and writing-based forms of administration during the 4th millennium. Thus, illiterate seal-bearing individuals could potentially have participated in literate administration in some form. During the Jemdet Nasr period in mid 3rd millennium southwestern Asia, it appears that the use of sealed clay balls was discontinued, and the practice of countersealing tablets fell out of use. It has been theorized that the growing prominence of writing as an administrative tool eliminated the need for sealed recording devices (Matthews 1993, 26–27; Brisch 2013, 116). An exception to this trend can be found in the Iranian culture based in the Susiana region, which continued to employ sealed proto-Elamite record tablets during this period (Dittmann 1986, 346–350). It has also been speculated that seal impressions were no longer required to carry out administrative functions related to tablets (Pittman 2013, 329). Thus, the direct interaction of seal-based, potentially illiterate administration, and writing-based administration appears to have come to an end until the late

Table 6.4: Cylinder seals from Susa found to seal more than one type of administrative artefact/sealing. Plate and figure references refer back to Le Brun and Vallat (1978). Sealing type names have been translated, but the associated numbers refer back to the numbering system used in Le Brun and Vallat (1978).

Excavation no.	Sealing type, no.	Seal image type no.	No. of different seal images	Numbers/letters?	Depicted on plate no.
2119.1	Ball 10	Figure 5:2; Figure 6:7	2 seals	Number	IV:2
2073.2	Tablet 21	Figure 5:2	1 seal	Number	IV:2; Figure 4:1
2128.1/1128.1	Tablet 22	Figure 5:2	1 seal	Numbers	IV:4; Figure 4:4
2128.3	Tablet 23	Figure 5:2	1 seal	Numbers	IV:6; Figure 4:5
2157.1	Tablet 26	Figure 6:7	1 seal	Numbers	IV:1
2142.3	Ball 1	Figure 5:6	1 seal	Numbers	I:4
2162.1	Ball 5	Figure 5:6	1 seal	Numbers	III:3
2083.1	Bulla 37	Figure 5:6	1 seal		V:3
2173.4	Ball 2	Figure 7:2	1 seal	Numbers	I:3; Figure 3:3
2093.2	Tablet 24	Figure 7:2	1 seal	Numbers	IV:5
2093.3	Tablet 25	Figure 7:2	1 seal	Numbers	Figure 4:3
2117.2	Bulla 33	Figure 7:2	1 seal		V:1
2130.4	Ball 8	Figure 7:3	1 seal		I:2
2130.3	Clump of clay 40	Figure 7:3	1 seal		VI:3
2117.1/2127.1	Ball 15	Figure 7:6	1 seal		III:2
2130.5	Flat round clay piece 39	Figure 7:6	1 seal		VI:2
2130.2	Ball 4	Figure 7:8	1 seal	Numbers	III:2 Figure 3:1
2130.8	Tablet 29	Figure 7:8	1 seal	Number	

3rd millennium BCE Akkadian period, when seal impressions again begin to appear on tablets (Pittman 2013, 334; Brisch 2013, 116).

Later 3rd millennium communities like Tell Brak (see Chapter 5) did employ administrative systems that prominently featured sealed administrative devices. However, the system at Tell Brak did not feature countersealing, and was apparently not based around the use of sealed balls or tablets. Although the concept of sealed administrative tools did not completely disappear in the 3rd millennium, Uruk-style sealed and countersealed administrative tools apparently did fall out of use. Thus, the end of the Uruk material culture in southwestern Asia (Brisch 2013, 116) was likely also marked by the disuse of countersealed recording devices associated with this culture.

6.3.1 Possible functions of countersealed recording devices

Wright and Johnson (1975, 272) theorized that balls and tablets were not present at Tepe Sharafabad since these documents had been sent as bills of lading to large settlements (e.g. the city of Susa). The examination of sealed balls and tablets also led Le Brun and Vallat (1978, 38) to the conclusion that such objects were either bills of lading sent to a recipient or receipts written by the receiving party and sent back to the sender.

Le Brun and Vallat (1978, 39) initially suggested that countersealed balls and bullae could have represented:

- A bill of lading sealed by two suppliers,
- A contract sealed by a sender and a receiver, or
- A record countersealed by a controlling individual.

On further consideration, they rejected the idea that countersealed balls or bullae represented a contract between a sender and a receiver, since the sender and receiver would have to seal the document simultaneously while it was wet. Le Brun and Vallat (1978) also rejected the theory that a controller countersealed the record, since they considered the existence of administrative controllers at the end of the 4th millennium implausible. Dittmann (1986, 335) summarized the Le Brun and Vallat (1978) article by stating that countersealing may have indicated a contract between a sender and a receiver or a reflection of different hierarchical units in the administrative system, without noting that both of these theories had been invalidated by Le Brun and Vallat (1978, 39). As discussed in Section 1.3.2, subsequent scholarship frequently focussed on the importance of seal imagery as conveyers of meaning, without examining the artefacts on which the seal images were impressed and their find context. To offset this bias, the current section re-examines seal use patterns on bullae, balls, and tablets in the Uruk period based on contemporary evidence. These findings are then compared to data from later periods.

The earliest systematically analysed clay document sealing practices related to literate administration are dated to the Ur III period, circa 2112–2004 BCE (Brisch 2013, 116). During this period, tablets sealed with a single seal could record a wide variety of transactions, both commercial and legal (Steinkeller 1977). Most of the Uruk records do not record the specifics of transactions in the degree of detail common in the Ur III period. However, evidence does provide clues to the possible meanings of balls, bullae, and tablets, particularly when compared to the Ur III data.

The parallels between Ur III clay envelopes for tablets and clay balls containing tokens from the Uruk period have previously been examined by Fiandra (1981, 30). Her analysis assumed that clay balls corresponded to receipt tablets placed inside envelopes, following the theory developed by Le Brun and Vallat (1978, 38). As explained by Steinkeller (2004, 78, Footnote 27), her erroneous interpretation was founded on a misreading of Ur III written documents. Consequently, her theory is not considered in this thesis when comparing Ur III and earlier Uruk document sealing practices.

Table 4.3, shows that Chogha Mish seal images 149:E and 153:A were found on fragments of clay balls, door sealings, and container sealings. Based on this evidence, it can be theorized that individuals responsible for sealing particular doors and/or goods may also have been responsible for sealing documents related to the use of sealed goods and the doors they were stored behind. In this scenario, the disburser or seller of the goods would have sealed the clay ball. Therefore, the function of the clay balls may have been comparable to the Ur III sale tablets, which were almost always sealed by the seller, and not the purchaser (Steinkeller 1977, 45). Further parallels between Ur III sale tablets and Uruk clay balls can be seen in the method of their creation. Ur III sale tablets were not sealed, but placed inside a clay envelope that was inscribed with a text that mainly copied the interior text, giving particulars of the goods and individuals involved in the transaction. This envelope was also impressed with a seal or seals. By comparison, Uruk tokens were placed inside a clay ball, which functioned as an envelope that was subsequently sealed. On occasion, the number of tokens inside was also noted by numerical markings on the exterior of the ball⁵².

Sealed tablets and bullae, although ostensibly not placed in ‘envelopes’, could have served similar purposes as sale documents. However, these artefacts could also have been sealed by the recipient of the goods recorded on the tablet or bulla, thereby representing early equivalents to receipt texts or disbursement texts of the Ur III period (Steinkeller 1977, 42). Multiple seals were sometimes impressed on Ur III

⁵²There are some exceptions to this practice. For instance, clay balls Sb 01932 and Sb 01938 from Susa (CDLI 2016a,b) have inscribed numbers that apparently do not correspond to the number of tokens they contain. Further research is necessary to determine the possible meaning of these clay balls.

sale tablet envelopes. These frequently consisted of the seal of the seller and various witnesses to the transaction (Steinkeller 1977, 45). Countersealed Uruk tablets and balls may therefore represent an earlier example of this practice. Balls, tablets, and bullae impressed with seals that were rolled on container sealings, but not found on door sealings (e.g. seal image 138:I from Chogha Mish on Table 4.3) may also have been brought to a settlement from other locations as records of transactions of goods impressed with the same seal.

A comparison between general trends in sealing practices of the Uruk period and later periods reveals notable differences. Uruk-era material from Chogha Mish provides evidence that an individual wielding the same seal could be responsible for sealing doors, containers, and clay recording devices. By contrast, Reichel (2001) shows that late 3rd and early 2nd millennium Ur III–Old Babylonian administration at Tell Asmar circa 2112–1850 BCE (Brisch 2013, 116; Reichel 2001, 107) seems to have employed a system where separate seal users were responsible for sealing containers, doors, and tablets. Only occasionally, a single high official or ruler, possibly acting by proxy, sealed different objects with different seals inscribed in their name at Tell Asmar (Reichel 2001, 122–123 Malamat 1986, 161). The administrative turmoil documented by the well known 3rd millennium Ebla tablets (Malamat 1986, 160–161; Fissore 1994, 340–341; Palaima 1994, 358) also mentions that different seals were used on different artefacts. Thus, available evidence seems to demonstrate that in earlier Uruk administrative systems, administrators using the same seal could seal different artefacts. This is apparently not the case in later periods, where separate individuals were responsible for sealing different objects, or the same individual used more than one seal for sealing various objects. Thus, the progressive compartmentalization of bureaucratic structures in southwestern Asia can be traced through seal use patterns. The order of operations followed when creating clay documents also seems to differ between the Uruk period and later periods. Hattori (2002, 50) has stated that the Ur III tablets of Nippur were sealed after they were impressed with writing, while close examination of available photos of earlier Uruk-era balls, bullae, and tablets seems to demonstrate that the seal was rolled on these artefacts before they were inscribed (see also Van Driel (1982, 22)).

During the Early Dynastic period in southwestern Asia circa 2900–2350 BCE (Brisch 2013, 116), the use of seals on tablets seems to have been discontinued, only to resume in the Akkadian period (Pittman 2013, 329, 334). However, evidence of the continued use of bullae sealed with one seal per bulla at Tell Brak (Matthews 1997; McDonald *et al.* 2002, see also Chapter 5) as well as Tell Beydar (Jans and Bretschneider 2011, 274; Jans 2004) in the Syrian region during the Early Dynastic IIIb–Akkadian period (circa 2500–2200 BCE (Brisch 2013, 116)) demonstrates the use of some form of sealed records persisted within these communities. At Tell Brak, these bullae were marked with numbers and other incised abstract signs, or infrequently, with

cuneiform writing. By contrast, the material from Tell Beydar published to date shows evidence for number markings and cuneiform writing (Milano *et al.* 2004) on some sealed bullae. The Brak bullae (McDonald *et al.* 2002, 99–120) appear to have been inscribed only after a cylinder seal was rolled over all surfaces. However, most of the Beydar bullae had facets rolled with seals while other facets were left blank and inscribed, with one notable exception: Bulla number 28508-T-10 (Milano *et al.* 2004, 104) was apparently inscribed after a cylinder seal was rolled over its surface. A tablet bearing only numerical signs from Tell Beydar was also found to be rolled with impressions of one seal (Milano *et al.* 2004, 99). The material from Tell Brak and Tell Beydar therefore appears to provide evidence for the continuous use of sealed clay recording devices between the Uruk period and the Akkadian period in southwestern Asia. The lack of evidence for countersealing on bullae and tablets from these two sites may be due to changing administrative practices. However, the absence of countersealed clay recording devices may also be a result of preservation and the sectors chosen to be excavated by archaeologists at each site. Evidence for such practices may therefore emerge as a result of future investigations.

Thus, the Uruk sealed and countersealed recording devices may have constituted sale records, receipts, and disbursement records, though the administrative systems employing these devices were likely not as complex as in later periods. Future research may uncover more evidence for the functioning of these documents within early southwestern Asian administration.

6.4 Egyptian countersealings

The earliest currently published Egyptian cylinder seal impressions on sealings were found in the elite burials at Abydos (Hartung 1998) dated to the Naqada II period (circa 3600–3350 BCE (Hendrickx 2006, 92)). However, countersealing practices employing cylinder seals are only evidenced from Naqada III onward (circa 3350–3150 BCE (Hendrickx 2006, 92)). At present, the earliest countersealed objects published are three fragments of jar sealings from tomb U-j at Abydos (Hartung 2001, 218).

In Section 1.4, it was mentioned that burial rite practices shared by communities along the entire Egyptian Nile predated the emergence of a pharaonic state. After the establishment of a ruling institution, it appears that the pharaonic government was actively engaged in commissioning the creation of sealed funerary goods that were then employed in elite and royal burials (see Section 3.3.7). Specifically, large vessel and bag sealings sealed with royal seals (see Figures A.112, A.113, and A.114) have only been found in elite funerary contexts, indicating these types of sealings were likely designed for display purposes. A type G2 seal still paired with a vessel in the British Museum measures 1 metre in total height alone (British Museum 2016c,d). The size of large prestigious vessel seals of types G1 and G2, as well as the size of vessels generally

attached to them (see Figure A.112 for examples), indicates that transporting such heavy goods would likely require large-scale pharaonic organizational logistics to carry out (Bloxam 2015, 801–802). This section investigates changes in countersealing practices employed on sealings over time, to determine whether these practices reflect possible trends and changes in the dynamics of elite and royal funerary display, a traditional venue of social reproduction for the higher classes both before and after state formation (Wengrow 2006, 175)

Similar to southwestern Asia, the use of two or more cylinder seals on a sealing in Egypt seems to have been restricted to specific types of sealings. However, unlike southwestern Asians, Egyptians apparently did not employ sealed clay objects purely as recording devices. Instead, vessel and bag sealings appear to have been the most commonly countersealed artefacts in Egypt. Countersealed vessel and bag sealings were all recovered either from burials or from structures likely associated with funerary rituals (see Table A.22). Available evidence suggests the practice of countersealing funerary goods came to an end after Dynasty 3⁵³. Consequently, data scrutinized in the present chapter was derived from burials dating from Naqada III to Dynasty 3 (circa 3350–2544 BCE (Hendrickx 2006, 92; Hornung *et al.* 2006, 491)). In Chapter 3, some burials could not be included in the analysis due to a lack of published measurements for the grave substructures. However, presence or absence of countersealings, rather than tomb size, is the important criterion for inclusion in the Chapter 6 database. Consequently, sealings from some of these previously excluded burials are included here. When compiling data for this analysis, all sealed fragments were individually counted as one sealing unless indications were given that several broken pieces fit together. Thus, this estimate may be biased since many non-countersealed fragments may originally have formed one sealing. Also, some countersealed sealings may have suffered damage to the extent that only one seal impression remained visible on the surface, or were broken into pieces that have only traces of one seal each on them. In order to minimize the effect of these potential biases, every precaution was taken to include all burials whose seal-impressed sealings were adequately recorded in publications. On occasion, publications note that auxiliary markings were incised into large jar sealings. Also, some jar sealings were sealed, covered with a layer of clay, and this second layer was subsequently sealed with other seals. The documentation of these practices has been relatively inconsistent to date. Thus, they will not be discussed here. However, they likely constitute other steps in the administrative procedures that led to the creation of these clay sealings.

In situations where the number of sealings of a particular type (sealed or countersealed, jar or bag, etc.) was only noted in vague terms (e.g. ‘a few’ or ‘many’), it was assumed that the site contained two sealings of this type. On occasion, sources

⁵³No countersealed sealings were found in the Dynasty 4–6 Giza and Abusir burials listed in Table A.14.

did not explicitly state whether a sealing was sealed or countersealed. These sealings were included only in the total number of sealings attributed to a burial or funerary complex. Saqqara mastaba 2322 was dated to circa Dynasty 2–3 (Regulski 2010a, 73). The present study assumes the tomb is dated to Dynasty 2, due to lack of evidence for a Dynasty 3 dating. Saqqara mastaba 3050 was dated to Dynasty 3 based on the types of pottery and stone vessels found in this tomb (Martin 1974, 23). However, subsidiary burials were discovered surrounding the mastaba. Since the practice of creating subsidiary burials appears to have been discontinued after Dynasty 2 (see Section 2.2), mastaba 3050 was reclassified as a Dynasty 2 burial. Two funerary enclosures of Peribsen and Khasekhemwy at Abydos found to contain countersealed sealings were also included in the present database. These structures were presumably employed for the mortuary cult of the deceased rulers, and therefore could be counted as funerary structures (Morris 2007a, 16; Kemp 1966, 15–16). Kaplony's (1963a) lists of sealings were used as sources for evidence on countersealings in burials.

When a seal image was recorded by excavators but no longer traceable in museum collections, Kaplony assumed the existence of one sealing bearing this particular seal image (Kaplony 1963a, 58). The current study follows this assumption. Any quantities of seals tagged with a question mark by Kaplony (1963a) were recorded as-is (ie: '2(?)' was recorded as '2' in the present database). All sealings were re-classified in the present study according to the sealing classification system given by Engel and Müller (2000) to allow for inter-site comparison. Sealings that were not classifiable as a specific type were designated by category in addition to a description of their type (see Table 6.5).

To determine the types of sealings that were countersealed, the number of countersealed sealings in graves and funerary complexes was tallied according to sealing type and era in Figure 6.1. Sealings that could not be classified by type were not included in Figure 6.1. Of all countersealed sealings represented in graves, vessel sealing type G2 (See Figure A.113) and bag sealing type B1 (See Figure A.114) are most prevalent (Engel and Müller 2000). However, G2 appears to have remained in use throughout all four periods, while B1 bag sealings were mostly attested during Dynasty 1 (see Figure 6.1).

To date, it appears that only 10 identifiable countersealed sealings have been found in settlements dated prior to Dynasty 4 (see Table 6.5). Aside from the one sealing classifiable as G6 from Elephantine, all of the identifiable sealings belong to different categories of sealings than the countersealed sealings found in graves. Future investigations will likely provide more evidence for the types of countersealing practices generally in use in Egyptian settlements. The seals used on all of these sealings bear no markings associating them with pharaonic authorities. Thus, the individuals creating these sealings were likely part of a local administrative system (Regulski 2014, 241). Like southwestern Asian bullae, these objects may have

Table 6.5: Countersealed sealings from Naqada III–Dynasty 3 settlements. Engel and Müller (2000) classification of each seal impression is noted where possible as as E+M 2000). When this was not possible, the sealing type was described.

Site	Excavation/museum #	E+M 2000 sealing type	Reference
Elephantine	1895 (internal cat. 117)	G5	Pätznick (2005, 330)
	5612 (internal cat. 184)	G6	Pätznick (2005, 364)
	4133 (internal cat. 323)	G5	Pätznick (2005, 435)
	5619-1- (internal cat. 191)	Wooden box	Pätznick (2005, 368)
	1595 (internal cat. 009)	Double-leaved door bolt	Pätznick (2005, 276)
	1596 (internal cat. 010)	Double-leaved door bolt	Pätznick (2005, 276)
Tell el-Iswid	ISW07-007	S2	Regulski (2014, 232–233)
	ISW07-015	S2	Regulski (2014, 235)
Hierakonpolis	N/A	Door peg sealing	Fairservis (1986, 25, Figure 13-221) Bussmann (2014b, 30)
El Kab	E.7843	N/A	Regulski (2009a, 40–41)
			Total: 10

been attached to strings tied around containers (see Oates and Oates (1995, 492)). Consequently, two types of countersealing practices were apparently in use in early Egypt: jars and bags bearing counterseals were deposited in tombs, and triangular bullae were used in settlement contexts.

A closer examination of the evidence presented in Table A.22 shows that countersealed objects appear to have been almost exclusively deposited in large elite tombs or royal burials (compare the tombs in Table A.22 with those found in Tables A.12–A.14). These countersealed sealings frequently bore royal names. Consequently, the royal names on the sealings may have indicated the special status of these goods (see Section 3.4). This study has posited that the provision of sealed goods to elite and royal tombs was controlled by pharaonic officials. The predynastic countersealed sealings found in the elite Abydos tomb U-j show that countersealing predated this system of provisionment. Thus, countersealing may have initially been used in Egypt by individuals or collectives creating sealed goods whose distribution was not directly controlled by elites (see Section 3.3.5).

Subsidiary sacrificial burials were also occasionally found to contain one fragmentary or intact countersealed type G2 jar sealing (see Table A.22). The placement of sealed goods in these tombs may have been regulated by pharaonic officials (see Section 3.3.6).

The relative rarity of sealed goods vs non-sealed goods in some tombs led Müller (2012, 17–18) to conclude that the administrative systems controlling these dispensations were limited in scope. However, it can also be argued that the scarcity

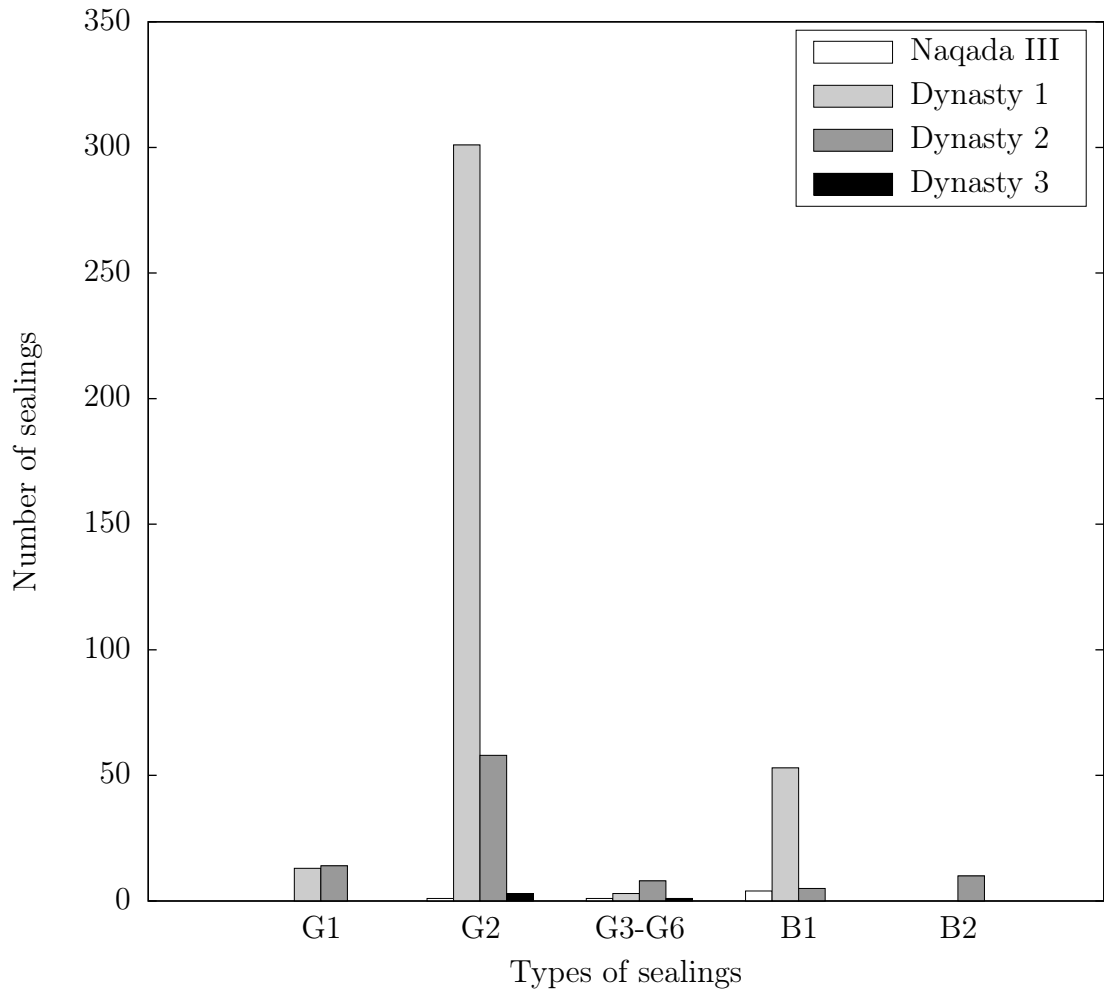


Figure 6.1: Number of countersealed sealing types found in burials and funerary complexes from Naqada III to Dynasty 3. As defined by Engel and Müller (2000), G1 refers to large vessel sealings shaped like a large dome, G2 refers to tall cone-shaped vessel sealings, G3 refers to smaller flat-edged vessel sealings, G4 to smaller, rounded-off sealings on smaller vessels, G5 to cork-shaped clay sealings partly protruding from smaller vessel mouths, and G6 to sealings attached to strings fastened around the vessel that hold a cloth or leather in place around the vessel mouth. B1 refers to oval sealings (frequently with three facets: one top facet and two side facets) attached to the knots of strings around the necks of bags. B2 refers to small half-dome sealings that are also attached to strings at necks of bags.

Table 6.6: Quantity of countersealed sealings (CS) and total quantity of sealings (Tot.) found in tombs and mortuary complexes from Naqada III to Dynasty 3.

	Naqada III		Dynasty 1		Dynasty 2		Dynasty 3	
	CS	Tot.	CS	Tot.	CS	Tot.	CS	Tot.
Royal burials	5	26	224	652	97	1459	0	22
Non-royal burials	3	471	250	1165	4	20	4	76
Total	8	497	474	1817	101	1479	4	98

The results tabulated in the first two rows were employed to create Figure 6.3, and the third row was employed to create Figure 6.2. Mortuary complexes were included in the royal burial data.

of seal-impressed goods in burials was a result of a deliberate restriction of the supply intended to raise the prestige of sealed goods. Tallies of sealed vs non-sealed containers in burials have not been accurately published. Hence, Müller's hypothesis could not directly be investigated here. However, the quantities of singly sealed vs countersealed goods can be investigated. The data from Table 6.6 was graphed in Figure 6.2 to examine the degree of scarcity of countersealed sealings in tombs. Values shown in Figure 6.2 were calculated by taking the quantity of countersealed sealings found in tombs of each era (Naqada III, etc) and dividing them by the total quantity of all sealings found in all impression containing tombs per era.

As shown in Figure 6.2, the percentage of countersealed sealings in all seal impression-containing burials per era in Egypt and Nubia⁵⁴ began with a low quotient of 1–2%, increased to a maximum of 26% in the following Dynasty 1, and subsequently decreased to circa 7% in Dynasty 2, and circa 4% in Dynasty 3. Hence, available data appears to show that countersealed grave goods were most popular during Dynasty 1. However, much evidence from Dynasty 2 still remains to be published, leading to the possibility that levels may be different than can be deduced from currently available evidence. The percent of countersealed sealings versus the total quantity of sealed sealings in graves and funerary complexes per era throughout Egypt and Nubia never exceeded 30%. Consequently, countersealed goods may have been considered especially 'rare' and valuable.

The quantity of countersealed sealings found in royal vs non-royal burials per era was also examined to determine whether one of these groups had preferential access to countersealed goods. Figure 6.3 was created by taking the quantity of countersealed sealings found in counterseal-containing royal tombs of each era (Naqada III, etc.) and dividing them by the total quantity of all sealings found in seal impression-containing royal tombs per era (see Table 6.6). The same calculation was performed for non-royal tombs. Subsidiary burials surrounding royal tombs were counted as

⁵⁴The similarity of Egyptian and Nubian burial practices for much of the period under study justified the inclusion of impression-containing Nubian graves in the present analysis. See also Section 2.2.2.

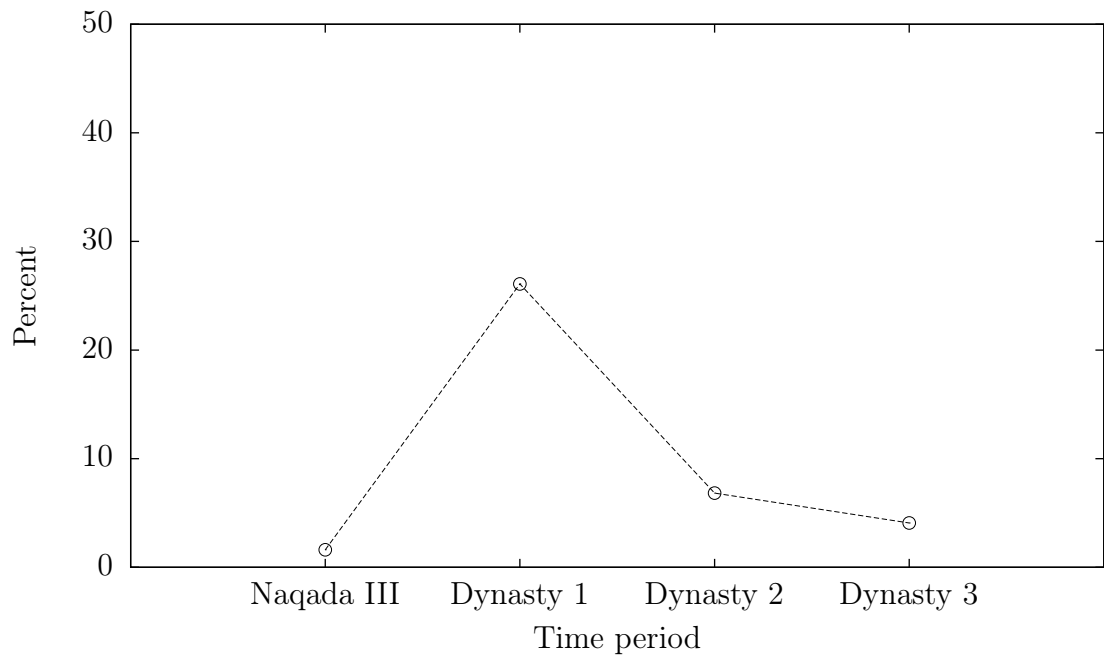


Figure 6.2: Quantity of countersealed sealings as a percentage of the total number of seal-impressed sealings found in tombs of each period. See last row of Table 6.6 for data employed to create this figure. Only sealings from well-documented burials were included.

non-royal burials, since they were apparently not made for royal individuals. As mentioned previously, the non-royal tombs that contained countersealed sealings are mostly elite, aside from a few subsidiary burials (see Table A.22).

Figure 6.3, shows that royal burials apparently did contain more countersealed goods than non-royal burials during Naqada III and Dynasty 1. However, since only one Naqada III tomb with countersealings is currently known from each category (the royal burial of Narmer, and the non-royal Tomb U-j), this conclusion may change as further evidence comes to light. The highest relative deposition incidence of countersealed sealings in royal and non-royal burials is evidenced during Dynasty 1. In Dynasty 2, the quantity of countersealed goods in both royal and non-royal burials was apparently declining. The percent of counterseals in non-royal burials (20%) appears to have surpassed the percent of countersealed goods found in royal burials (7%) for the first time. Finally, in Dynasty 3, countersealings are still attested in non-royal burials (5%), but not found in royal tombs. The state of preservation of some royal pyramid tombs may contribute to low percentages during this period. However, from Dynasty 4 onward, countersealed containers seemingly disappear entirely from burials⁵⁵, indicating that the trends exhibited by the data during Dynasty 2 and 3 are likely indicative of the gradual disuse of

⁵⁵Dynasty 4–6 Giza and Abusir burials listed in Table A.14 were only found to contain small jar sealings similar in style to type G5 (Engel and Müller 2000, 38), and box sealings (Reisner and Smith 1955, 48–54; Giza Archives 2014, UM1824, UM4312, UM3814, UM3110; Verner *et al.* 2002, 94–7, Plate XXIV; Bárta *et al.* 2009, 243, 245).

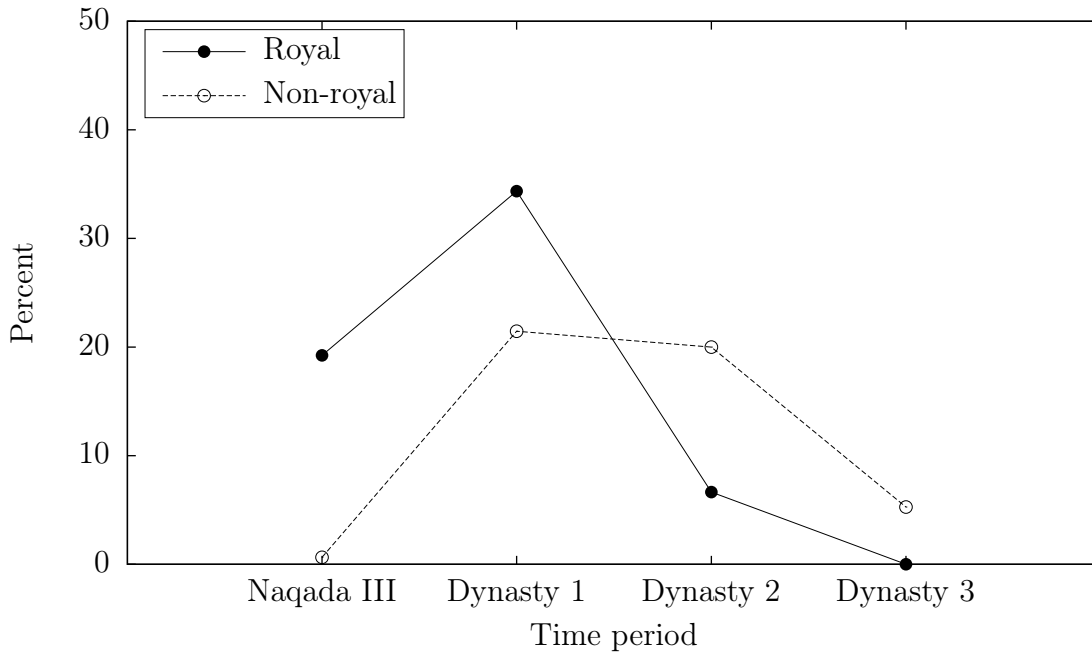


Figure 6.3: Quantity of countersealed sealings found in royal and non-royal tombs as a percentage of the total number of seal-impressed sealings found in royal or non-royal tombs of each period. See first two rows of Table 6.6 for data employed to create this figure. Only sealings from well-documented burials were included.

countersealed containers as grave goods over time. The data compiled in Table 6.6 also provides further evidence that the quantity of sealed goods in burials appears to have decreased from Dynasty 2 onward (see also Section 3.3.5).

Figure 6.3 appears to demonstrate that the quantity of countersealed goods in royal tombs and non-royal tombs of each dynasty varied over time. Royal individuals of Naqada III and Dynasty 1 may have had preferential access to countersealed goods. However, this trend appears to have been reversed in Dynasties 2 and 3. Thus, it can tentatively be concluded that over time, non-royal elites gradually gained more access to countersealed grave goods bearing the royal mark.

The prestige of some sealed goods in tombs may have been further enhanced by the use of countersealing practices. To date, published information tends to indicate that large, prestigious vessel and bag sealings were supplied to burials by private collectives overseen by pharaonic officials. It has also previously been stated (Kaplony 1963a, 57; Kaplony 1963c, 715, Footnote 713) that seals bearing specific motifs or hieroglyphs were preferentially used to counterseal containers found in burials. Consequently, specific collectives employing particular seals may have been responsible for the provision of countersealed goods. Pharaonic officials may also have provided these collectives with the necessary seals.

Conversely, countersealing was apparently only used on small bullae in settlements. Thus countersealing practices employed on sealings in settlements appear to have been fundamentally different from the countersealing practices employed on mortuary

goods. Further investigation into the use of auxiliary symbolic markings on jar sealings from burials (i.e. Emery (1958, 61–62)) will likely reveal the additional complexities of the logistics surrounding the creation and transportation of mortuary goods. Further analysis is also necessary to confirm whether sealings classified by Kaplony were correctly identified by type.

Funerary good countersealing practices appear to have fallen into disuse from Dynasty 4 onward. Administrative changes within the pharaonic administration (Müller 2012, 18) may have caused the practice of countersealing to be ‘phased out’ with regard to funerary items. The sparse evidence for countersealing from Dynasty 4 onward comes from different contexts and is frequently found on sealings of different type than those previously discussed. A countersealed Dynasty 4 sealing bearing impressions of finely carved seals with the royal names of Khafre and Menkaure was excavated from the Old Kingdom settlement at Buhen (Emery 1963, 119, A6–18). However, this sealing was not classified according to type (jar sealing, bag sealing, etc). Thus, it is unknown whether this sealing was used on an artefact intended for a local funerary cult, a temple cult, or other purposes. Consequently, countersealing was probably still considered a prestigious practice in some contexts in Dynasty 4.

Countersealing is also attested on material from Balat, dated circa Dynasty 6. Four door lock sealings from Balat were found in a mixed context in the shaft of tomb 29 in the necropolis surrounding the mastaba of Khentika (Castel and Pantalacci 2005, 421–427). An unspecified number of further countersealings from the administrative centre at the site remain unpublished (Pantalacci 1996, 362). None of the published sealings were sealed with well-carved pharaonic cylinders. One countersealed sealing from the administrative centre at Balat bore a seal impression with royal titulary. However, the seal employed to make this impression was apparently of inferior quality (Pantalacci 1996, 362). Most of the other attested examples bear impressions of illegible cylinder and stamp seals (Castel and Pantalacci 2005, 421–427). Thus, there is almost no evidence for pharaonic titulary on published countersealings employed at Balat. Consequently, the practice of countersealing doors may have evolved in a separate sphere to the officially produced countersealed wares studied in this chapter. This may explain the lack of evidence for official well-made pharaonic seals rolled on door sealings. Future research may uncover earlier evidence for such practices.

6.4.1 Sealed Levantine Jars: Importations or imitations?

Jars apparently originating from the Levant have been found in elite Egyptian burials. Many seal impressions of Engel and Müller type G6 presumed to have been fastened to Levantine import jars were found in the Naqada III elite burial of Tomb U-j at Abydos (Hartung 2001, 216; Hartung *et al.* 2015). However, only three of these sealings (see Table A.22) appear to have been countersealed.

Only Engel and Müller type G4 and G6 sealings were apparently used on imported jars during the Early Dynastic (2000, 38). A few countersealed sealings dated from Dynasty 1 to 3 were potentially found to be of this type. However, in many cases, the identification is tentative. One sealing from the Dynasty 1 Saqqara mastaba 3506 is classifiable as G4, nine sealings from the Abydene grave of the ruler Khasekhemwy can be tentatively classified as type G4 or G5, and one sealing from the Dynasty 3 mastaba grave 2 at Beit Khallaf was also tentatively classified as type G4 or G5 based on available published information. Finally, a sealing that could be classified as G6 or B2 (box sealing type 2) was found in the grave of Peribsen at Abydos (see Table A.22). Assuming all of these sealings were found on ‘imported’ vessels, only 15 countersealed sealings from such jars appear to have been found in tombs to date. It can tentatively be concluded that ‘Levantine’ jars and their contents, whether imports or imitations, were not frequently subject to complex countersealing practices.

Non-countersealed sealings placed on ‘Levantine’ style jars have also been found. Examples of such sealings are the non-countersealed sealings from tomb U-j, two seal impressions found on Levantine jars from the Dynasty 1 Saqqara mastaba 3506 (Emery 1958, 61, 65), the sealed Levantine jar from the Dynasty 6 Giza mastaba G 2381 shaft A, classified as an import from Syria/Palestine (Sowada and Grave 2009, 178, Boston MFA 13.2932; Giza Archives 2014, C3363_NS, A1001_NS), and Levantine jars classified as local imitations from the Dynasty 6 tomb of Qar Junior at Abusir (Bárta *et al.* 2009, 243; Sowada and Grave 2009, 168). Future research may uncover more examples of such jars.

An analysis of the U-j sealings found they were made of local Egyptian clay. Apparently, the closed jars were sealed with seal impressions on entry into Egypt (Hartung *et al.* 2015, 299). Type G6 sealings were probably affixed to the string holding a cloth or piece of leather in place over a jar mouth (Engel and Müller 2000, 35, Abb. 2). However, later Levantine jars were sealed with jar sealing type G4. This type of clay sealing was likely placed over the jar mouth after it was covered with a potsherd or reeds (Engel and Müller 2000, 35). Thus, type G4 was probably applied directly on a vessel after the jar was filled. Consequently, a re-analysis of jar sealings of this type found in graves might provide further evidence for the origin of the vessel contents and administrative procedures related to the creation of these funerary goods.

In future, more analyses of the composition of clay sealings and ‘import vessels’ found in Egyptian elite graves should be conducted to determine how funerary administrative systems may have functioned in conjunction with Levantine trade.

6.5 Conclusion

By examining countersealing practices in 4th to 3rd millennium southwestern Asia and Egypt, this chapter has demonstrated that both regions employed significantly different countersealing practices. In southwestern Asian communities where Uruk style administration is evidenced, only recording devices (balls, tablets) appear to have been sealed with more than one cylinder seal. These devices came into use with the advent of the Uruk culture, and were employed in a similar fashion in communities throughout southwestern Asia. Sealed balls and tablets appear to have been created in a relatively standardized manner in southwestern Asia. New ‘colonial’ settlements were established in regions outlying the Uruk heartland in southern Iraq–Iran at places such as Tell Sheikh Hassan, Jebel Aruda and Habuba Kabira (Pittman 1999, 50). Uruk trading colonies were apparently also created in far outlying indigenous communities like Hacmebi (Stein 2001, 153).

From the evidence examined here, it appears that Uruk traders or administrators in these communities were adhering to a particular standard or convention of document ‘formatting’. Parallels with later Ur III era sealed tablets may indicate that sealed tablets served similar functions in the Uruk period. The gap in the use of sealed documents between the Uruk and the Akkadian period is also closing thanks to recently uncovered evidence.

In Egypt, countersealing with cylinder seals was frequently used to mark prestigious burial goods, and the practice may also have further enhanced the prestige of these goods. If one ‘brand name’ indicated by a single sealing motif was considered prestigious (Wengrow 2008, 10), then the use of several different seals may have further enhanced the ‘brand name appeal’ of the goods they sealed. The large cone-shape of G2 sealings (see Figure A.113) may also have enhanced the ostentatious nature of countersealed jars placed in tombs as grave goods.

Thus, southwestern Asian countersealing practices were likely employed for accounting purposes, while Egyptian countersealing practices apparently signalled prestige and control over the contents of containers. Given the differences between the systems used in both regions, it appears that Egypt did not adopt Uruk-style cylinder seal countersealing techniques. Consequently, countersealing techniques appear to have developed independently in state-level southwestern Asia and Egypt.

Chapter 7

Discussion

7.1 Introduction

This thesis has examined different types of seal-based administration in southwestern Asia and Egypt during the 4th to 3rd millennium BCE by scrutinizing the distribution of sealed objects and seals. By examining data from both southwestern Asia and Egypt, it was possible to analyse how seal-based administration was developed and employed during the period when complex stratified societies evolved in these regions. Evidence from both regions showed that seal-based administration developed along different lines in southwestern Asia and Egypt. Clay sealed recording devices that could also be inscribed with numbers, letters, and other signs developed in southwestern Asia, but not Egypt. A detailed discussion of these cultural trends is found in Section 7.3. By contrast, container and door sealings were employed in both regions. In settlements, some seal-users may have engaged in sealing activities more frequently than others. The imagery on the seals employed by such individuals in southwestern Asia may not have been directly indicative of their status. By contrast, Elephantine in Egypt provides evidence that those with similar hieroglyphic inscriptions on their seals may have been part of administrative divisions.

7.2 Seals, Authority, and Writing

Seal-based administration may not have required literacy, though interactions with literate administrators likely occurred at certain stages. The creation of a seal with legible inscriptions in both southwestern Asia and Egypt would have required the input of a literate person. Sealed clay tablets and bullae bearing cuneiform inscriptions from southwestern Asia, as well as written papyri sealed with a clay seal impression from Egypt also represent occasions where individuals sealing written documents may have been literate. However, in the evidence examined here (see Table 6.1, Oates 1993; Oates and Oates 1995 and McDonald *et al.* 2002), it appears clay tablets or bullae were sealed before they were inscribed. Thus, non-literate

individuals in southwestern Asia could also have sealed these objects before passing them to a literate administrator who wrote on them. In Egypt, papyri, once written, may have been passed to a non-literate sealer who sealed them. Consequently, seal-based administration in southwestern Asia and Egypt was likely a type of administration in which illiterate or partially literate individuals could participate. In addition, clay recording objects from 4th millennium southwestern Asia inscribed with numbers and signs, but no writing, also show evidence that numerate, but possibly non-literate individuals were involved in seal-based administration in the region. Parallels between these classes of early sealed documents and later sealed tablets may indicate that sealed bullae, balls, and tablets were also used as a means of recording sales and other transactions requiring receipts.

In southwestern Asia, the use of sealed Uruk-type recording devices such as clay balls and tablets was likely an extension of previous sealing systems. However, these devices were created according to relatively standardized ‘formatting conventions’. The Uruk III/Jemdet Nasr period (circa 3150/3100–2900 BCE) city-seal impressions from various widely separated southern Mesopotamian cities also exhibit evidence for a relatively standard order in which the city names were carved (Matthews 1993, 40), and even a standard documentary format for inscribed tablets sealed with these seal images (Steinkeller 2002, 253). Thus, the standardization of administrative tools and the way they were used continued to be a feature of administration in the Jemdet Nasr period Brisch (2013, 115). In both cases, standard formats for documents and tools associated with them seem to have existed in the Uruk culture in 4th to early 3rd millennium southwestern Asia.

Sealings from the 4th millennium site of Chogha Mish and the 3rd millennium site of Tell Brak provide evidence that the status of seal-bearers may have been conveyed through the objects they were entitled to seal, rather than the images carved on their seals. Evidence for four seal images belonging to ‘sealers’ of higher rank can be discerned at Chogha Mish by assuming individuals entitled to seal clay balls/tablets and doors and other clay sealings may have been of a superior rank.

At Tell Brak, two pictorial seal images were almost exclusively found on rectangular or triangular cross-section bullae (see Table 5.4). Almost no other seals were used on these artefacts (see Table 5.5). Thus, the individuals wielding these two pictorial seals may have been controlling the creation and distribution of these bullae. A few seal images were frequently found on both clay bullae likely used as administrative records and peg sealings possibly attached to doors. Again, the motifs of these seals were of varying types. Some were inscribed with writing, and others were uninscribed. None of these seal images employed a consistent type of motif or style of carving, indicating that iconography may not have been a mark of the putative sealer’s status. Instead, the objects these ‘sealers’ had access to and were entitled to seal may have been a fundamental indicator of their status. Consequently,

previous theories that particular styles of seal images were more prestigious (see Section 1.3.2) may prove insufficient to interpret how sealing systems functioned in southwestern Asia. Evidence from Old Kingdom Egypt may shed new light on the functioning of southwestern Asian sealing systems. In his thesis, Nolan (2010, 319) posits that pharaonic officials working at Giza continued to use the seals made for them when they first entered royal administrative bureaus for the rest of their careers. Similarly, the individuals sealing doors and clay balls/bullae at Chogha Mish and Tell Brak may have been employing seals they had used since the beginning of their careers. Such a supposition would serve to explain why such an eclectic mix of seal motifs was found to be used by purported 'higher administrators' at both sites. Thus, by examining sealing types and the seals impressed on them, possible administrative hierarchies of sealers can be discerned at southwestern Asian sites, regardless of whether the seals were inscribed. Evidence from later sites in southwest Asia indicates that the development of bureaucratic structures eventually compartmentalized the administrative roles of individuals to the extent that many may only have sealed one type of object (e.g. door, tablet) or had different seals for different purposes.

The technology of the seal was introduced to Egyptian culture from southwestern Asia in the Naqada II period (circa 3600–3350 BCE (Hendrickx 2006, 92)). Seals were imported when elites were beginning to emerge in the region. The ability of seals to mechanically reproduce imagery many times over on different objects did not go unnoticed, and was quickly employed to seal goods placed in the burials of individuals belonging to emerging higher classes in Abydos cemetery U (Hartung 1998). Thus, the use of seals to mark elite goods may already have been established almost from the beginning of the introduction of the seal to the region. By contrast, seals were also introduced to Egypt at a time when commerce with neighbouring regions was increasing (Guyot 2004). Seals may already have been employed by traders and villagers to seal goods in contexts that were not necessarily elite from Naqada II onward. Thus, seal-impressed goods could be used as elite propaganda, but were also employed in non display-based contexts. Architecture and art imported into Egypt from the southwestern Asian Uruk culture in the subsequent Naqada III period (circa 3350–3150 BCE (Hendrickx 2006, 92)) was clearly employed almost exclusively for purposes of elite display (Guyot 2004, 86–88). By contrast, the seal, though imported from southwestern Asia, was used in elite and non-elite contexts due to its usefulness in marking objects. Previously, it has been suggested by Baines (2007, 291) and Wengrow (2006, 152–3) that in the period when the institution of pharaonic kingship emerged in Egypt, ordinary individuals were prevented from using visual forms of display on objects buried in tombs and employed in daily life (e.g. painted pottery). However, cylinder seals placed in burials and used in

non-pharaonic administrative contexts appear to show that such a form of display survived through the use of the seal as a grave good and in settlements.

The advent of the pharaonic state saw a clear differentiation between formally carved seals with royal iconography used on grave goods and ritual offerings, and smaller, informally carved seals used in settlements and found in graves of the non-elite (see Section 2.3.9). Thus, the pharaonic administration may have deliberately distanced itself from commoners through the use of more elaborately carved seals. Seals with explicitly pharaonic motifs also do not appear to have been placed in burials.

The later development and use of the stamp seal in Old Kingdom Egypt has led to theories that stamp seals were used by individuals of lower status than those employing cylinder seals (Pantalacci 1996, 360). However, the analysis of material from the ka-sanctuaries of Balat would seem to indicate that there was more of a split between the status of seal-users who employed seals with clearly carved pharaonic motifs, and those who employed cylinder or stamp seals carved with hieroglyphs or pictorial motifs (see Section 5.4.7). However, the types of objects that each ‘group’ of administrators was entitled to seal could not be investigated due to the badly damaged state of most sealings. Also, the theory developed by Pantalacci (1996) is likely based on material from Balat that has yet to be published, and further investigations of sealings found at other settlements of the same era is required to determine whether differences in status can be discerned between cylinder and stamp seal users, and those who employed pharaonic seals, non-pharaonic hieroglyphic seals, and pictorial seals. The scrutiny of the type of objects different seal users were entitled to seal (see Frangipane 2007b, 470 and analyses conducted in Chapter 4 and 5) should provide more evidence for such a hierarchy. By examining how seals were employed in southwestern Asia and Egypt, this study discerns how different individuals with different social roles employed the technology of the seal. Evidence for different classes of seal-users can be found by analysing seal impressions and their discard locations. The number of individuals per community entitled to seal goods may have been relatively low. Door sealings were presumably sealed by the residents of a site. However, many of the other seal impression types may have been sealed at a different location and brought in as part of a shipment of sealed goods, or as a sealed document from outside. Thus, an unknown quantity of the sealings examined in Chapters 4 to 6 may have been sealed by traders or officials working at other sites. Sealed clay documents such as bullae, balls, and tablets may have served as documents recording sales, as receipts, or as disbursement records. Future investigations into the types of clay used for sealings should provide more evidence for the number of seal impressions created by administrators residing in a town versus the number of seal impressions created by traders and administrators shipping goods and sealed messages from outside.

7.3 Seals in administration

Seals are the most widely used and long-lasting of all the administrative tools developed during the 4th to early 3rd millennium BCE in Egypt and southwestern Asia. However, it must be remembered that a large variety of administrative tools were concurrently in use during this period.

In 4th millennium southwestern Asia, cylinder seal impressions were frequently used to seal doors and goods. These early seals were uninscribed, likely due to their evolution from earlier anepigraphic stamp seals used by non-literate cultures from the 6th millennium onward (Duistermaat 2010). Though writing was developed in the region during the 4th millennium, evidence for inscribed seals is not found in southwestern Asia until the 3rd millennium (Pittman 2013, 338). Anepigraphic seals had been used in this region for two millennia prior to the development of writing. Consequently, it is possible that the employment of anepigraphic seals was already firmly culturally entrenched. As a result, the concept of using inscribed seals may not have gained traction until long after the invention of writing.

Cylinder seals were also employed in conjunction with recording devices. Both cylinder seals and clay recording devices appear to have been developed around the same time as part of the emerging early complex Urukian culture (Pittman 2013, 324–325). There was a fairly widespread use of sealed clay balls and bullae (Schmandt-Besserat 1992, 109–110). At times, hollow balls were fabricated that contained tokens symbolizing goods (Schmandt-Besserat 1992, 112). Numerical markings were already employed on some of the hollow bullae to indicate their contents (Schmandt-Besserat 1992, 127). These administrative devices appear to have been succeeded by ‘numerical tablets’, consisting of flat pieces of clay that had seal impressions and numerical markings impressed on their surface (Le Brun and Vallat 1978, 30). Clay tablets bearing the first written signs began to appear near the end of the 4th millennium (Pollock 1999, 162). The role played by seals impressed on these administrative records is debated (see also Section 1.3.2). However, given the evidence examined here, it is possible that these seals represented individuals or people acting on behalf of a group within an administrative system (see Section 7.2). Other information may also have been conveyed by these seal impressions (Pittman 2013, 325).

Though inscribed tablets were also impressed with seals, the practice of sealing tablets was generally discontinued in southwestern Asia during the 3rd millennium BCE. The practice of writing may have rendered the use of seals on tablets obsolete (Matthews 1993, 26–27; Brisch 2013, 116), or administrative practices related to tablets may no longer have required seals (Pittman 2013, 329). At the end of the 3rd millennium, the use of seals on tablets was revived, with seal impressions apparently serving as signatures to documents (Pittman 2013, 337). However, sealed proto-Elamite record tablets from the Susiana region in Iran were still produced

during the ‘interregnum’ when tablets at other sites were no longer sealed in the 3rd millennium (Dittmann 1986, 346–350). The 3rd millennium Tell Brak bullae examined in Chapter 5 were occasionally found to bear inscriptions. ‘Flat bullae’ sealed with Akkadian-style seals from a subsequent 3rd millennium occupation layer at Tell Brak were also sometimes inscribed (Matthews 1997, 181). Consequently, the practice of employing sealed and inscribed clay objects for administrative purposes never entirely disappeared during the 3rd millennium. As a result, the disuse of seals on tablets may have been a regional phenomenon.

By contrast, native Egyptian pictorial and abstract potmarks likely used for administrative purposes may already have existed in Egypt prior to the introduction of the cylinder seal from southwestern Asia (van den Brink 2011, 1007). When cylinder and stamp seals were introduced into Egyptian culture, they were mainly employed to seal containers and doors. Hieroglyphic writing came into use on seals of ‘common’ and pharaonic type in Dynasty 1 at the beginning of the 3rd millennium, though purely pictographic seals also continued to be employed outside of the main pharaonic administrative systems (see Chapters 3, 4, and 6). However, most recording devices do not appear to have evolved alongside seals in Egypt.

The use of papyrus as a writing surface from the Early Dynastic onward can be surmised since clay seal impressions that once sealed these documents have been excavated (Pätznick 2005, catalogue no. 079). Thus, seal impressions were only employed in conjunction with written documents as a means of closing and sealing them.

Other recording devices appear to have evolved ‘in parallel’ to sealing practices in Egypt. Pictorial and abstract pot marks dating from the Naqada II period onward have been found in Egypt. These markings were painted with ink on jars or incised before or after firing. Such vessels can be found in burials and settlements (Regulski 2010b). The question of whether to classify potmarks from the elite Naqada III tomb U-j at Abydos as early hieroglyphs or late pictographic signs continues to be debated, but the use of such signs to convey some type of meaning seems clear (Regulski 2009b, 259–261; Baines 2010, 140). Clear evidence for hieroglyphic potmarks is attested after the invention of hieroglyphs (Tassie *et al.* 2008, 211).

In the Naqada III era (Regulski 2008, 993), flat tags made of organic materials and inscribed with pictorial and numerical markings came into use for marking items in prestigious burials. These tags were first attested at the elite tomb U-j at Abydos. At times, these tags were made of exotic elephant ivory and rare imported wood. It has been suggested that these signs represent early hieroglyphs (Dreyer 1998; Kahl 2003; Baines 2004, Regulski 2008). In Dynasty 1, these tags were inscribed with hieroglyphic as well as pictorial information (Regulski 2010a, 32–33). Use of these tags for goods deposited in elite and royal burials (Regulski 2010b) continued into Dynasty 1, before being discontinued in Dynasty 2. It has been speculated that

the information contained in these tags may have been partially conveyed by seal impressions during Dynasty 2 (Regulski 2010a, 34–35). Stone vessels, predominantly deposited in elite and royal graves during Dynasty 1–2 (Regulski 2010a, 30), could also be carved or incised with inscriptions (Tassie *et al.* 2008, 211). Thus, in the Dynasty 1–2 period, at least two administrative labelling systems inscribed with hieroglyphics were developed for use in predominantly elite burials.

Cylinder and stamp seals were first imported into Egypt from southwestern Asia in the 4th millennium BCE. However, clay sealed administrative records such as balls, bullae and tablets were not employed in Egypt. Instead, pictographic marks and hieroglyphic signs could be incised on clay fired pots, painted with ink on pots, written on papyrus, inscribed on tags for funerary goods, and carved on stone funerary vessels. In southwestern Asia, seal impressions, numbers, and writing were all impressed on clay. In Egypt, seal impressions on clay represented one means of conveying a message, while other tools such as reed pens were used to write numbers and letters on entirely different media such as clay pots. For Egyptians, seals were a newly introduced technology. Unlike southwestern Asians, ancient Egyptians likely had no culturally entrenched practices related to seal use. Consequently, the earlier appearance of writing on seals at the beginning of the 3rd millennium in Egypt may be due to the lack of preconceptions ancient Egyptians held with regard to the ‘proper’ use of seals.

7.4 Summary of Major Findings

By examining where seals or seal impressions were buried in Egyptian cemeteries, this thesis has uncovered the existence of different depositional practices for these two types of artefacts. Seals and goods sealed with seal impressions were apparently never deposited in the same tomb (see Section 3.4). Thus, the individuals entitled to take a seal to the grave may have been ascribed a different status from individuals who were entitled to be buried with sealed goods. Examining the area of seal versus impression containing tomb substructures from Egypt and Nubia (see Figures A.15–A.18) dated from Naqada II to Dynasty 6 (see Figure 7.1) demonstrates that there was a consistent size difference between the average seal-containing tomb and the average seal impression-containing tomb.

Many exceptionally large elite and royal burials were found to contain seal impressions, while seal-containing burials were generally not ascribable to individuals of the high elite (see Section 3.3.7). Consequently, evidence shows that seals were not considered high elite grave goods (*contra* Regulski 2010a, 40; 2011, 24). By contrast, seal-impressed goods were perceived as an elite funerary item.

Based on evidence from Naqada II to Dynasty 6 (circa 3600–2153 BCE (Hendrickx 2006, 92; Hornung *et al.* 2006, 491–492)) examined here, seals were rarely deposited

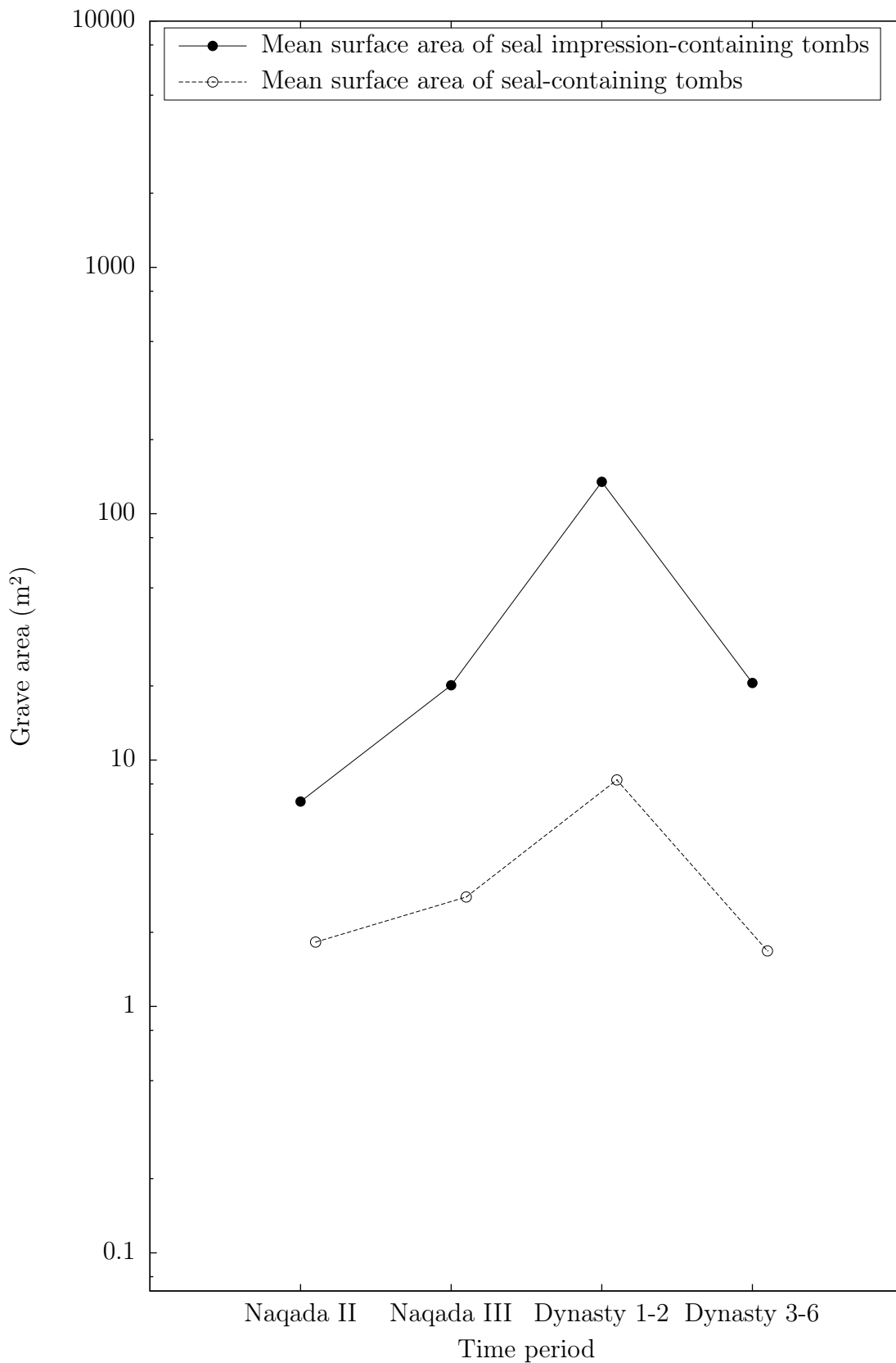


Figure 7.1: Average area of tomb substructures found to contain seal impressions, and average area of tomb substructures found to contain seals, from Naqada II to Dynasty 6. Plotted on a logarithmic scale. Data does not include measurements from subsidiary burials.

in graves as a funerary item. The scarcity of seals in non-elite burials may indicate that seals were a sign of heterarchical status. Evidence from well-preserved and well-recorded burial contexts also indicates that seals found in tombs may have been personal symbols of local prestige. By contrast, most sealed artefacts in graves appear to have been controlled by a pharaonic administrative division or divisions that employed seals frequently carved with royal names and the names of high officials (see Section 3.3.5). Workers involved in producing these sealed objects may not have been literate, but grave goods sealed with royal and elite inscriptions apparently held a significant value to high-ranking individuals. Thus, the gulf between producers and consumers may already have been formed with regard to the creation and use of sealed funerary goods in Egypt.

Morris (2007b, 187–188) has theorized that the lack of inscriptions naming the Saqqara mastaba owners versus the surfeit of seal impressions inscribed with the names of officials responsible for sealed mortuary goods was a deliberate means of erasing the identity of the high-ranking tomb owners to deprive them of their authority. However, elites were possibly also complicit in the creation and maintenance of the elite sealed goods distribution system (Garcia 2013, 3). For them, the presence of prestigious sealed artefacts bearing royal insignia in their tombs may have been a means of visibly displaying their status.

Subsets of the data examined also provided more detailed information about certain aspects of burial practice in early Egypt. Abydos Cemetery U is generally considered to have developed into an elite cemetery during Naqada III (Dreyer 1998; Hartung 2001). Such a trend can be seen when examining grave sizes at the site from Naqada I onward. A general increase in grave size over time could be seen in available data on the size of graves in Abydos Cemetery U (see Section 3.3.2), as was the case in the previously examined non-elite Egyptian cemeteries of Armant (Bard 1988, 51) and Nag el-Deir 7000 (Delrue 2001, 43). However, further analyses on the U cemetery data showed that larger grave sizes grew at an increasing rate over time from the Naqada I to the Naqada III period (circa 4000–3150 BCE (Hendrickx 2006, 92)). Thus, the development of elite burial practices in this cemetery just prior to the emergence of pharaonic kingship was traced via grave area data.

By studying data from intact or relatively well-preserved burials, it became clear that customs governing the placement of seals in tombs varied from one locality to another, and also varied over time from Naqada II to Dynasty 6.

Seals placed in Dynasty 1–2 sacrificial subsidiary burials were generally found to be made of wood (see Section 2.3.7). Given evidence for the possible use of wooden seals to create high-status seal impressions, it seems likely that such wooden seals were considered prestigious, contrary to assumptions about the unprestigious nature of wooden items in later Egyptian burials (Richards 2005, 110, 111). Wooden seals

may have been specially granted indicators of post-mortem status for the sacrificed individuals.

Seal impressed sealings found in sacrificial subsidiary burials displayed evidence for other depositional patterns. Intact burials gave evidence for the deposition of a single jar sealing. In some cases, the sealing was still attached to a jar, and in others, the sealing was deposited without the jar (see Section 3.3.6). All 17 well-recorded subsidiary burials with impressions contained one sealing per tomb. Many elite tombs were found to contain larger quantities of seal impressed sealings. Thus, seal impressions placed in subsidiary burials may again have been special allotments. The number of sealings that could be deposited in such a burial was apparently deliberately limited to one. This was possibly done to emphasize that the tomb occupant was special, but still of inferior rank in comparison to the elite grave occupant for whom the subsidiary individual had been sacrificed. This elite grave occupant was usually buried with many more seal impressions.

Graphing and comparing the area of tombs from three sacrificial subsidiary cemeteries also provided evidence that the size of these tombs was standardized (see Section 3.3.3.2). Both the Aha subsidiary burials surrounding the royal tomb of Aha at Abydos and the subsidiary graves surrounding the royal mortuary temple of the ruler Djer at Abydos exhibited a similar size distribution. Most of the small tomb areas clustered around a single peak, with a ‘long tail’ of larger burial areas (see Figure A.32 and A.33). By contrast, the subsidiary graves of Den at Saqqara seemed to mimic the size distribution of graves at ‘normal’ cemeteries that were presumably created in a more random fashion. Thus, the Saqqara subsidiary cemetery of Den may have been deliberately created as a simulacrum of a normal Egyptian cemetery whose inhabitants would accompany the ruler in death. Artefact distribution and grave arrangement trends in the Den Saqqara cemetery have been previously investigated (see Kaiser (1985) and Morris (2007a)). However, the examination of grave area trends in this thesis demonstrates that the sizes of different burials in the cemetery were probably also deliberately planned.

In the process of investigating seal impressions from Elephantine in Egypt, it was also noted that seal images on seal impressions and seals found discarded in the settlement bore the hieroglyphic legends *rnw.tj* and *nfr m3' jz.t*. These legends are also attested on seal impressions elsewhere in Egypt (see Section 4.4.4), and were found in royal mortuary contexts at Abydos. Thus, individuals bearing these seals may have been responsible for supplying sealed mortuary goods to burials. The impressions found at Abydos were made on Nile clay, and were therefore of potentially lower quality than sealings created out of potter’s clay for mortuary contexts. Thus, at least some individuals bearing seals with the legends *rnw.tj* and *nfr m3' jz.t* were apparently associated with a ‘second tier’ of sealed funerary good providers. Consequently, artefacts from Elephantine and elsewhere in Egypt provide

evidence for a lower tier of administration that was linked to pharaonic administrative systems responsible for mortuary goods. The affiliation of *rnw.tj* and *nfr m3' jz.t* seals with pharaonic administration has been posited previously (Regulski 2011). However, the link between 'middle-class' seal-wielders evidenced in settlements and pharaonic mortuary goods was not established prior to this study.

When comparing sealings from a 4th millennium settlement in southwestern Asia to an Egyptian settlement of roughly the same era, the quantity of seal images found on sealings in both settlements was almost equivalent (200 in Chogha Mish, 150 at Elephantine, see Section 4.5). The same was found to be true when examining 3rd millennium settlements from both regions (43 in Tell Brak and 65 at Balat, see Section 5.5). Findings from the two southwestern Asian sites tend to indicate that hierarchies of 'sealers' who were entitled to seal certain objects existed. However, seals employed by these individuals frequently bore imagery interpreted as non-prestigious by archaeologists, indicating that seal image types apparently did not serve to mark the seal wielder's rank. Hierarchies of sealers could be discerned at the two Egyptian sites, but these individuals did not wield seals carved with elite pharaonic imagery, indicating a similar principle may have been in effect in Egypt. Assuming that a given seal was only used by one individual, the number of seal wielders per settlement was relatively low. Thus, people entitled to seal objects in a settlement may functionally have formed part of a 'middle class' during this period.

Finally, analysing countersealing practices employing cylinder seals in the Uruk culture of southwestern Asia and in early Egypt (see Chapter 6) showed that both cultures employed countersealing practices in a regulated manner, but for different purposes. In settlements of the Uruk culture, multiple seals were used on clay bullae, balls and tablets. A shared Urukian administrative culture may have facilitated trade between settlements that employed variants of this system. Comparison of the Uruk period administrative practices with tablet-based administration employed in the later Ur III period seems to indicate the balls, bullae, and tablets may have constituted sale records, receipts, and disbursement records.

By contrast, most evidence for countersealing in Egypt comes from mortuary settings, where it was used on sealed goods placed in high elite burials, possibly as a means of displaying the prestige of goods. Pharaonic officials may have been responsible for commissioning the creation of sealed mortuary goods, and organizing the transportation of these items to burial sites. The clay sealings employed on funerary goods may also have been designed to be large and imposing for display purposes in many cases.

Seals and seal impressions examined here provide clear evidence for the existence of complex administrative bodies in both regions in the 4th to 3rd millennium BCE that regulated and controlled commerce in southwestern Asia and elite display in Egypt. Evidence for ordinary individuals affiliated with such administrative systems

can also be traced. These individuals may have belonged to a ‘middle class’. Thus, complex administration was already well developed in the period when complex stratified societies first emerged in both regions.

7.5 Summary of comparative approach

Comparative studies of ancient cultures tend towards systematic or intensive approaches (Smith 2012, 7). The present study employs an intensive approach comparing two proximate regions as opposed to previous systematic, but more superficial, studies of world cultures (Childe 1929; Frankfort 1951; Trigger 2003; Peregrine 2001, 2004; Yoffee 2005). The scale of this study is mid-range, since it examines sealing practices that are contextualized within the cultures employing the seals (Smith 2012, 12). The use of cylinder seals in both cultures at around the same period in the 4th to 3rd millennium BCE facilitates comparisons. This thesis analyses seal and seal impression find locations at sites not previously intensively examined in this fashion. Comparisons between sealing practices in southwestern Asia and Egypt are principally employed to question previous theories and establish new hypotheses regarding seal use in both regions (Smith 2012, 10–14). In doing so, cultural attitudes and approaches to administration in both regions are revealed, providing indications of the early evolution of administrative processes in southwestern Asia and Egypt.

One of the principal differences between southwestern Asian and Egyptian seal-based administration was likely the use of sealed clay recording devices (tablets, balls, bullae). Comparing the cultural contexts in which seals were embedded in both cultures shows that the evolution of administrative technologies in both regions may have caused this difference to emerge (see Section 7.3).

By examining the incidence of the complex practice of countersealing with cylinder seals in both regions during the 4th–3rd millennium BCE (see Chapter 6), it was shown that this practice seems to have been implemented for different purposes. In southwestern Asia, it was used for sealing tablets and clay balls recording transactions, and in Egypt, it was used for sealing prestigious mortuary goods.

Finally, evidence from the southwestern Asian sites of Chogha Mish and Tell Brak showed that high-ranking administrators frequently appear to have used seals with relatively ‘non-prestigious’ carved imagery. Evidence for officials at the Egyptian site of Giza that continued to use the first seal made for them well into their careers, may indicate that this was also the case for officials at these southwestern Asian sites (see Section 7.2).

By comparing how the technology of the cylinder seal was employed in southwestern Asia and Egypt in the 4th to 3rd millennium BCE, this thesis reveals evidence for both different cultural attitudes and approaches to administration at a time when complex society was developing in these regions. This study has examined the early

development of two distinct, proximate, complex societies from a new perspective, and uncovered evidence for complex administrative systems and cultural practices associated with administration.

Chapter 8

Conclusion

Distinct stratified complex societies developed in the proximate regions of southwestern Asia and Egypt during the 4th to 3rd millennium BCE. These two areas may have contained the earliest civilizations to employ the same administrative tool, the cylinder seal, during the period of their concurrent development. Analysing the use of this technology held in common between the two regions enables a direct comparison of the developmental trajectories of both societies. This thesis shows how both regions **developed different administrative techniques to suit their purposes**⁵⁶. Cultural practices associated with seals are also elucidated. Though both southwestern Asia and Egypt used cylinder seals for administration, seal usage appears to have varied according to the administrative priorities of each culture. Comparing how both regions implemented technology or ideas provides new insight into cultural differences.

Clay sealed recording devices that could also be inscribed with numbers, letters, and other signs developed in southwestern Asia, but not Egypt, possibly due to different cultural perceptions of the use of the seal in these regions. By contrast, container and door sealings were employed in both regions. Particular seal-users may have engaged in sealing activities more frequently in southwestern Asian and Egyptian settlements. The imagery on the seals employed by such individuals in southwestern Asia may not have been directly indicative of the status of these individuals. By contrast, Elephantine in Egypt provides evidence that individuals with similar hieroglyphic inscriptions on their seals may have been part of a particular administrative division.

Analysing seal-based administration in the early complex societies of southwestern Asia and Egypt demonstrates that written administrative records were used in both regions, but literacy may not have been required of sealers in either region. Seals were often uninscribed. Even when inscriptions were present on seals, they frequently existed in conjunction with images. Seals inscribed with hieroglyphs can also be

⁵⁶Bolded sections of the text indicate how this thesis answers the research questions posed in Section 1.7.

considered pictorial due to the visual nature of the script. Consequently, administrative activities involving seals may not have been supervised by literate administrators in many cases. The use of seals in administrative capacities that did not require literacy has already been surmised from the unpublished 3rd millennium administrative palace sealings at Balat in Egypt, and later 2nd millennium material from Egyptian sites as well as in the Aegean (Pantalacci 2013, 40; Smith 2001, 192–193; Palaima 2003, 174). The present thesis provides evidence that such systems also existed in the earlier 4th and 3rd millennium in Egypt and southwestern Asia.

Seal use was apparently also integrated into society in a variety of ways. Pictorial and inscribed seals were used as non-elite grave goods in Egyptian burials, indicating that seals may not have been culturally perceived as an elite object. Seals bearing elite or royal motifs and writing, however, were apparently not deposited in tombs. Consequently, seal-based administration affiliated with the pharaonic elite may have been subject to stricter controls, and seals carved with royal motifs may have been disposed of at the end of their use life. The small number of seals found in tombs under examination here may also indicate that seals were special indicators of heterarchical post-mortem status that were accorded to select individuals. At times, the find context of these seals provides further evidence that the deceased may have been highly regarded by the local community.

Evidence from Chogha Mish seems to indicate that sealing activities at the 4th millennium BCE southwestern Asian settlement were restricted to certain areas and not under the control of a temple. In the later 3rd millennium settlement of Tell Brak in the same region, only sealings of particular types were chosen to be placed in a ritual deposit outside a temple, indicating that certain types of sealing activities may have been considered more important and worthy of highlighting in the deposit. At the 4th and early 3rd millennium settlement of Elephantine in Egypt, sealings with similar inscriptions provide evidence for individuals that may have belonged to the same administrative ‘units’. A grave from Nag el-Deir in Egypt was found to contain these types of seals, possibly indicating that the tomb owner was a higher-ranking individual entitled to delegate seals to individual users. The restricted deposition of sealings featuring royal titulary at Balat provides evidence that individuals employing such seals in this 3rd millennium settlement may have been of higher rank. Seal users employing seals with pictographic motifs or non-royal inscriptions may have been of lower rank, but further investigations are required to determine if evidence exists to support this hypothesis in other areas of Balat and at other sites.

Varying levels of administrative organization employed in different contexts could be discerned in both regions. However, only a few specific types of administrative systems involving seals may have been controlled to some degree by elites in both regions. In southwestern Asia, the development

of the cylinder seal, as opposed to the earlier stamp seal, apparently occurred in tandem with the development of clay recording devices in the Uruk culture. The use of the complex practice of countersealing on such administrative devices in the 4th millennium shows that an elaborate system employing cylinder seals on recording devices was developed, which may have presaged later standards in cuneiform document formatting. Parallels between Uruk documents with later sealed tablets and tablet envelopes may indicate that the earlier bullae, balls, and tablets were also employed as records of transactions. Uruk-style administration appears to have been culturally shared, and not hegemonically imposed.

At both Chogha Mish and Tell Brak, the seals that were found to seal both doors and clay records (balls, bullae) or doors and other objects frequently did not bear motifs that were explicitly elite. Thus, evidence from these two sites indicates that individuals who may have held a higher administrative status often did not employ seals with motifs that designated their rank.

In Egypt, the cylinder seal was imported during the period when emergent elite social groups were forming. Sealed goods were apparently quickly adopted as elite grave items, possibly due to the capacity of the cylinder seal to replicate elite imagery that confirmed the status of the deceased. The use of countersealing on such devices provides evidence for pharaonic administrators that controlled the production of these grave goods from the late 4th millennium onward. The subsequent phasing out of countersealing in grave goods during the 3rd millennium could be a result of changes in the pharaonic administrative systems controlling the creation of sealed grave goods.

Both regions developed distinct types of seal-based administration that were subject to various degrees of hierarchic control and supervision. Initially, the trajectory of these administrative systems may have depended on the circumstances under which the cylinder seal first came into use in each region. As time progressed, sealing systems continued to evolve according to circumstances in southwestern Asia and Egypt. Thus, an apparently monolithic practice such as sealing can provide significant evidence for different cultural practices and the possible circumstances that led to their development. Different levels of administration can also be distinguished, from lower level individuals responsible for container sealing to elite organizations exerting control over the creation of records and the distribution of prestige goods. Thus, evidence for social stratification in early Egypt and southwestern Asia can also be detected through the examination of sealing practices.

8.1 Future directions for investigation

The wide scope of the present analysis has uncovered numerous research issues that should be addressed in future investigations. Use patterns of seals in various

settings remains an underinvestigated field, particularly with regard to early seal images displaying anepigraphic patterns. Current and future investigations of newly uncovered archaeological data and archival material should methodically examine such use patterns. Depositional practices for seals and impressions in burials should also be further scrutinized, since these provide evidence for local cultural practices.

Analyses of the clay used for sealings in both southwestern Asia and Egypt should be undertaken wherever possible in an attempt to determine whether sealed clay sealings and sealed clay recording devices found in settlements were created within the settlement or brought there from other locations by traders or officials. This would help to discern how frequently sealing activities occurred within a single settlement as well as provide evidence for trade patterns.

Initial research for this thesis revealed that microscopic analyses of Egyptian seals have yet to be undertaken. Examining seals found in tombs in this manner could help to determine whether seals were used prior to deposition in burials. Further experimental work is also necessary to differentiate between wear on seals caused by rolling the seal in clay, and wear caused when the seal was worn as an ornament and rubbed against the clothes or skin of the owner. This would help to reveal whether seals in burials were used or were simply decorative accessories.

While assembling materials for this study, it was also noted that the 4th to 3rd millennium Egyptian seals found in graves and funerary seal impressions are studied relatively frequently. By contrast, later seals and seal impressions from tombs are not often examined. Future studies should also chart the use of sealed grave goods and seals in tombs after the Old Kingdom in Egypt to determine how mortuary practices related to these artefacts evolved over time.

Administrative seals with royal motifs are not found in Egyptian tombs, indicating they may have been specially disposed of. The non-funerary find contexts of seals with royal motifs from the 4th to 3rd millennium should therefore be examined to determine whether such seals were deliberately disposed of in certain locations.

The case studies of seal impression deposition patterns in settlements performed in this thesis provide an approach for future studies comparing seal impression discard patterns at other settlements in both regions. Future investigations should focus on determining whether patterns detected in the case studies of southwestern Asian sites and Egyptian sites can also be seen at other locations. Additional investigation is required to determine whether high-ranking southwestern Asian cylinder seal users entitled to seal doors, clay administrative records (tablets, balls, bullae), and other objects frequently employed cylinder seals that did not bear prestigious motifs at other sites. Analysing inscriptions and seal imagery to determine whether administrative groups can be detected within settlements at Egyptian sites should also prove a fruitful line of investigation given the initial results of such examinations in this thesis.

Investigations of seals used in administrative contexts that did not require literacy (i.e. door sealing) in later 3rd and 2nd millennium BCE southwestern Asian contexts should also be undertaken. Some preliminary studies have examined the use of anepigraphic seals on doors and containers, but the implications for their possible use by non-literate individuals do not appear to have been considered (Matthews 1991; Charvát 2005).

Due to a lack of published evidence, seal use and seal-based administration at Egyptian site layers exclusively dated to the 4th millennium could not be investigated. In future, the earliest evidence for sealing in Egyptian settlements should be scrutinized to determine whether sealing practices developed similarly to early southwestern Asian practices.

Levantine seals and seal impressions could not be examined here due to the scope of the investigation. Additionally, seals and impressions from this region tend to be found in settlements (Parker 1949; Beck 1976; Ben-Tor 1978; Beck 1984; Lapp 1989; Braun 1993; Ben-Tor 1994; Joffe 2001; Braun 2004; Ortner and Frohlich 2008). Early seal and seal-impressed artefacts from Egyptian settlements that could be compared to this material are insufficiently published to date. Once more Egyptian material is published, studies should examine if Levantine seal motifs influenced seal carvings found in Egyptian and southwestern Asian settlements. Seal impressions on clay with motifs that appear to be Levantine in style from both regions should also be analysed to determine whether these sealings originated from the Levant and can therefore be associated with trade goods.

Further scrutiny of southwestern Asian countersealed clay balls would help to determine whether stamp seals were only used on the ‘polar’ surfaces of the balls. Wherever possible, the order in which seals were impressed on balls should also be analysed to establish whether a standard sealing practice was normally applied (i.e. equatorial seal impressed first, then polar seals, or vice versa).

Recently, it has been noted that Egyptian seal impressions on a door sealing from a settlement context were rather ‘messy’ and difficult to decipher, leading Bussmann (2014b, 31) to the conclusion that witnesses to the sealing process were more important than the legibility of the sealing. It can also be posited that the act of sealing was more important than the legibility of the sealing, and that an approximately identifiable sealing would have sufficed for administrative purposes in this case. By contrast, the seal impressions on mortuary sealings from elite contexts tend to be more cleanly rolled and legible when found in a well-preserved condition (see, for example, Figure A.113). In future, a study should examine whether such prestigious mortuary sealings were more deliberately and carefully sealed in comparison to settlement sealings. If such a practice can be attested, it is possible that mortuary sealings were sealed with greater care to ensure the visibility of the pharaonic ‘brand’ on their surfaces.

Less commonly attested evidence for countersealing on objects such as door sealings from both regions should be examined in future to determine how countersealing was employed on objects other than records and grave goods in both regions, and whether such practices persisted into the 3rd millennium.

Finally, comparing the sealings from the earlier settlement of Elephantine to those from Balat shows that the Elephantine sealings always bore hieroglyphs, while most of the Balat seal images were purely anepigraphic images. The presence of hieroglyphs on the Early Dynastic Elephantine seal images may be due to local imitation of the newly invented elite practice of writing. However, this trend may have fallen out of fashion by the time of the Old Kingdom, as evidenced by the predominantly pictorial seal images from Balat. Future studies should also investigate whether this is a general trend that can be traced in other Egyptian settlements over time.

Appendix A

Tables and figures

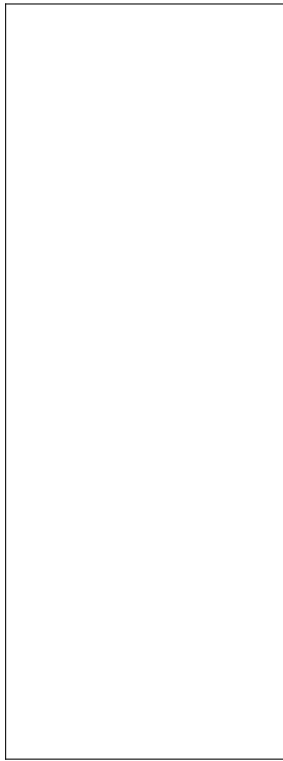


Figure A.1: Tokens found inside sealed clay ball at Hacinebi. From Stein (2002, 170).



Figure A.2: Sealed clay ball found at Hacinebi. From Stein (2002, 170).

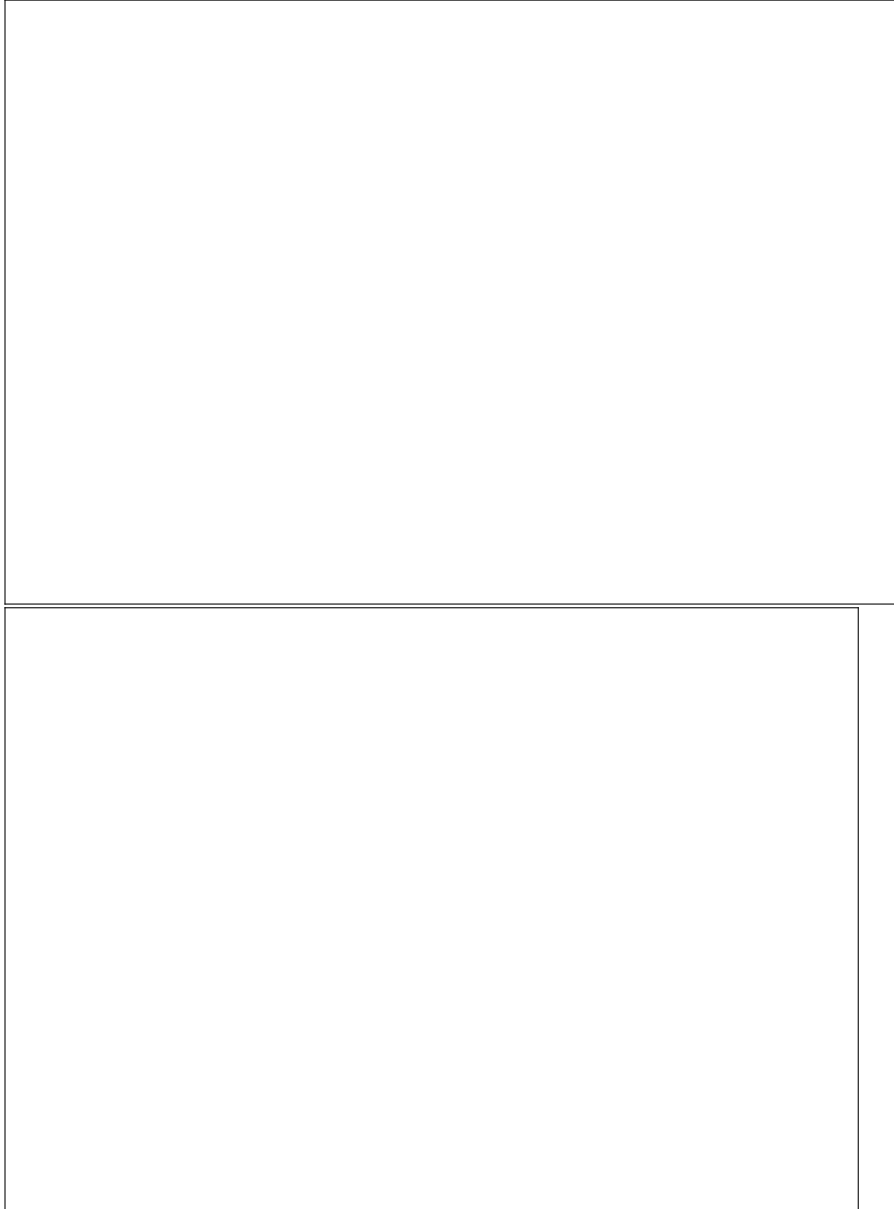


Figure A.3: Sealed clay tablets found at Uruk. Ovoid tablet is inscribed with numbers and letters, while rectangular tablet is inscribed with numbers. From Englund *et al.* (2001, Tafel 96–97).

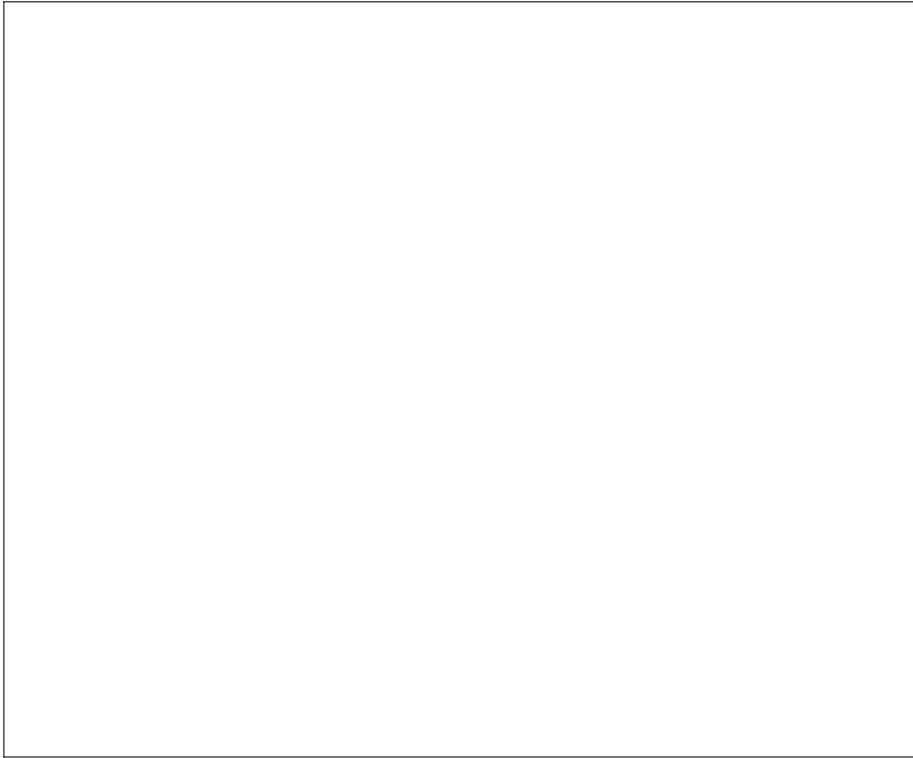


Figure A.4: An example of a **royal grave substructure**, at Abydos. This type of grave is dated to Dynasty 1–2. Example image of Abydos tomb of Qa'a from Dreyer *et al.* (1996, Tafel 10a).



Figure A.5: An example of a **large mudbrick mastaba with stairways**, at Beit Khallaf. This type of grave is dated to Dynasty 1–3. Example image of Beit Khallaf mastaba K5 from Reisner (1936, Fig. 80).

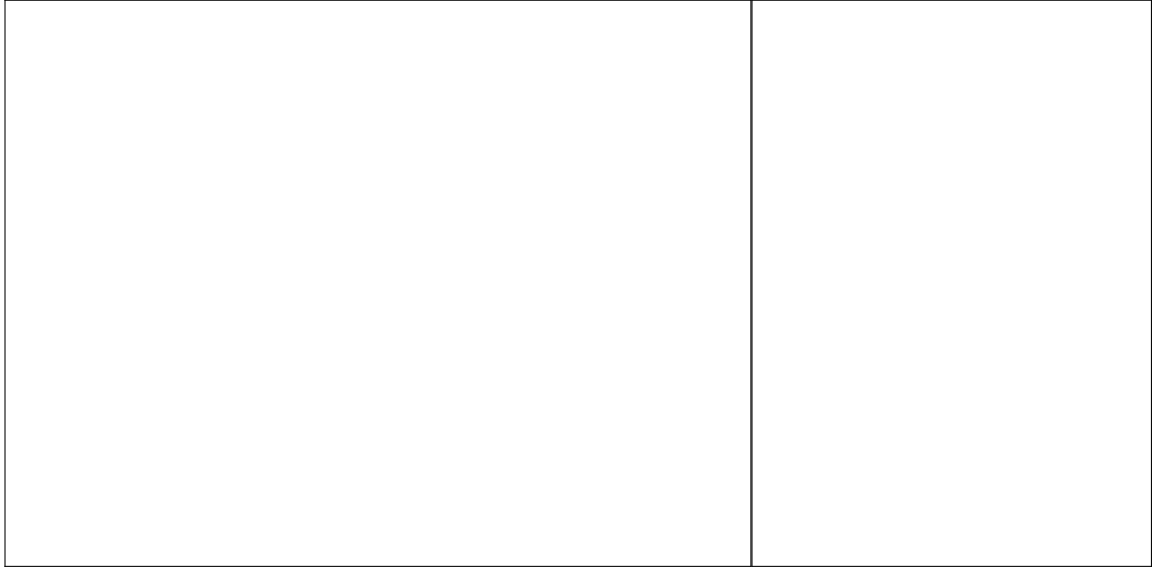


Figure A.6: An example of a **subsidiary burial that has no superstructure**. This type of grave is dated to Dynasty 1–2. Example images of the east face of the Abydos Djet valley enclosure tombs, facing south, and subsidiary tomb 329 from Petrie (1925, Plate I.4, XIII).

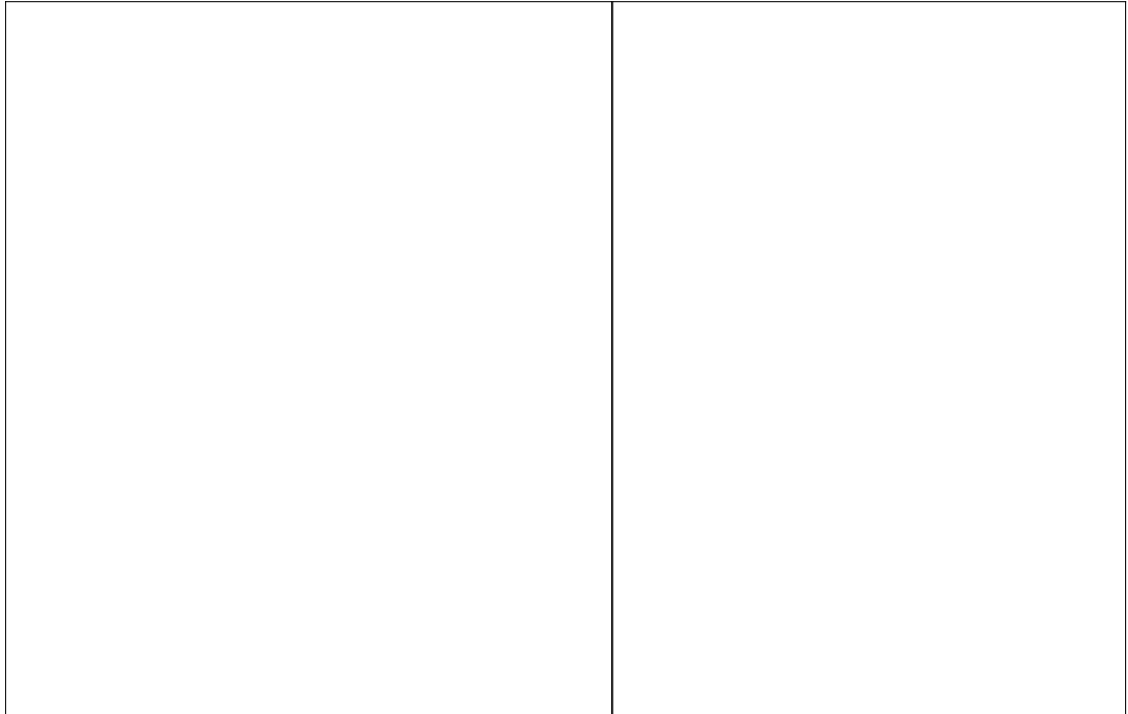


Figure A.7: An example of a **subsidiary burial with a superstructure**. This type of grave is dated to Dynasty 1–2. Example images of the row of subsidiary graves along the south face of mastaba 3500 at Saqqara, and grave 2 from the row of subsidiary graves Emery (1958, Plate 120c, 121c).



Figure A.8: Examples of **small mudbrick substructures**, with or without stairway or mastaba superstructure, at Nag el-Deir cemetery 1500. This type of grave is dated to Dynasty 1–2. Example image of Beit Khallaf graves N1584, N1514, N1506 from Reisner (1936, Fig. 128).

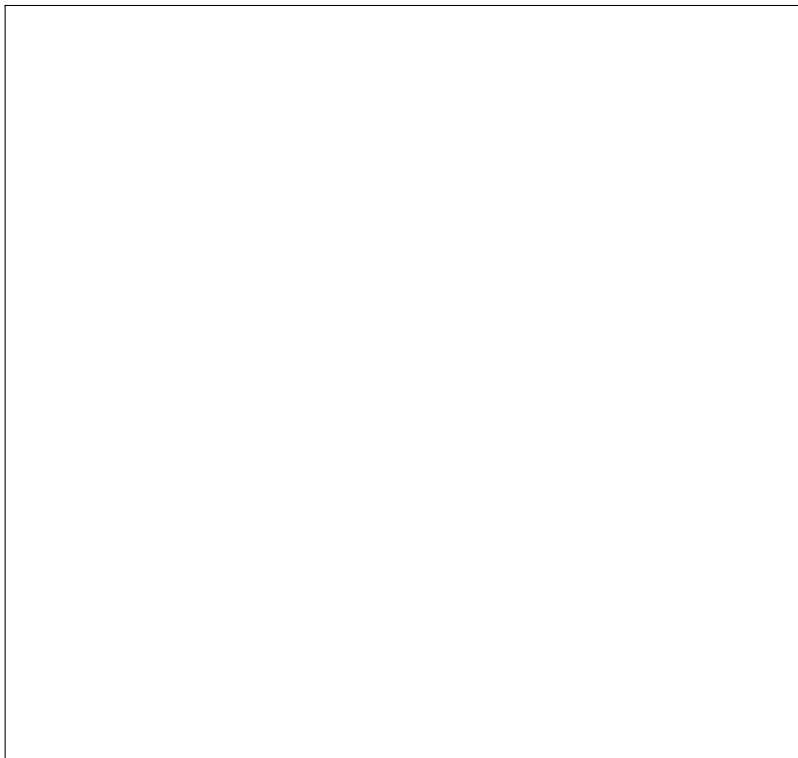


Figure A.9: Example of **shaft grave** at Nag el-Deir Cemetery 500. This type of grave is dated to Dynasty 4–6. Example image of Nag el-Deir grave N731 from Reisner (1932, Figure 271).

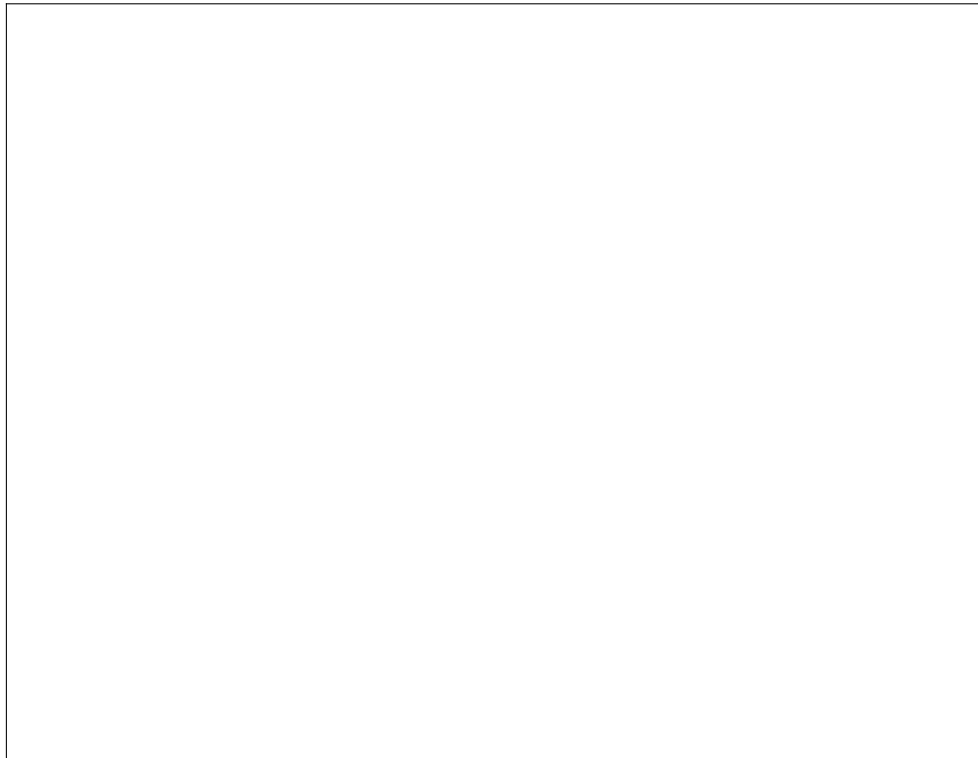


Figure A.10: An example of a **simple pit grave**, showing the mat that was sometimes used to cover the inhumation. This type of grave is dated to Naqada II–III. Example image of Mesaid grave 612 from Reisner (1936, Fig. 182).

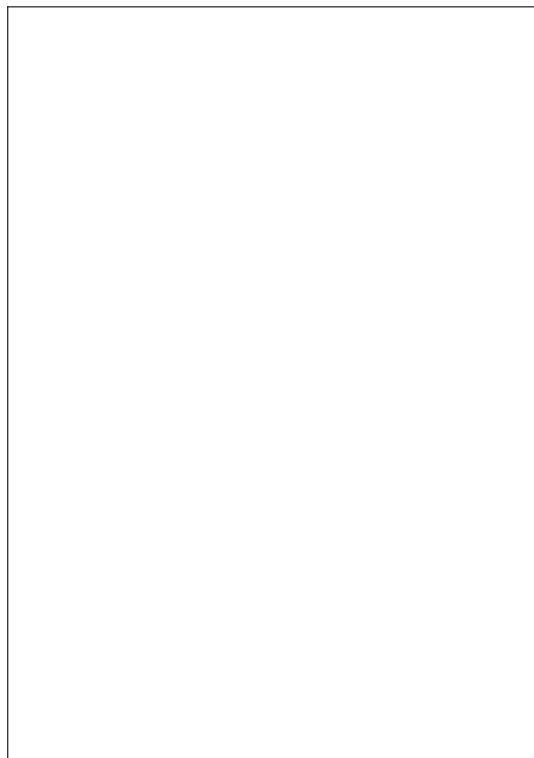


Figure A.11: An example of a **mud brick-lined grave**. This type of grave is dated to Naqada III–Dynasty 1–2. Example image of Abydos tomb U-v from Dreyer *et al.* (1990, Tafel 18c).

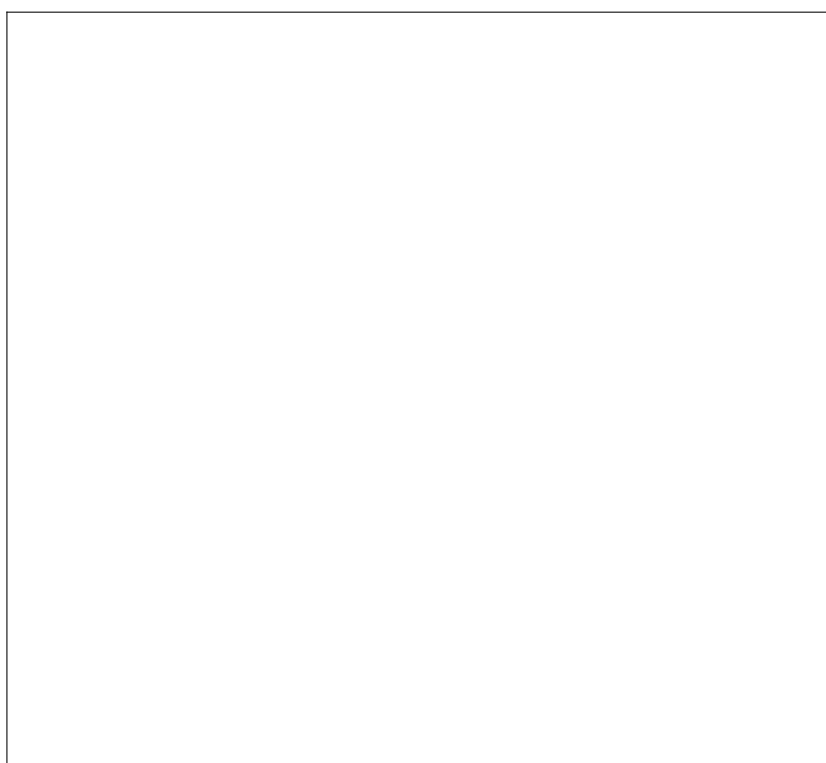


Figure A.12: Example of **jar burial** at Elkab. This type of grave is dated to Dynasty 4–6. Example image of Elkab grave 166 from Quibell (1898, Plate I).

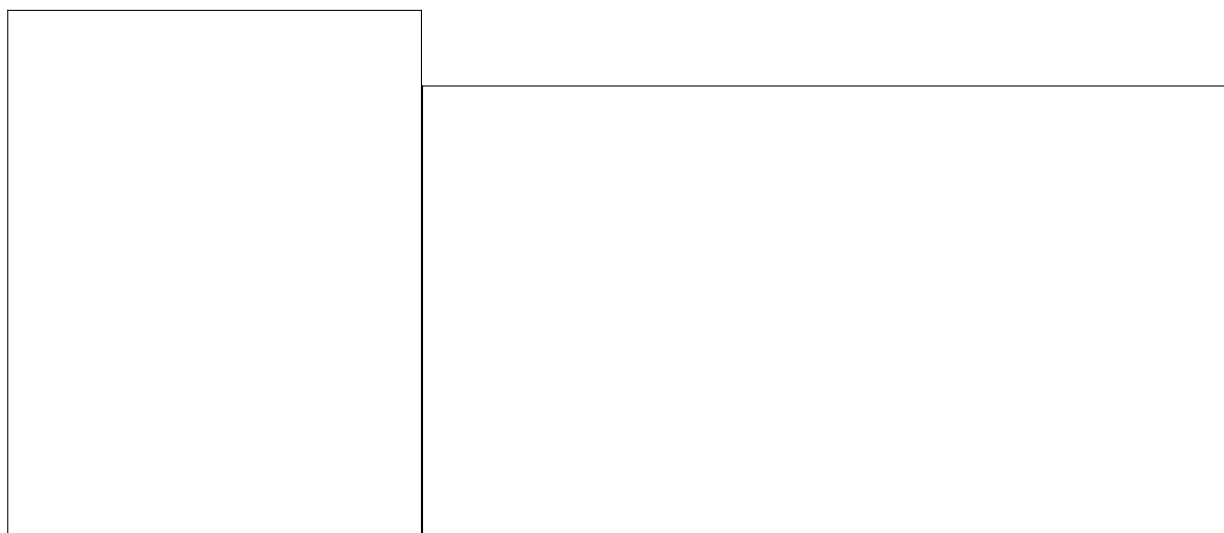


Figure A.13: Example of **Old Kingdom mastaba substructures** at Giza. This type of grave is dated to Dynasty 4–6. Example images of Giza G2130 shaft A and G2381 shaft A from Reisner (1942, Fig. 19, 27).

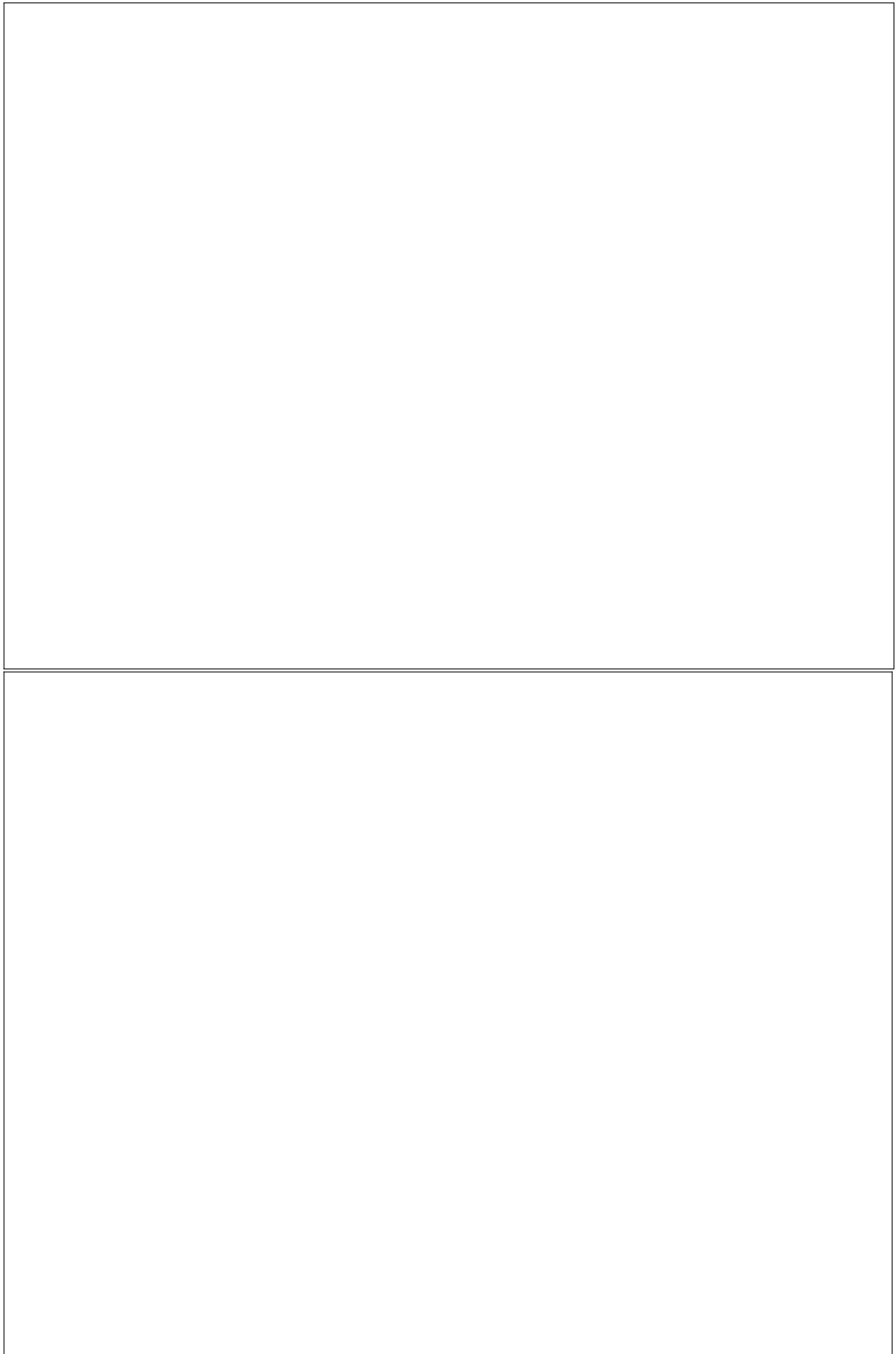


Figure A.14: Example of **Old Kingdom mastaba superstructures** at Giza. This type of grave is dated to Dynasty 4–6. Example images of Giza Western Cemetery and east-facing view of Giza Cemetery G 1200 shaft A and G2381 shaft A from Reisner (1942, Plate 8b, 10b).

Table A.1: Cemeteries with tombs found to contain seals. Cemeteries with seal-containing tombs of unrecorded dimensions were not included. Tombs with unrecorded dimensions within cemeteries, and animal graves were also excluded from the total burial count. Grey highlighting indicates the totality of tomb area data (m²) was analysed in Figures A.19–A.39 and Table A.6. White highlighting indicates only the areas of seal-containing tombs from these cemeteries were included in the analysis in Figures A.47–A.49 and Table A.7.

Cemetery name	Graves dated to	Total no. of burials	No. of burials containing seals	Seal-containing graves dated to	Sources for numbers/dates
Nag el-Deir 7000	Naqada IIA–IID2	590	2	Naqada II	Friedman 1981, Appendix III
Matmar cemetery 3000-3200	Naqada IB–IID2	74	1	Naqada II	Hendrickx and van den Brink 2002, 353
Deir el-Ballas, Lythgoe cemetery	Naqada IIC–IID	ca. 250	1	Naqada II	Hendrickx and van den Brink 2002, 360
Haraga cemetery H	Naqada IIC–IID2	26	1	Naqada II	Hendrickx and van den Brink 2002, 352
Faras	A-Group (circa Naqada III)	88	2	A-Group	Griffith Institute (2016)

Table A.1: Cemeteries with tombs found to contain seals - (continued)

Cemetery name	Graves dated to	Total no. of burials	No. of burials containing seals	Seal-containing graves dated to	Sources for numbers/dates
Gezira Dabarosa, Cemetery 6-G-18	Terminal A-Group (circa Naqada IIIB–IIIC)	20	1	A-Group (Naqada IIIB)	Nordström 2014, 39, 48
Qustul, Cemetery L	A-Group (circa Naqada III)	33	1	Naqada III	Williams 1986, 164–165; Takamiya 2004, Table 3; Gatto 2006, 67
Qustul, Cemetery W	Middle-Late A-Group (circa Naqada II–III)	34	1	Naqada III	Williams 1989, 14; Gatto 2006, 67
Saras West Cemetery 11-H-6	A-Group (circa Naqada III)	47	1	A-Group	Mills and Nordström 1966, 7; Hill 2004, 58
el Amra, cemetery B	Naqada IA–IIIC	ca. 400	1	Dynasty 1	Hendrickx and van den Brink 2002, 359
Naqada main cemetery	Naqada IA–IIIC1 (Beginning of Dynasty 1)	2000	1	Naqada II	Hendrickx and van den Brink 2002, 360

Table A.1: Cemeteries with tombs found to contain seals - (continued)

Cemetery name	Graves dated to	Total no. of burials	No. of burials containing seals	Seal-containing graves dated to	Sources for numbers/dates
Abu Simbel Cemetery 215	Dynasty 1–2, as well as early C-group	123	1	Dynasty 1–2	Emery and Kirwan 1935, 450, Plate 56
Helwan	Naqada III, Dynasty 1–2 (Naqada IIIC1–D)	10258	2	Naqada III, Dynasty 1–2	Hendrickx and van den Brink 2002, 351
Nag el-Deir 1500	Dynasty 1–2 (Naqada IIIC1–D)	81	5	Dynasty 1–2	Hendrickx and van den Brink 2002, 357
Abydos, Umm el-Qaab, subsidiary tombs of Aha	Dynasty 1 (Naqada IIIC1)	36	3	Dynasty 1	Martin 2011, 15
Abydos, Umm el-Qaab, subsidiary tombs of Djer	Dynasty 1 (Naqada IIIC1)	317	3	Dynasty 1	Martin 2011, 15
Abydos cemetery S, Djer enclosure (subsidiary burials surrounding valley enclosure)	Dynasty 1–2 (Naqada IIIC1)	68	4	Dynasty 1	Petrie 1925, XVI

Table A.1: Cemeteries with tombs found to contain seals - (continued)

Cemetery name	Graves dated to	Total no. of burials	No. of burials containing seals	Seal-containing graves dated to	Sources for numbers/dates
Abusir, Bonnet cemetery	Dynasty 1–2 (Naqada IIC2–IIID)	66	1	Dynasty 1–2	Hendrickx and van den Brink 2002, 350
Nag el-Deir 3000	Dynasty 2 (Naqada IIID)	33	1	Dynasty 1–2	Reisner 1908
Saqqara mastaba 3500 subsidiary burials	Dynasty 1 (Naqada IIC1–IIID)	4	2	Dynasty 1	Hendrickx and van den Brink 2002, 350
Elkab	Naqada III–Dynasty 5	103	1	Dynasty 5	Quibell 1898, 3
Nag el-Deir 500–900	Dynasty 2–6	217	18	Dynasty 4–6	Reisner 1932, 368
Qaw	Dynasty 4–6	485	19	Dynasty 4–6	Seidlmayer 1990, 135–139, 395
el-Mustagidda	Dynasty 4–6	68	10	Dynasty 4–6	Seidlmayer 1990, 135–139, 395
Matmar	Dynasty 4–6	87	11	Dynasty 4–6	Seidlmayer 1990, 135–139, 395

Table A.1: Cemeteries with tombs found to contain seals - (continued)

Cemetery name	Graves dated to	Total no. of burials	No. of burials containing seals	Seal-containing graves dated to	Sources for numbers/dates
Saqqara, Cemetery M, on the east side of the causeway of Pepi II pyramid going by magnetic north	Dynasty 6	112	2	Dynasty 6	Jéquier 1929
Balat, mastaba of Medou-Nefer, graves found in and around the mastaba complex	Dynasty 6	5	1	Dynasty 6	Valloggia and Henein 1986a,b
Balat, mastaba of Ima-Pepy, graves found in the mastaba complex	Dynasty 6	5	1	Dynasty 6	Minault-Gout <i>et al.</i> 1992
Balat, mastaba of Khentika, graves found in the mastaba complex	Dynasty 6	4	1	Dynasty 6	Castel <i>et al.</i> 2001a,b
Balat, mastaba of Ima-Pepy/Ima-Meryre, graves found in the mastaba complex	Dynasty 6	23	5	Dynasty 6	Valloggia 1998a,b
Balat, graves found outside the mastaba complex of Khentika	Dynasty 6	25	6	Dynasty 6	Castel and Pantalacci 2005

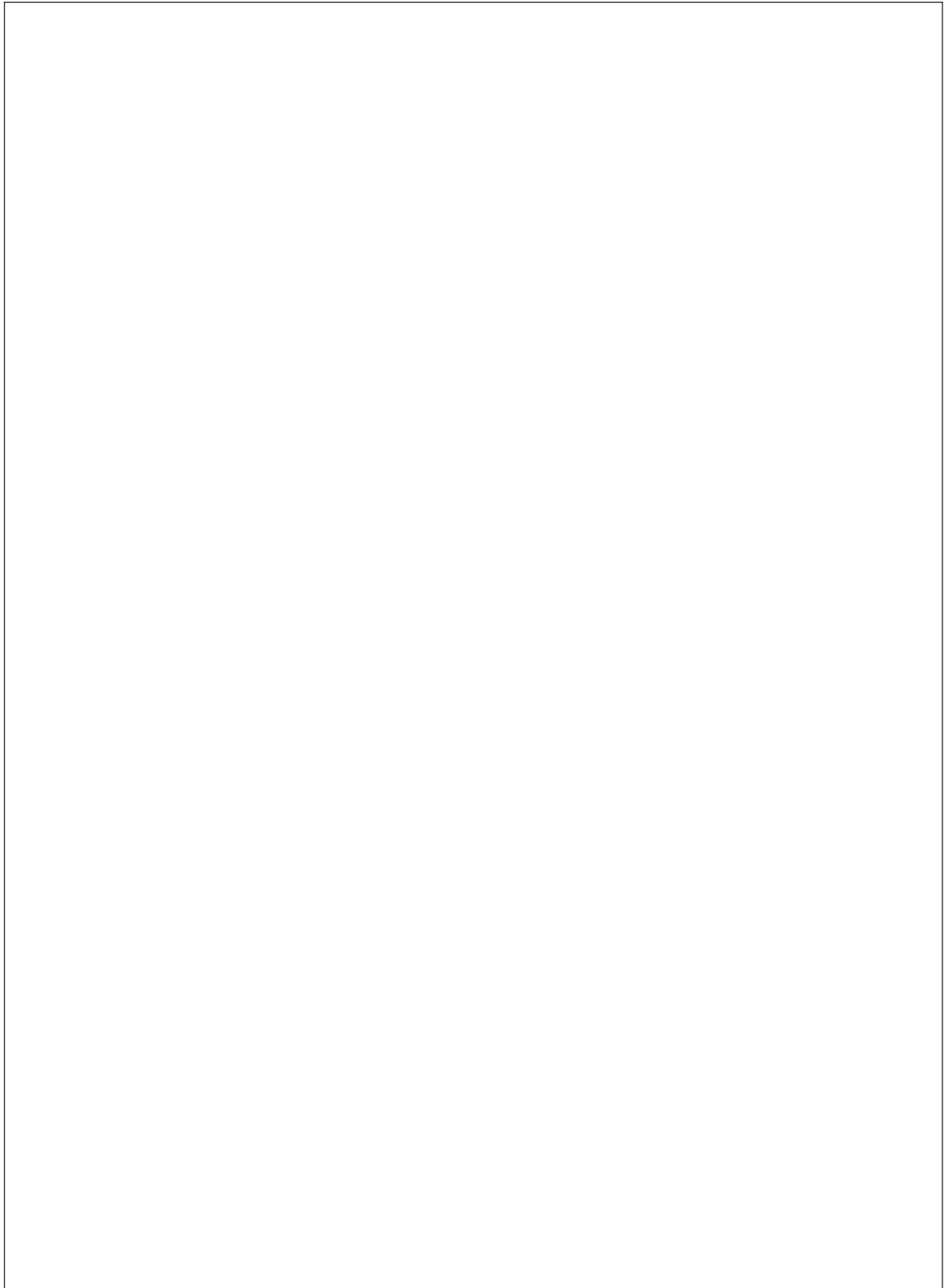


Figure A.15: Lower Egyptian and Middle Egyptian cemetery sites. Middle Egypt is located toward the bottom of the map. The sites found to contain tombs with seals or seal impressions are designated by black rectangles. Modified from Hendrickx and van den Brink (2002, Figure 23.2).

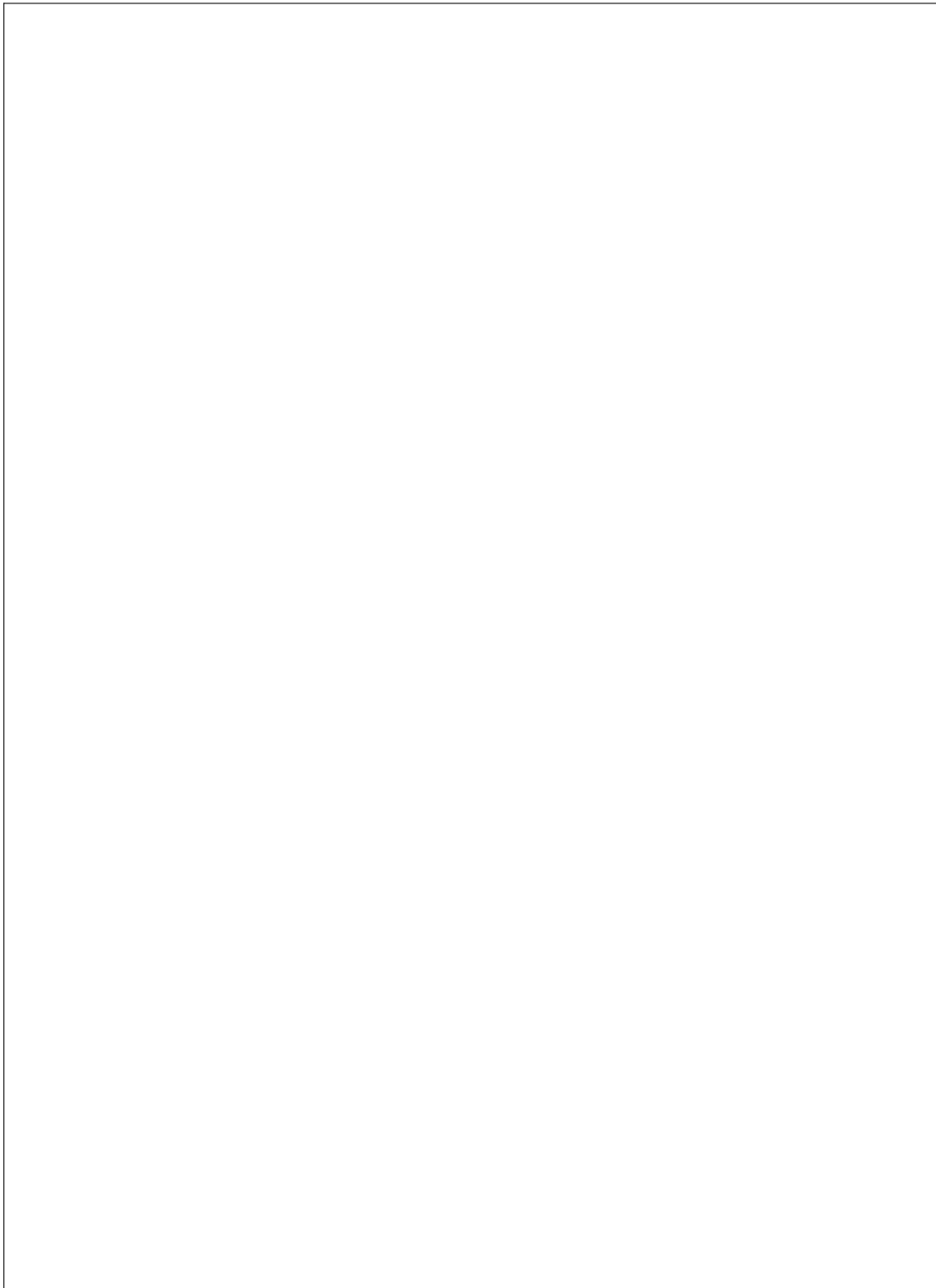


Figure A.16: Middle Egyptian cemetery sites. The sites found to contain tombs with seals are designated by black rectangles. Modified from Hendrickx and van den Brink (2002, Figure 23.3).

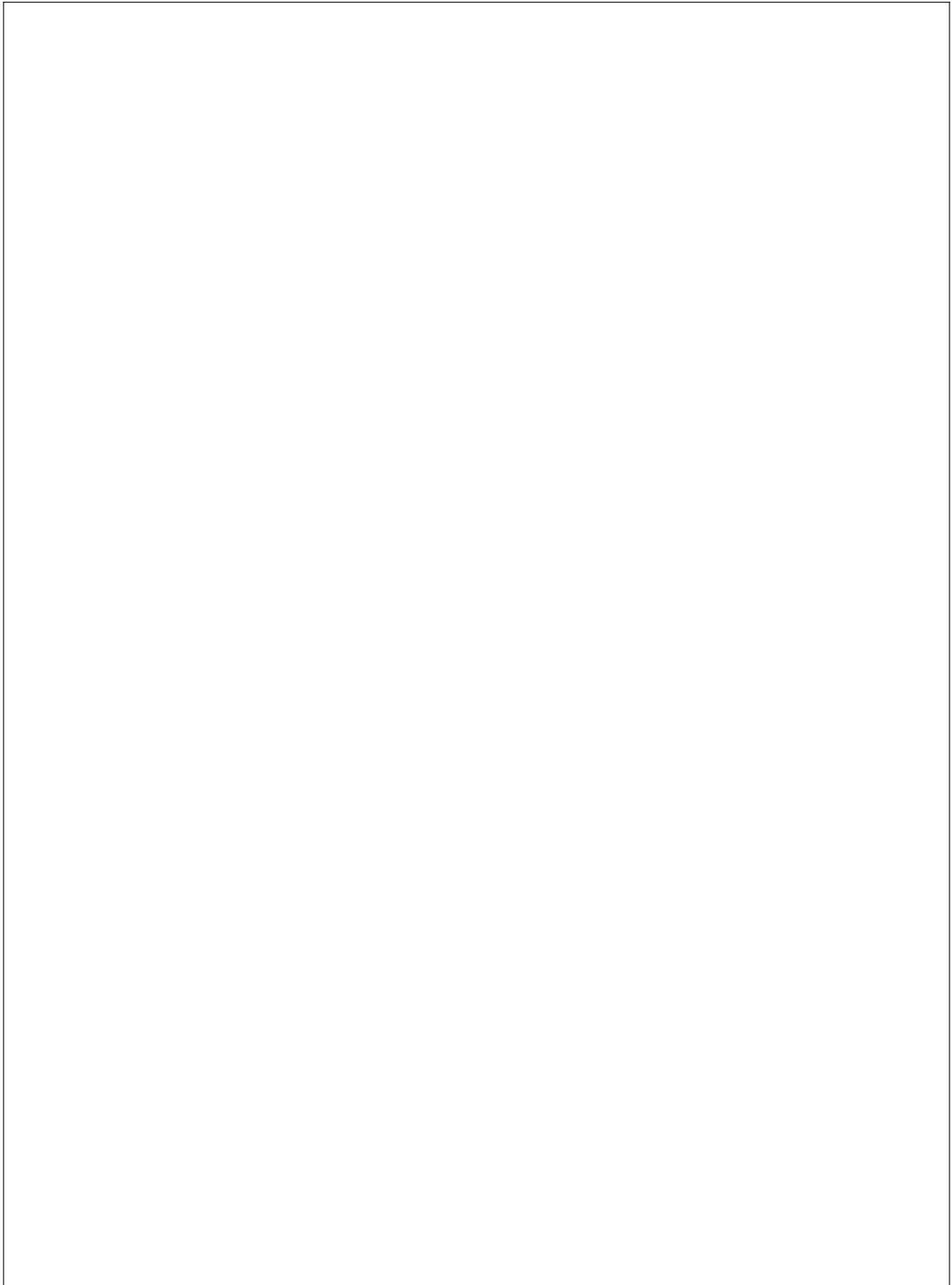


Figure A.17: Upper Egyptian cemetery sites. The sites found to contain tombs with seals are designated by black rectangles. Not shown are Beit Khallaf, located near Nag el-Deir, and el-Kubaniya South, located under el-Kubaniya north. Modified from Hendrickx and van den Brink (2002, Figure 23.4).

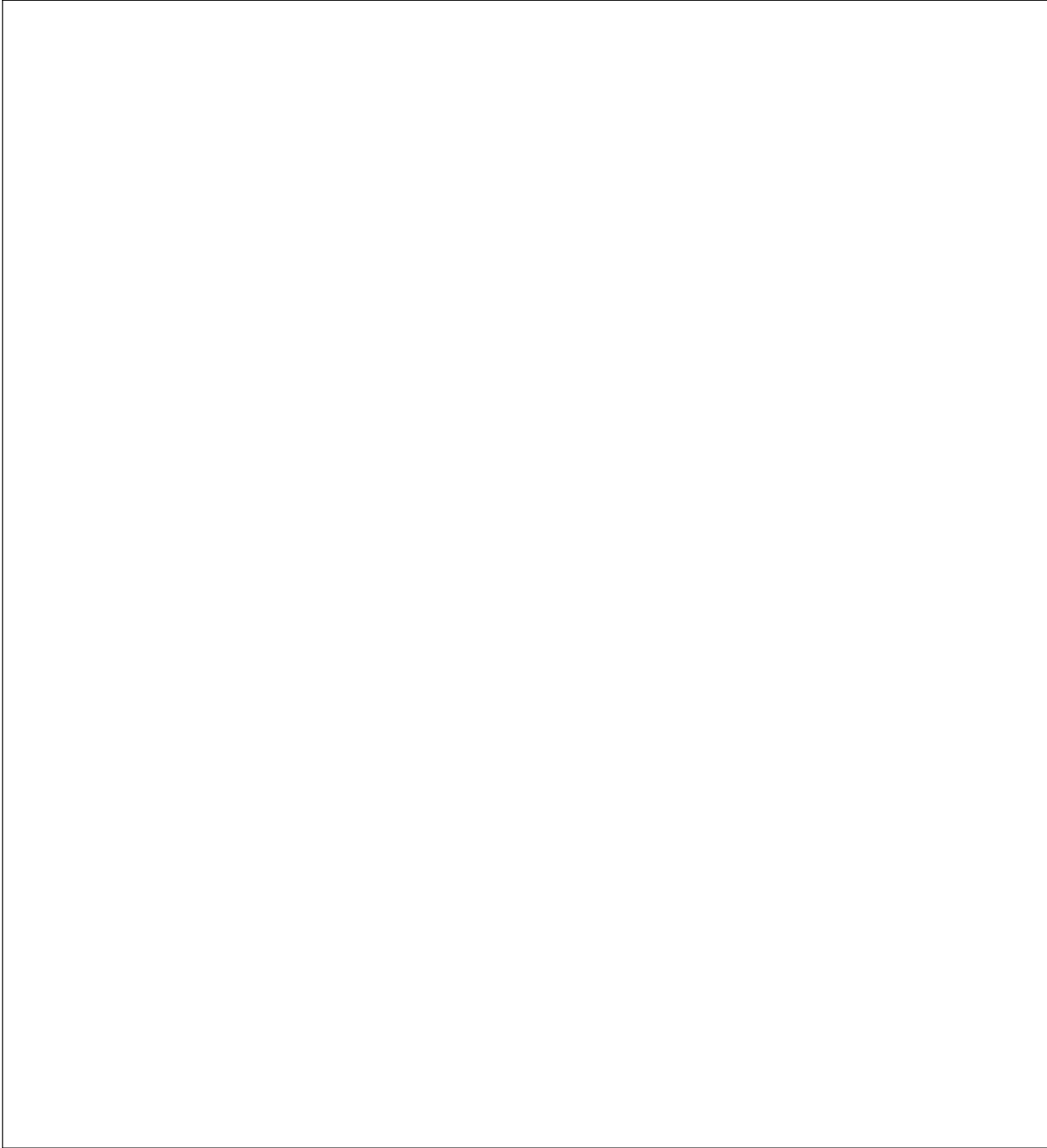


Figure A.18: Nubian cemetery sites. The sites found to contain tombs with seals are designated by black rectangles. Gezira Dabarosa 6-G-18 could not be precisely pinpointed and was therefore not included on this map. Modified from Baines and Málek (2000, 186).

Table A.2: Naqada II graves found to contain seals.



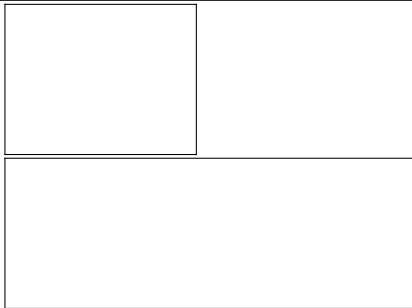
Grave number	Seal type and quantity	Seal picture	Disturbed/ undis- turbed	Area of grave (m ²)	Inner/ outer measure- ment?	Source
Deir el-Ballas B307 (cemetery excav. by Lythgoe)	1 limestone cylinder seal		Disturbed	1.2	Inner	Podzorski (1988, 264) Image from Podzorski (1988, 265)
Haraga Cemetery H, grave 470	1 'carne- lian' or possibly red lime- stone stamp seal		Undisturbed	0.6	Inner	Engelbach (1923, 14, Plate LV); (Pittman and Potts 2009, 110) Image from Engel- bach (1923, Plate VI)
Matmar 3039	1 limestone cylinder seal		Disturbed	1.1	Inner	Brunton (1948, 2, Plate IX) Drawing from Brunton (1948, Plate XV), photo from Buchanan (1966, Plate 64)

Table A.2: Naqada II graves found to contain seals - (continued)



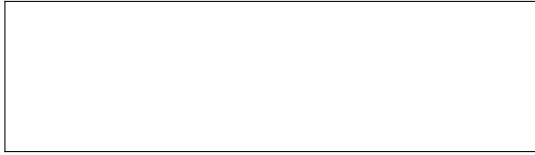
Grave number	Seal type and quantity	Seal picture	Disturbed/undisturbed	Area of grave (m ²)	Inner/outer measurement?	Source
Nag el-Deir N7304	1 limestone cylinder seal		Disturbed	5.6	Inner	Lythgoe and Dunham (1965, 179–180) Image from Podzorski (1988, 261)
Nag el-Deir N7501	1 limestone stamp seal		Undisturbed	0.6	Inner	Lythgoe and Dunham (1965, 317–318) Image from Podzorski (1988, 262)
Naqada 1863	1 limestone cylinder seal		Likely undisturbed (condition not listed)	1.8	Inner	Petrie Museum (1999) Image from Boehmer (1974, 500)

Table A.3: Naqada III graves found to contain seals.

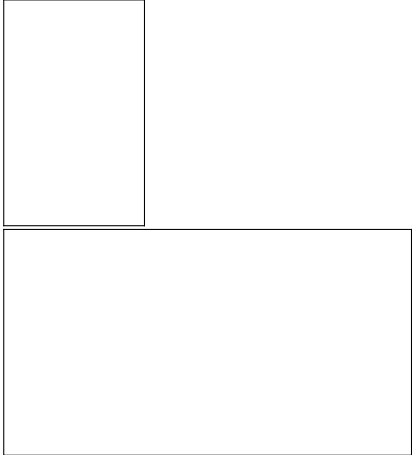
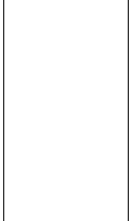
Grave number	Seal type and quantity	Seal picture	Disturbed/undisturbed	Area of grave (m ²) sub-structure	Inner/outer measurement?	Source
Faras 4	1 ivory cylinder seal		Disturbed	1.5	Inner	Griffith (1921, 12–13, Plate II) Images from Buchanan (1966, Plate 64)
Faras 17	1 pottery cylinder seal		Appears intact	0.9	Inner	Griffith (1921, Plate IV.5) Image from Griffith Institute (2016)

Table A.3: Naqada III graves found to contain seals - (continued)




Grave number	Seal type and quantity	Seal picture	Disturbed/undisturbed	Area of grave (m ²) sub-structure	Inner/outer measurement?	Source
Gezira Dabarosa 6-G-18, grave 55	1 ivory cylinder seal		Undisturbed	2.4	Inner	Nordström (2014, 47–49) Image from Nordström (2014, 58)
Helwan 160 H3	1 steatite cylinder seal		Likely disturbed	3	Unknown (Köhler does not specify)	Saad (1951, Plate 1); Köhler (1999, 54) Image from Köhler (2005, Plate 48)
Qustul L17	1 ivory cylinder seal		p313 'substantially intact'	7.3	Outer	Williams (1986, 304,305–313) Image from Williams (1986, Figure 133)

Table A.3: Naqada III graves found to contain seals - (continued)

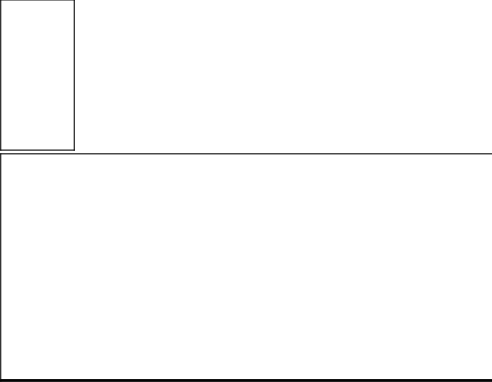

Grave number	Seal type and quantity	Seal picture	Disturbed/ undis- turbed	Area of grave (m ²) sub- structure	Inner/ outer measure- ment?	Source
Qustul W2	1 ivory cylinder seal		Not listed but appears intact from grave draw- ing	1.2	Likely in- ner	Williams (1989, 46–47) Photo from Williams (1986, Plate 13), drawing from Williams (1986, Figure 14)
Saras West cemetery 11-H-6, grave 16	1 ivory cylinder seal		Not listed but appears intact from grave draw- ing	1.5	Outer	Mills and Nord- ström (1966, 8–9) Image from Williams (1986, Figure 58)

Table A.4: Dynasty 1–2 graves found to contain seals.

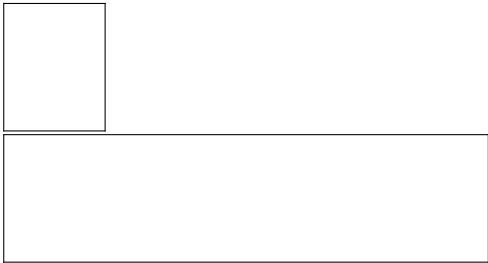
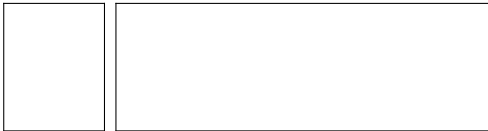
Grave number	Seal type and quantity	Seal picture	Disturbed/undisturbed	Area of grave (m ²) sub-structure	Inner/outer measurement?	Source
Abusir Tomb 10B - 2/3	1 Ivory cylinder seal		Disturbed	11.9	Outer	Bonnet (1928, 4, 47, Tafel 2) Images from Bonnet (1928, Abbildung 17, Tafel 31)
Wadi north of Abu Simbel, Cemetery 215, Grave 85	1 stone cylinder seal		Disturbed	1.9	Outer	Emery and Kirwan (1935, 471) Images from Emery and Kirwan (1935, Figure 443)

Table A.4: Dynasty 1–2 graves found to contain seals - (continued)


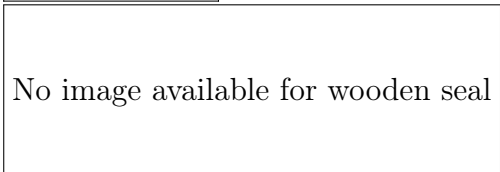



Grave number	Seal type and quantity	Seal picture	Disturbed/ undisturbed	Area of grave (m ²) sub-structure	Inner/ outer measurement?	Source
el Amra b91	1 steatite cylinder seal, 1 wooden cylinder seal	  <p>No image available for wooden seal</p>	Disturbed	24.5	Outer	Randall-MacIver and Mace (1902, 39, Plate IV) Image from Kaplony (1963b, Tafel 6)
Helwan 207 H5	1 stone cylinder seal		Disturbed	0.8	Likely inner	Saad (1951, 31, Planche I) Image from Saad (1951, 31)
Nag el-Deir N1501	1 stone cylinder seal	 	Disturbed	3.9	Outer	Reisner (1908, 22) Images from Reisner (1908, Plate 43, 44)

Table A.4: Dynasty 1–2 graves found to contain seals - (continued)

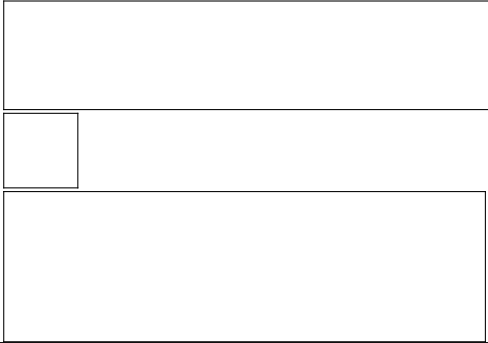
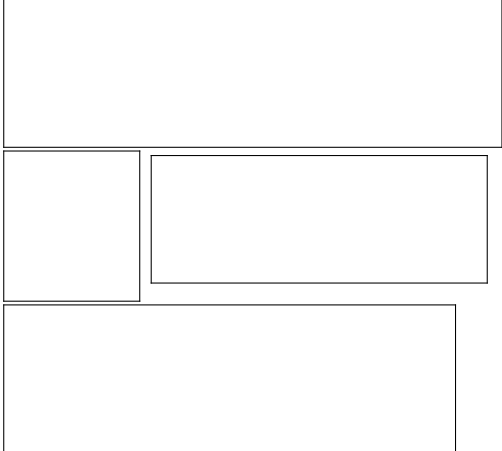
Grave number	Seal type and quantity	Seal picture	Disturbed/undisturbed	Area of grave (m ²) sub-structure	Inner/outer measurement?	Source
Nag el-Deir N1532	1 gold plating, top carrying loop, and gold case for a cylinder seal presumed to have wood core originally		Disturbed	13.3	Outer	Reisner (1908, 29–33) Images from Reisner (1908, Plate 9, 43)
Nag el-Deir N1562	1 stone cylinder seal		Disturbed	4.7	Outer	Reisner (1908, 59) Images from Reisner (1908, Plate 43, 44)

Table A.4: Dynasty 1–2 graves found to contain seals - (continued)

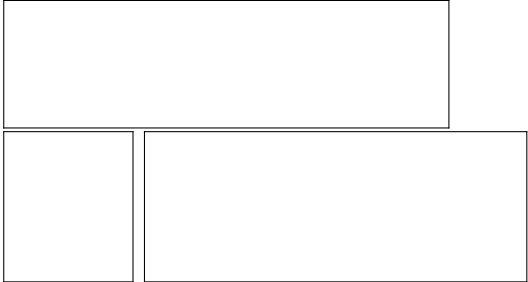
Grave number	Seal type and quantity	Seal picture	Disturbed/ undis- turbed	Area of grave (m ²) sub- structure	Inner/ outer measure- ment?	Source
Nag el- Deir N1604	1 stone cylinder seal		Likely undis- turbed	0.9	Outer	Reisner (1908, 24) Images from Reis- ner (1908, Plate 43, 44)

Table A.4: Dynasty 1–2 graves found to contain seals - (continued)

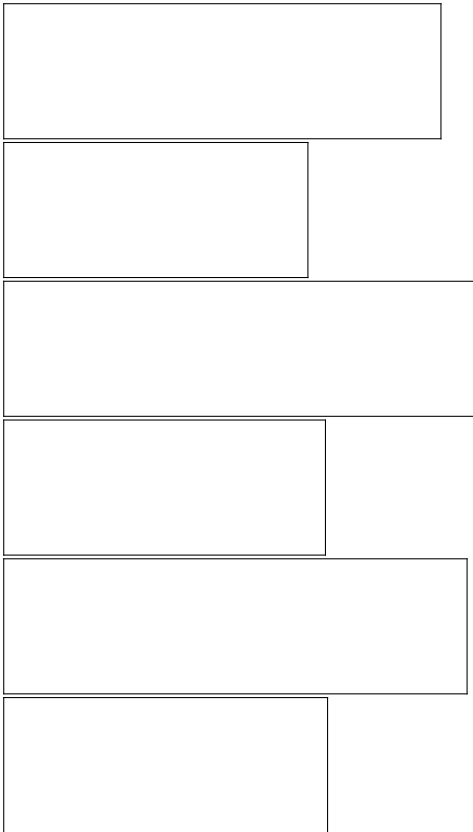
Grave number	Seal type and quantity	Seal picture	Disturbed/ undis- turbed	Area of grave (m ²) sub- structure	Inner/ outer measure- ment?	Source
Nag el- Deir N1605	9 stone cylinder seals		Disturbed	21.4	Outer	Reisner (1908, 54–55) Images from Reisner (1908, Plate 43, 44)

Table A.4: Dynasty 1–2 graves found to contain seals - (continued)

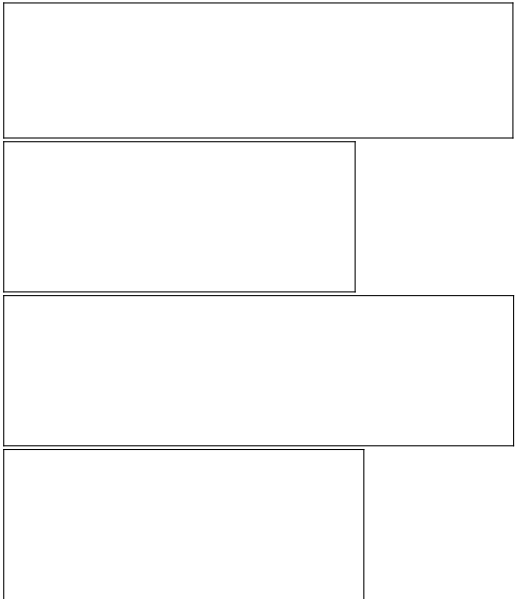
Grave number	Seal type and quantity	Seal picture	Disturbed/ undis- turbed	Area of grave (m ²) sub- structure	Inner/ outer measure- ment?	Source
Nag el- Deir N1605	9 stone cylinder seals		Disturbed	21.4	Outer	Reisner (1908, 54–55) Images from Reisner (1908, Plate 43, 44)

Table A.4: Dynasty 1–2 graves found to contain seals - (continued)

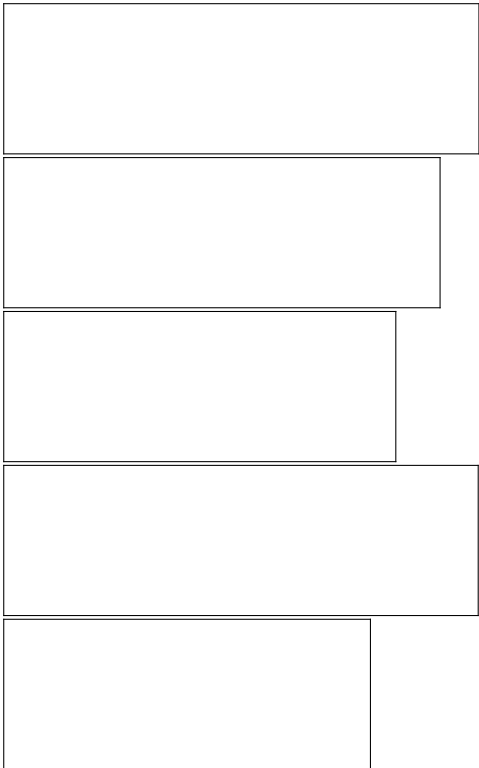
Grave number	Seal type and quantity	Seal picture	Disturbed/ undis- turbed	Area of grave (m ²) sub- structure	Inner/ outer measure- ment?	Source
Nag el- Deir N1605	9 stone cylinder seals		Disturbed	21.4	Outer	Reisner (1908, 54–55) Images from Reisner (1908, Plate 43, 44)

Table A.4: Dynasty 1–2 graves found to contain seals - (continued)

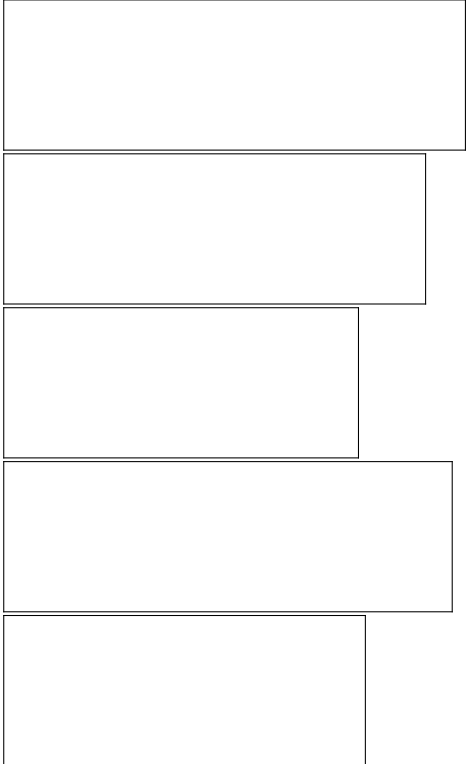
Grave number	Seal type and quantity	Seal picture	Disturbed/ undis- turbed	Area of grave (m ²) sub- structure	Inner/ outer measure- ment?	Source
Nag el- Deir N1605	9 stone cylinder seals		Disturbed	21.4	Outer	Reisner (1908, 54–55) Images from Reisner (1908, Plate 43, 44)

Table A.4: Dynasty 1–2 graves found to contain seals - (continued)

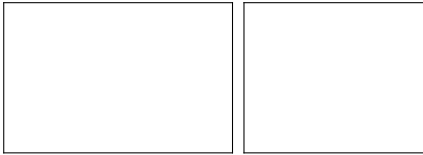


Grave number	Seal type and quantity	Seal picture	Disturbed/undisturbed	Area of grave (m ²) sub-structure	Inner/outer measurement?	Source
Nag el-Deir N3091	1 wooden cylinder seal		Likely undisturbed	0.2	Outer	Reisner (1908, 86) Images from Reisner (1908, Plate 43, 44)
Abydos, Djer Subsidiary Grave 36	1 wooden cylinder seal		Likely disturbed	1.7	Likely inner	Amélineau (1904, 78–79, Planche XV, 2) Image from Kaplony (1963b, Tafel 6)
Abydos, Djer Subsidiary Grave 59	1 wooden cylinder seal		Likely disturbed	2.6	Likely inner	Amélineau (1904, 101–102, Planche XV, 1) Image from Kaplony (1963b, Tafel 20)

Table A.4: Dynasty 1–2 graves found to contain seals - (continued)




Grave number	Seal type and quantity	Seal picture	Disturbed/ undisturbed	Area of grave (m ²) sub-structure	Inner/ outer measurement?	Source
Abydos, Djer valley enclosure subsidiary grave 467	1 wooden cylinder seal		Disturbed	1.7	Inner	Petrie (1925, Plate II, III, XX) Image from Kaplony (1963b, Tafel 39)
Abydos, Djer valley enclosure subsidiary grave 511	1 wooden cylinder seal		Disturbed	2.4	Inner	Petrie (1925, Plate II, III, XX) Image from Buchanan (1966, Plate 64)
Abydos, Djer valley enclosure subsidiary grave 654	1 wooden cylinder seal		Disturbed	1.6	Inner	Petrie (1925, Plate II, III, XX) Image from Kaplony (1963b, Tafel 35)

Table A.4: Dynasty 1–2 graves found to contain seals - (continued)

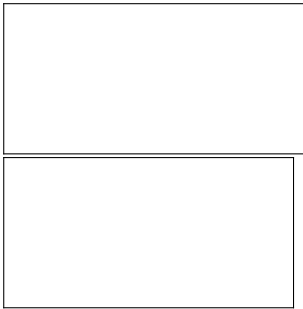
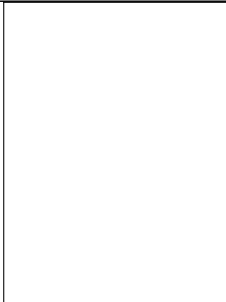
Grave number	Seal type and quantity	Seal picture	Disturbed/undisturbed	Area of grave (m ²) sub-structure	Inner/outer measurement?	Source
Abydos, Djer valley enclosure subsidiary grave 772	1 wooden cylinder seal		Disturbed	2.2	Inner	Petrie (1925, Plate II, III, XXI) Photo from Buchanan (1966, Plate 64), drawing from Kaplony (1963b, Tafel 43)
Abydos, Aha Subsidiary Grave B13	1 Ivory ‘dummy’ cylinder seal (uninscribed)		Disturbed	33.7	Outer	Photo from Dreyer <i>et al.</i> (1990, Tafel 24, g) Dreyer <i>et al.</i> (1990, 63, 66, Abb. 1)
Abydos, Aha Subsidiary Grave B14	1 fragment of ivory ‘dummy’ cylinder seal (uninscribed)	No image available	Disturbed	25	Outer	Dreyer <i>et al.</i> (1990, 63, 66, Abb. 1)

Table A.4: Dynasty 1–2 graves found to contain seals - (continued)

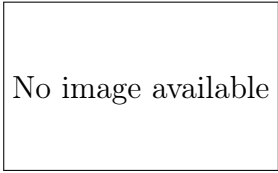
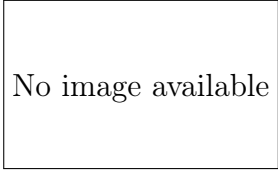
Grave number	Seal type and quantity	Seal picture	Disturbed/ undis- turbed	Area of grave (m ²) sub- structure	Inner/ outer measure- ment?	Source
Abydos, Aha Sub- sidiary Grave B16- 1c	1 fragment of ivory 'dummy' cylinder seal (uninscribed)		Disturbed	13.2	Outer	Dreyer <i>et al.</i> (1990, 64, 67, Abb. 1)
Saqqara mastaba 3500 sub- sidiary burial 1	1 wooden 'dummy' cylinder seal (unin- scribed, with ink markings on it)		Undisturbed	2.2	Inner	Emery (1958, 102, 104, Plate 116, 120–2)
Saqqara mastaba 3500 sub- sidiary burial 2	1 wooden 'dummy' cylinder seal (unin- scribed, with ink markings on it)		Undisturbed	2.2	Inner	Emery (1958, 102, 104, Plate 116, 120–2)

Table A.5: Dynasty 4–6 graves found to contain seals.

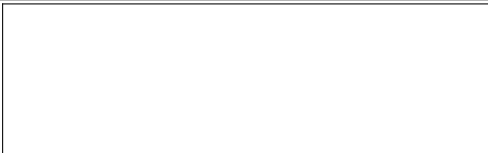
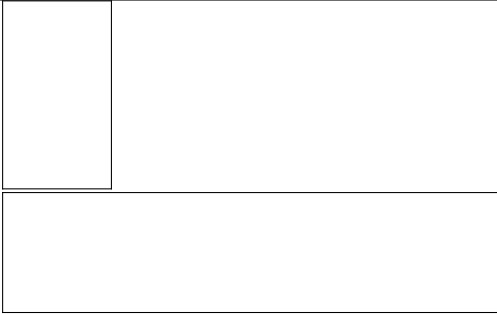
Grave number	Seal type and quantity	Seal picture	Disturbed/undisturbed	Area of grave (m ²) sub-structure	Inner/outer measurement?	Source
Balat, mastaba of Medou-Nefer, burial T4	1 Ferrous quartzite stamp seal shaped like a soft-shell turtle		Undisturbed	7.1	Inner	Valloggia and Henein (1986a, 60, 102) Images from Valloggia and Henein (1986a, 103)
Balat, mastaba of Ima-Pepy II, burial Tomb C	1 Carnelian ‘button’ seal, 1 steatite stamp seal that formerly had two baboons carved sitting back to back on handle area, one baboon had broken off and break was filed down		Undisturbed	5.1	Inner	Minault-Gout <i>et al.</i> (1992, 53–54, 101–102) Images from Minault-Gout <i>et al.</i> (1992, 101–102, Pl. 33)

Table A.5: Dynasty 4–6 graves found to contain seals - (continued)



Grave number	Seal type and quantity	Seal picture	Disturbed/ undis- turbed	Area of grave (m ²) sub- structure	Inner/ outer measure- ment?	Source
Balat, mastaba of Ima- Pepy/Ima- Meryre, burial T5	1 Copper ‘button’ seal		Undisturbed	3	Inner	Valloggia (1998a, 28), Valloggia (1998b, Pl. XXIII,B) Im- ages from Vallog- gia (1998a, 91, 5790), Valloggia (1998b, Pl. LXXVII)
Balat, mastaba of Ima- Pepy/Ima- Meryre, burial T22	1 Copper ‘button’ seal		Undisturbed	0.2	Inner	Valloggia (1998a, 30, 94), Valloggia (1998b, Pl. XXIII,B) Images from Vallog- gia (1998a, 91, 5367), Valloggia (1998b, Pl. LXXVII)

Table A.5: Dynasty 4–6 graves found to contain seals - (continued)

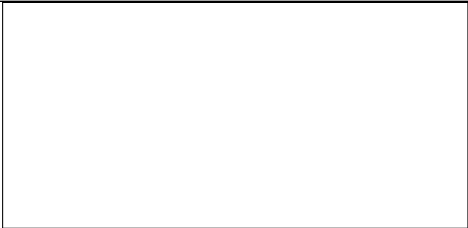
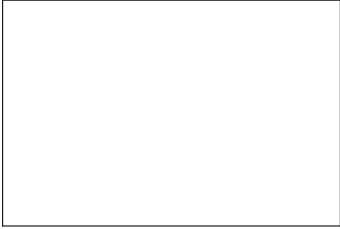
Grave number	Seal type and quantity	Seal picture	Disturbed/undisturbed	Area of grave (m ²) sub-structure	Inner/outer measurement?	Source
Balat, mastaba of Ima-Pepy/Ima-Meryre, burial T10	1 Chrysoprase or green jasper 'button' seal		Undisturbed	1	Inner	Valloggia (1998a, 32), Valloggia (1998b, Pl. XXIII,B) Images from Valloggia (1998a, 91, 5361), Valloggia (1998b, Pl. LXXVII)
Balat, mastaba of Ima-Pepy/Ima-Meryre, burial T20	1 Jasper cylinder seal		Undisturbed	3.2	Inner	Valloggia (1998a, 32) Images from Valloggia (1998a, 91, 5192), Valloggia (1998b, Pl. LXXVII)

Table A.5: Dynasty 4–6 graves found to contain seals - (continued)

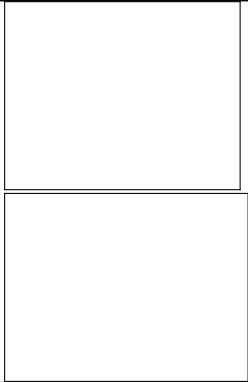

Grave number	Seal type and quantity	Seal picture	Disturbed/undisturbed	Area of grave (m ²) sub-structure	Inner/outer measurement?	Source
Balat, mastaba of Ima-Pepy/Ima-Meryre, burial T15	2 Steatite ‘button’ seals		Undisturbed	3	Inner	Valloggia (1998a, 36), Valloggia (1998b, Pl. XXXI,A) Images from Valloggia 1998a, 91, Valloggia (1998b, Pl. LXXVII)
Balat, mastaba of Khen-tika, burial Caveau 5100	1 Copper ‘button’ seal		Undisturbed	4	Inner	Castel <i>et al.</i> (2001a, 35, 54–55, 59, 155) Images from Castel <i>et al.</i> (2001b, 106)

Table A.5: Dynasty 4–6 graves found to contain seals - (continued)



Grave number	Seal type and quantity	Seal picture	Disturbed/undisturbed	Area of grave (m ²) sub-structure	Inner/outer measurement?	Source
Balat, cemetery east and west of mastaba of Khentika, Tomb 30	1 Glazed steatite cylinder seal		Undisturbed	2.5	Inner	Castel and Pantalacci (2005, 126–127, 421) Images from Castel and Pantalacci (2005, 420)
Balat, cemetery east and west of mastaba of Khentika, Tomb 101	1 Glazed steatite 'button' seal		Undisturbed	3.2	Inner	Castel and Pantalacci (2005, 149–150, 416) Images from Castel and Pantalacci (2005, 417)

Table A.5: Dynasty 4–6 graves found to contain seals - (continued)

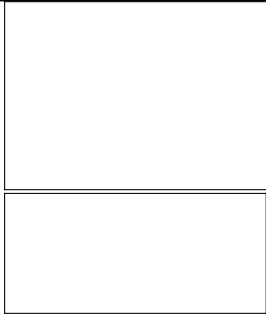

Grave number	Seal type and quantity	Seal picture	Disturbed/ undis- turbed	Area of grave (m ²) sub- structure	Inner/ outer measure- ment?	Source
Balat, cemetery east and west of mastaba of Khentika, Tomb 105	2 Glazed steatite 'button' seals		Undisturbed	2.9	Inner	Castel and Pantalacci (2005, 157–159, 418–419) Images from Castel and Pantalacci (2005, 163, 417, 420)
Balat, cemetery east and west of mastaba of Khentika, Tomb 113	1 Glazed steatite 'button' seal		Undisturbed	1.9	Inner	Castel and Pantalacci (2005, 194–195, 419) Images from Castel and Pantalacci (2005, 420)

Table A.5: Dynasty 4–6 graves found to contain seals - (continued)



Grave number	Seal type and quantity	Seal picture	Disturbed/undisturbed	Area of grave (m ²) sub-structure	Inner/outer measurement?	Source
Balat, cemetery east and west of mastaba of Khentika, Tomb 114	1 Glazed steatite 'button' seal		Undisturbed	1.7	Inner	Castel and Pantalacci (2005, 203–206, 416–418) Images from Castel and Pantalacci (2005, 417)
Balat, cemetery east and west of mastaba of Khentika, Tomb 118	1 Glazed steatite 'button' seal		Undisturbed	1	Inner	Castel and Pantalacci (2005, 213–214, 418) Images from Castel and Pantalacci (2005, 417)

Table A.5: Dynasty 4–6 graves found to contain seals - (continued)


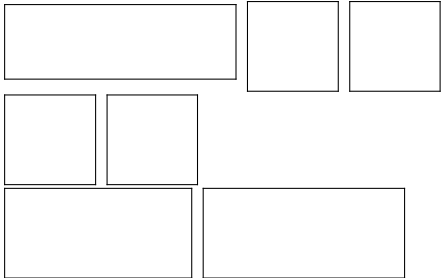
Grave number	Seal type and quantity	Seal picture	Disturbed/undisturbed	Area of grave (m ²) sub-structure	Inner/outer measurement?	Source
Elkab 166	1 ‘Green steatite’ cylinder seal		Undisturbed	0.3	Inner	Quibell (1898, 9) Images from Quibell (1898, XX.29)
Nag el-Deir N505	1 Bone cylinder seal, 1 bone ‘button’ seal, 1 faience ‘button’ seal, 1 green-glazed steatite ‘button’ seal, 3 ivory ‘button’ seals		Disturbed	0.8 per burial, total of 2.25 (3 burials found. These 3 interments were counted as separate graves in the total grave count.)	Inner	Reisner (1932, 111, 266–267) Images from Reisner (1932, 112, Fig. 47.1–7)

Table A.5: Dynasty 4–6 graves found to contain seals - (continued)

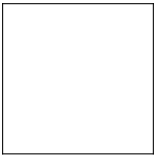
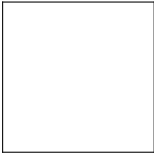

Grave number	Seal type and quantity	Seal picture	Disturbed/undisturbed	Area of grave (m ²) sub-structure	Inner/outer measurement?	Source
Nag el-Deir N506	1 Ivory 'button' seal		Disturbed	1.8	Inner	Reisner (1932, 111, 267–268) Images from Reisner (1932, 112, Fig. 47.8)
Nag el-Deir N508	1 Ivory 'button' seal		Undisturbed	0.4 per burial, total of 1.2, only infant burial 'I' counted since it was found with seal	Inner	Reisner (1932, 111, 268–269) Images from Reisner (1932, 112, Fig. 47.9)
Nag el-Deir N567	1 Green-glazed steatite 'button' seal		Undisturbed	1.3	Inner	Reisner (1932, 111, 269–270) Images from Reisner (1932, 112, Fig. 47.10)

Table A.5: Dynasty 4–6 graves found to contain seals - (continued)

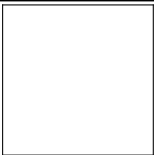
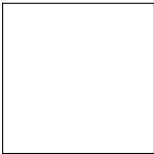

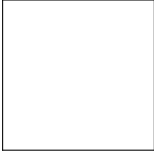
Grave number	Seal type and quantity	Seal picture	Disturbed/ undisturbed	Area of grave (m ²) sub-structure	Inner/ outer measurement?	Source
Nag el-Deir N609	1 Glazed steatite 'button' seal		Disturbed	1.7	Inner	Reisner (1932, 111, 273–274) Images from Reisner (1932, 112, Fig. 47.11)
Nag el-Deir N615	1 Ivory 'button' seal		Undisturbed	1	Inner	Reisner (1932, 111, 274–275) Images from Reisner (1932, 112, Fig. 47.12)
Nag el-Deir N627	1 Black stone cylinder seal		Disturbed	1	Inner	Reisner (1932, 107, 238) Images from Reisner (1932, 237, Fig. 177)
Nag el-Deir N731	1 Ivory 'button' seal		Disturbed	1	Inner	Reisner (1932, 111, 284–285) Images from Reisner (1932, 112, Fig. 47.13)

Table A.5: Dynasty 4–6 graves found to contain seals - (continued)


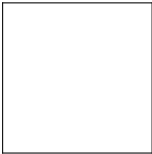

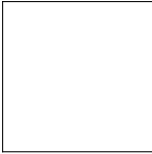
Grave number	Seal type and quantity	Seal picture	Disturbed/undisturbed	Area of grave (m ²) sub-structure	Inner/outer measurement?	Source
Nag el-Deir N734	1 Faience stamp seal with bottom plate in shape of cartouche and back in shape of lion		Disturbed	2	Inner	Reisner (1932, 112, 287, Map ii) Images from Reisner (1932, 112, Fig. 47.14)
Nag el-Deir N751	1 Glazed steatite 'button' seal		Undisturbed	1.2	Inner	Reisner (1932, 112, 291–292) Images from Reisner (1932, 112, Fig. 47.15)
Nag el-Deir N780	2 Faience 'button' seals		Undisturbed	0.9	Inner	Reisner (1932, 112, 304) Images from Reisner (1932, 112, Fig. 47.16–17)
Nag el-Deir N898	1 Faience 'button' seal		Undisturbed	1.7	Inner	Reisner (1932, 112, 337) Images from Reisner (1932, 112, Fig. 47.18)

Table A.5: Dynasty 4–6 graves found to contain seals - (continued)

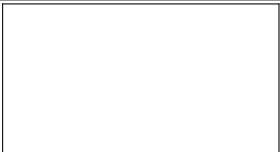


Grave number	Seal type and quantity	Seal picture	Disturbed/ undis- turbed	Area of grave (m ²) sub- structure	Inner/ outer measure- ment?	Source
Nag el- Deir N953	1 Glazed steatite 'pyramidal' rectan- gular seal		Undisturbed	1.1 per burial, total of 2.3, only one adult burial 'II' counted since it was found with seal	Inner	Reisner (1932, 113, 347–348) Images from Reisner (1932, 112, Fig. 47.19)
Matmar 822	1 Bone 'button' seal		Disturbed	2	Inner	Brunton (1948, XXV) Images from Brunton (1948, XXXIII.18)
Matmar 849	1 Green-glazed steatite 'button' seal		Disturbed	1.6	Inner	Brunton (1948, XXV) Images from Brunton (1948, XXXIII.12)

Table A.5: Dynasty 4–6 graves found to contain seals - (continued)





Grave number	Seal type and quantity	Seal picture	Disturbed/undisturbed	Area of grave (m ²) sub-structure	Inner/outer measurement?	Source
Matmar 3208	1 Green-glazed steatite 'pyramidal' rectangular seal		Undisturbed	1.5	Inner	Brunton (1948, XXIV) Images from Brunton (1948, XXXIII.1)
Matmar 3210	1 Steatite 'pyramidal' rectangular seal		Disturbed	0.6	Inner	Brunton (1948, XXIV) Images from Brunton (1948, XXXIII.3)
Matmar 3214	1 Brown soapstone 'ridge-back' rectangular seal		Undisturbed	2	Inner	Brunton (1948, XXIV) Images from Brunton (1948, XXXIII.8)
Matmar 3217	1 Green-glazed steatite 'pyramidal' rectangular seal		Undisturbed	1.5	Inner	Brunton (1948, XXIV) Images from Brunton (1948, XXXIII.4)

Table A.5: Dynasty 4–6 graves found to contain seals - (continued)

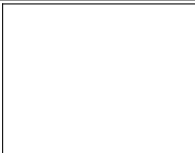



Grave number	Seal type and quantity	Seal picture	Disturbed/ undis- turbed	Area of grave (m ²) sub- structure	Inner/ outer measure- ment?	Source
Matmar 3315	1 Soapstone 'but- ton' seal		Undisturbed	1.9	Inner	Brunton (1948, XXV) Images from Brunton (1948, XXXIII.13)
Matmar 3230	1 Blue-glazed steatite 'pyrami- dal' rectangular seal		Disturbed	1.1	Inner	Brunton (1948, XXIV) Images from Brunton (1948, XXXIII.2)
Matmar 5301	1 Steatite 'pyra- midal' rectangular seal		Undisturbed	1.2	Inner	Brunton (1948, XXIV) Images from Brunton (1948, XXXIII.5)
Matmar 5304	1 Green-glazed steatite 'pyramidal' rectangular seal		Undisturbed	1	Inner	Brunton (1948, XXIV) Images from Brunton (1948, XXXIII.6)

Table A.5: Dynasty 4–6 graves found to contain seals - (continued)




Grave number	Seal type and quantity	Seal picture	Disturbed/undisturbed	Area of grave (m ²) sub-structure	Inner/outer measurement?	Source
Matmar 5323	1 Steatite 'button' seal		Disturbed	1.6	Inner	Brunton (1948, XXVII) Images from Brunton (1948, XXXIII.22)
el-Mustagidda 239	1 Green-glazed steatite 'pyramidal' rectangular seal		Disturbed	0.9	Inner	Brunton (1937, XLVI) Images from Brunton (1937, LX.7)
el-Mustagidda 514C Eastern burial chamber	1 Ivory 'button' seal		Undisturbed	0.9	Inner	Brunton (1937, XLVI) Images from Brunton (1937, LX.8)
el-Mustagidda 1420	1 Blue-glazed steatite 'pyramidal' rectangular seal		Undisturbed	1.6	Inner	Brunton (1937, XLV) Images from Brunton (1937, LX.6)

Table A.5: Dynasty 4–6 graves found to contain seals - (continued)




Grave number	Seal type and quantity	Seal picture	Disturbed/ undis- turbed	Area of grave (m ²) sub- structure	Inner/ outer measure- ment?	Source
el- Mustagidda 2614	1 Black-glazed 'button' seal		Disturbed	0.9	Inner	Brunton (1937, XLVI) Images from Brunton (1937, LX.9)
el- Mustagidda 2618	1 Green-glazed steatite 'pyramidal' rectangular seal		Undisturbed	1.2	Inner	Brunton (1937, XLV) Images from Brunton (1937, LX.3)
el- Mustagidda 2673	1 Bone cylinder seal		Undisturbed	0.7	Inner	Brunton (1937, XLV) Images from Brunton (1937, LX.1)

Table A.5: Dynasty 4–6 graves found to contain seals - (continued)

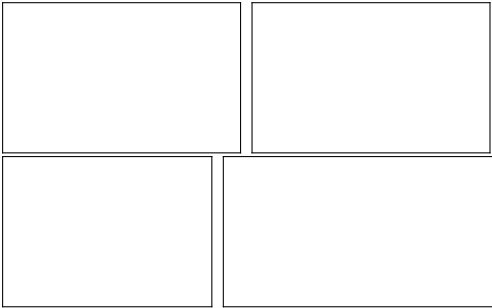

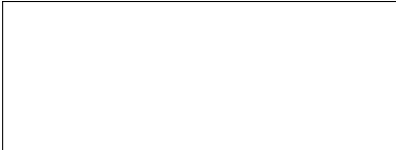
Grave number	Seal type and quantity	Seal picture	Disturbed/undisturbed	Area of grave (m ²) sub-structure	Inner/outer measurement?	Source
el-Mustagidda 10002	1 Green glazed steatite ‘button’ seal, 1 green soapstone ‘button’ seal, 1 pink limestone ‘button’ seal, 1 blue-glazed rectangular seal surmounted with reclining dog		Undisturbed	0.1	Inner	Brunton (1937, 99,XLVI) Images from Brunton (1937, LX.11,12,23,35)
el-Mustagidda 10012	1 Bone ‘button’ seal		Disturbed	1.6	Inner	Brunton (1937, XLVI) Images from Brunton (1937, LX.27)
el-Mustagidda 10020	1 Blue-glazed ‘button’ seal with frog on top		Undisturbed	1.1	Inner	Brunton (1937, XLVI) Images from Brunton (1937, LX.37)

Table A.5: Dynasty 4–6 graves found to contain seals - (continued)




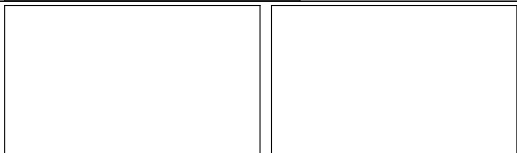

Grave number	Seal type and quantity	Seal picture	Disturbed/ undis- turbed	Area of grave (m ²) sub- structure	Inner/ outer measure- ment?	Source
Qaw 436	1 Steatite ‘button’ seal		Disturbed	1.5	Inner	Brunton (1928, LIII) Images from Brunton (1927, XXXII.39)
Qaw 462	1 Green glazed ‘button’ seal		Undisturbed	1.7	Inner	Brunton (1928, LIII) Images from Brunton (1927, XXXII.44)
Qaw 686	1 Brown pebble incised on both sides		Undisturbed	0.8	Inner	Brunton (1928, LI) Images from Brunton (1927, XXXII.6)
Qaw 712	1 Steatite ‘pyramidal’ rectangular seal, 1 bone ‘button’ seal		Undisturbed	1.1	Inner	Brunton (1928, LIII) Images from Brunton (1927, XXXII.16,43)
Qaw 955	1 Black steatite cylinder seal, with lines of incised design painted white		Undisturbed	1.2	Inner	Brunton (1928, LI) Images from Brunton (1927, XXXII.3)

Table A.5: Dynasty 4–6 graves found to contain seals - (continued)


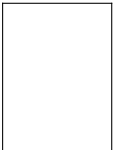
Grave number	Seal type and quantity	Seal picture	Disturbed/undisturbed	Area of grave (m ²) sub-structure	Inner/outer measurement?	Source
Qaw 1023	1 Blue-glazed steatite 'button' seal		Undisturbed	0.9	Inner	Brunton (1928, LV) Images from Brunton (1927, XXXII.67)
Qaw 1126	1 Ivory 'pyramidal' oval seal		Undisturbed	1.1	Inner	Brunton (1928, LI) Images from Brunton (1927, XXXII.32)
Qaw 1145	1 Black steatite cylinder seal		Undisturbed	1.1	Inner	Brunton (1928, LI) Images from Brunton (1927, XXXII.2)
Qaw 1165	1 White-glazed black stone 'pyramidal' rectangular seal		Disturbed	1.1	Inner	Brunton (1928, LI) Images from Brunton (1927, XXXII.8)
Qaw 1977	1 Ivory 'button' seal		Undisturbed	1.8	Inner	Brunton (1928, LX) Images from Brunton (1927, XXXIII.98)

Table A.5: Dynasty 4–6 graves found to contain seals - (continued)



Grave number	Seal type and quantity	Seal picture	Disturbed/ undis- turbed	Area of grave (m ²) sub- structure	Inner/ outer measure- ment?	Source
Qaw 3125	1 Ivory 'button' seal		Undisturbed	1.3	Inner	Brunton (1928, LVI) Images from Brunton (1927, XXXII.36)
Qaw 3141	1 Blue-glazed steatite 'pyrami- dal' rectangular seal		Undisturbed	1.2	Inner	Brunton (1928, LII) Images from Brunton (1927, XXXII.15)
Qaw 3159	1 Steatite 'button' seal		Disturbed	2.1	Inner	Brunton (1928, LVII) Images from Brunton (1927, XXXII.34)
Qaw 3217	1 Bone 'button' seal		Disturbed	0.2	Inner	Brunton (1928, LVII) Images from Brunton (1927, XXXII.60)
Qaw 4913	1 Pottery 'button' seal		Disturbed	1.9	Inner	Brunton (1928, LII) Images from Brunton (1927, XXXII.89)

Table A.5: Dynasty 4–6 graves found to contain seals - (continued)


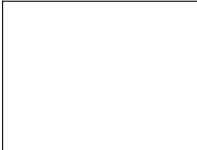
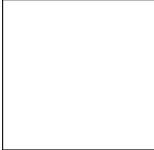

Grave number	Seal type and quantity	Seal picture	Disturbed/undisturbed	Area of grave (m ²) sub-structure	Inner/outer measurement?	Source
Qaw 5531	1 Black steatite cylinder seal		Disturbed	2	Inner	Brunton (1928, LII) Images from Brunton (1927, XXXII.1)
Qaw 5543	1 Brown soapstone 'button' seal, 'repierced'		Disturbed	2	Inner	Brunton (1928, LVIII) Images from Brunton (1927, XXXII.94)
Qaw 7572	1 Blue-glazed 'button' seal		Disturbed	1.6	Inner	Brunton (1928, LVIII) Images from Brunton (1927, XXXIII.108)
Qaw 7848	1 Green-glazed pottery 'button' seal		Disturbed	1.8	Inner	Brunton (1928, LIX) Images from Brunton (1927, XXXIII.99)

Table A.6: Periods during which cemetery was in use, total number of recorded graves, average area and standard deviation of burials in cemeteries found to contain burials with seals. Data used in Figures A.19, A.23, A.28, and A.34.

Graves dated to	Cemetery name	Total graves	Average (m ²)	St. Dev. (m ²)
Naqada IIC-IID2	Haraga cemetery H	16	1.7	0.9
Naqada IB-IID2	Matmar	48	1.6	1.2
Naqada IA-IID2	Nag el-Deir 7000	633	1.1	0.9
circa Naqada III	Faras, Cemetery 3	88	1.2	0.6
circa Naqada III	Gezira Dabarosa Cemetery 6-G-18	20	1.7	0.7
circa Naqada III	Qustul, Cemetery L	25	12.3	9.8
circa Naqada III	Qustul, Cemetery W	31	1.5	1
Dynasty 1–2	Aswan Cemetery 215	123	1.2	0.7
Dynasty 1–2	Nag el-Deir 1500, 1600	81	7.0	15.1
Dynasty 2	Nag el-Deir 3000	33	2.7	3.3
Dynasty 1	Abydos, subsidiary tombs of Aha	36	11.5	5.3
Dynasty 1–2	Abydos Djer valley enclosure	67	2	1
Dynasty 6	Balat, around Khentika mastaba	24	2	0.8
Dynasty 4–6	Matmar	83	1.6	0.6
Dynasty 4–6	el-Mustagidda	54	1.4	1.4
Dynasty 4–6	Qaw	413	1.4	0.6

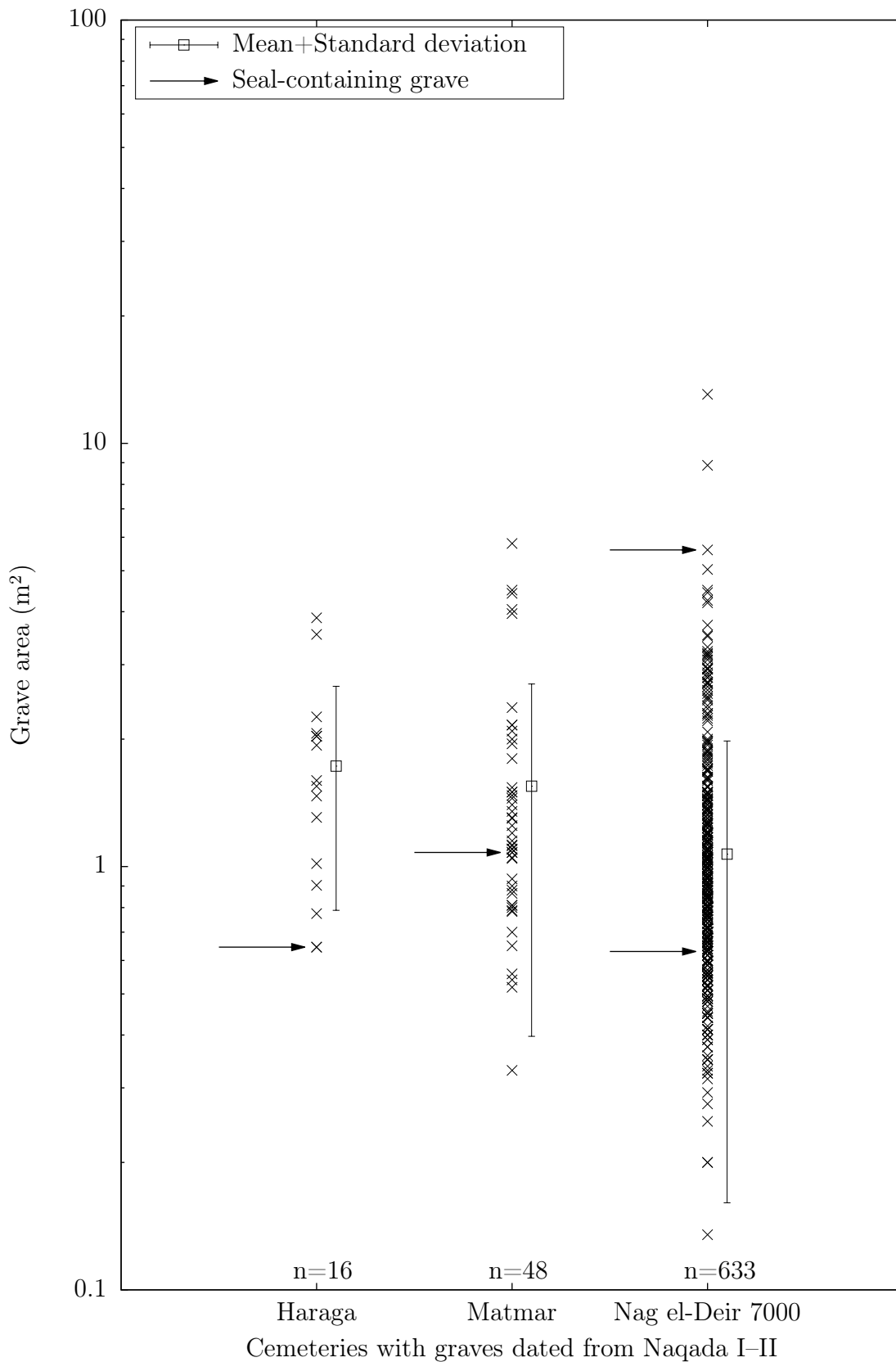


Figure A.19: Area of all tomb substructures within cemeteries found to contain seals dated to Naqada I–II, plotted on a logarithmic scale. The graves found to contain seals in these cemeteries were dated to Naqada II. Total number of graves per cemetery is (n) indicated on the graph. Non-subsidiary cemeteries were plotted in order from the northernmost to the southernmost site.

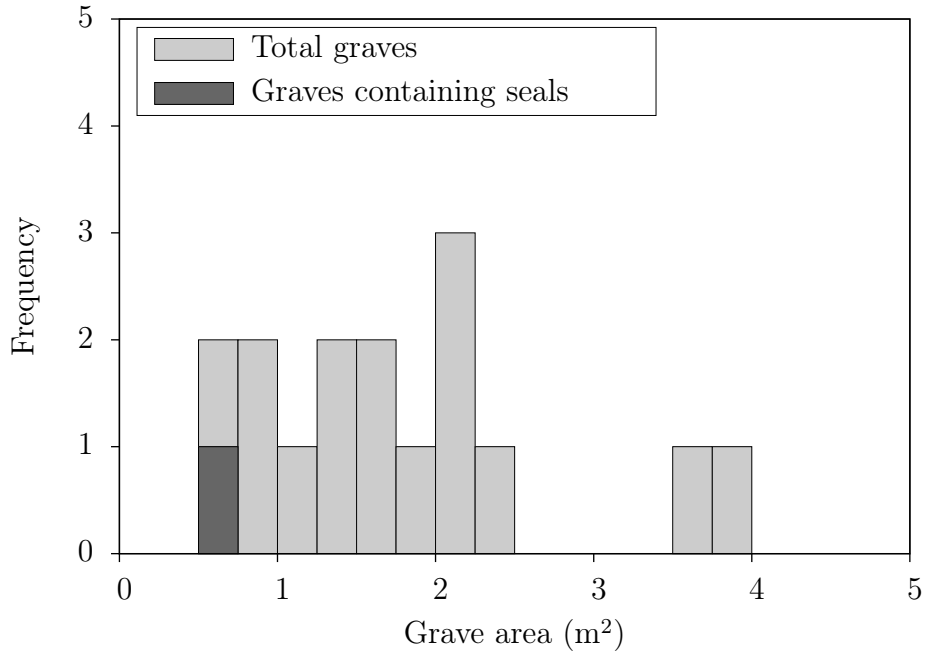


Figure A.20: Distribution of grave sizes in Haraga cemetery H, Naqada II. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seals.

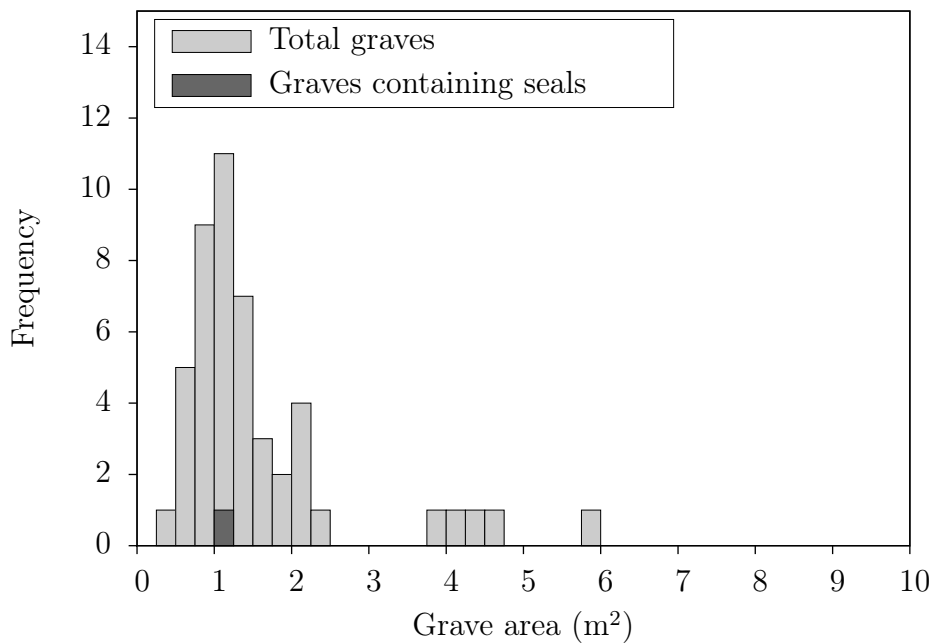


Figure A.21: Distribution of grave sizes in Matmar 3000-3200, Naqada I-II. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seals.

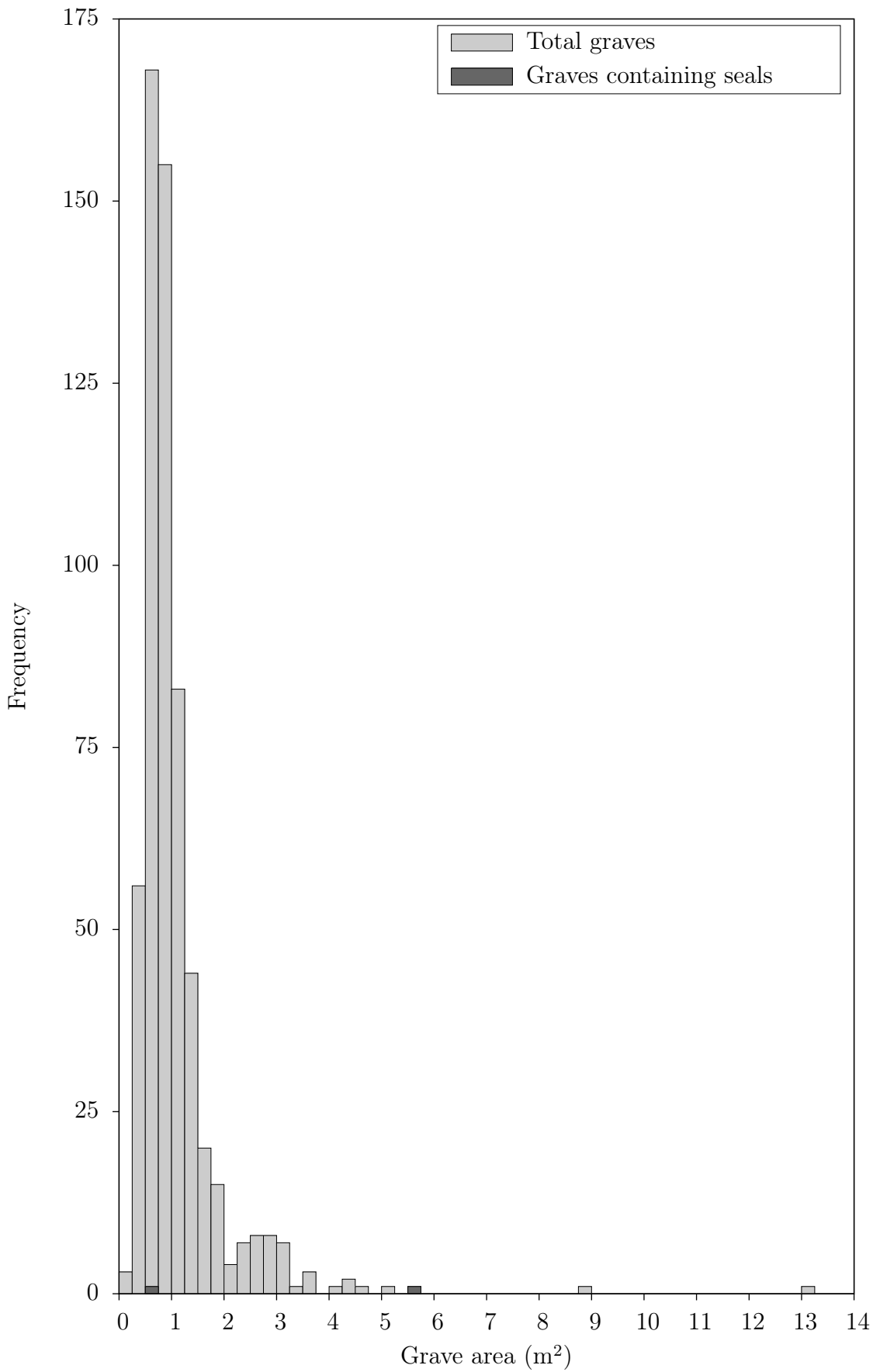
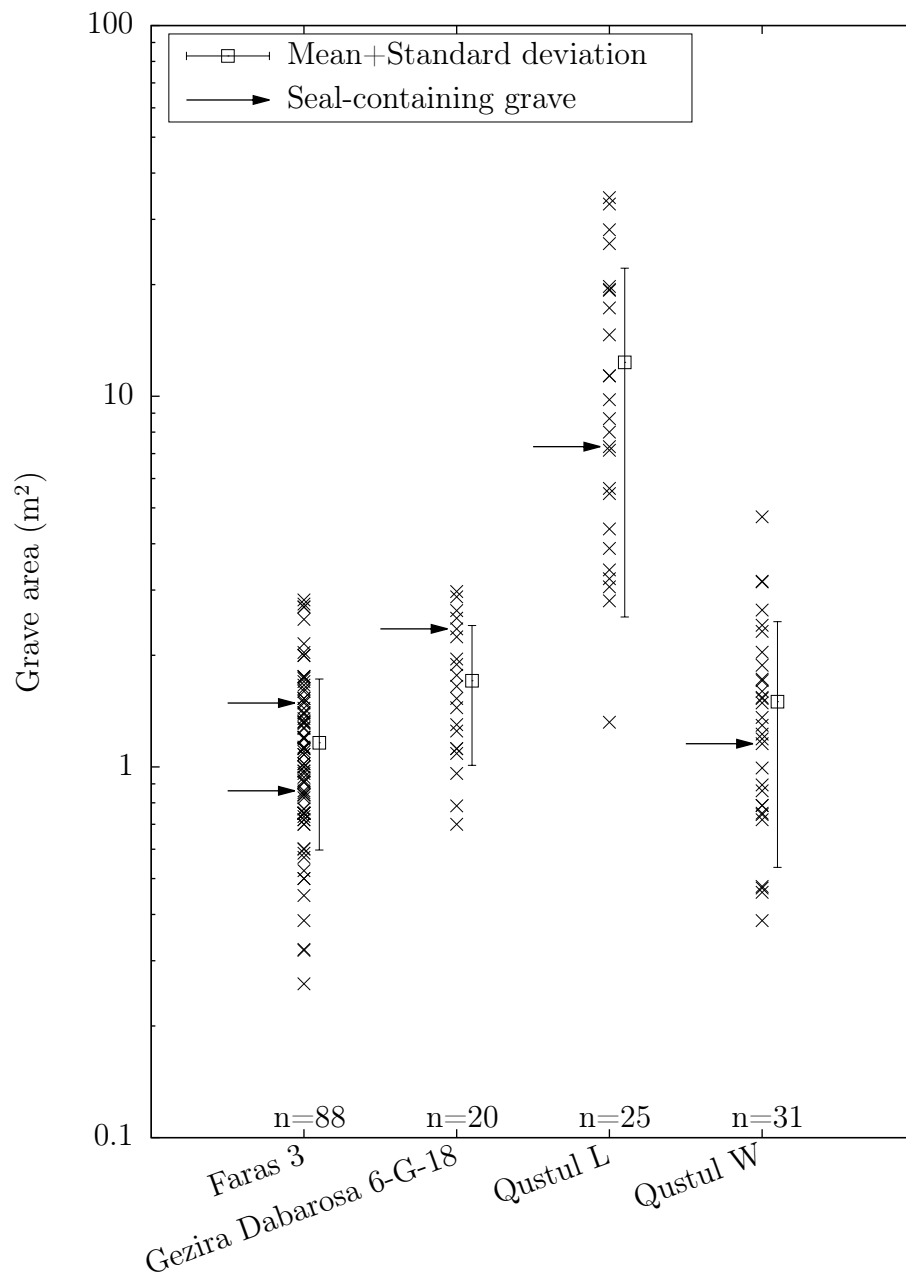


Figure A.22: Distribution of grave sizes in Nag el-Deir cemetery 7000, Naqada II. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seals.



Cemeteries with graves dated to Naqada III

Figure A.23: Area of all tomb substructures within cemeteries found to contain seals dated to Naqada III, plotted on a logarithmic scale. The graves found to contain seals in these cemeteries were dated to Naqada III. Total number of graves per cemetery (n) is indicated on the graph.

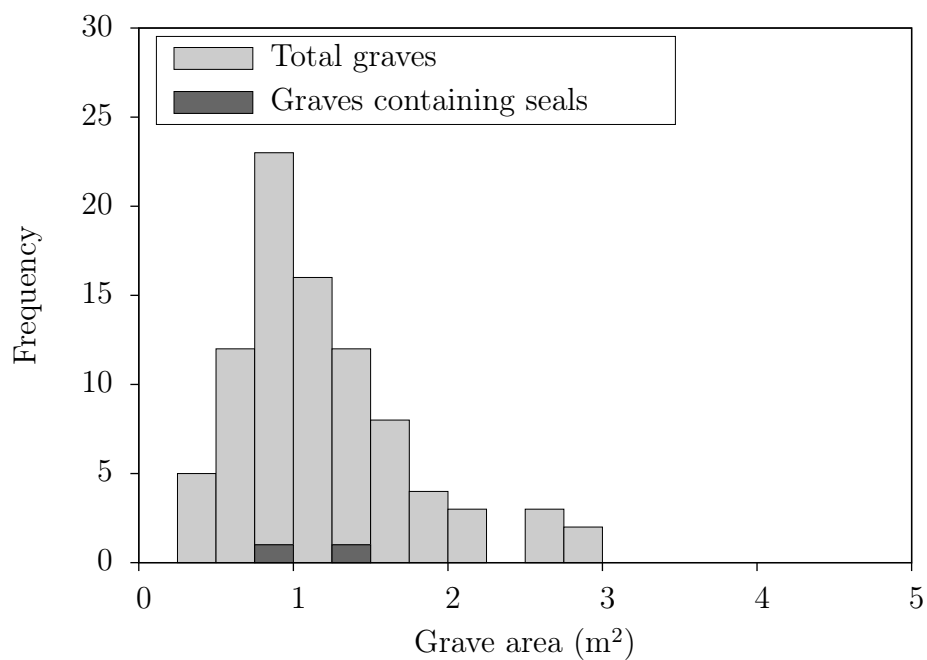


Figure A.24: Distribution of grave sizes in Faras Cemetery 3, Naqada III. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seals.

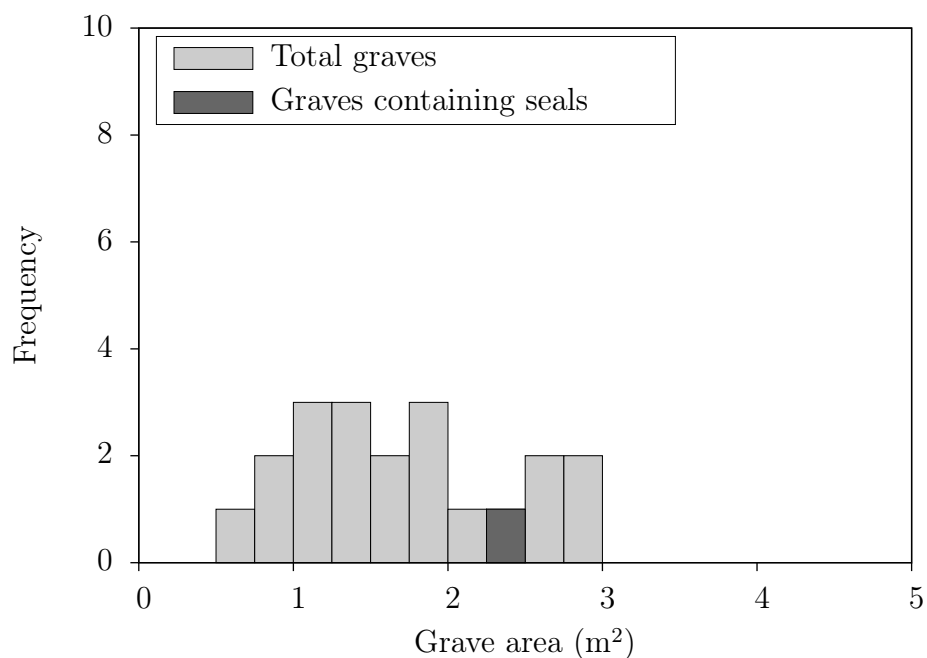


Figure A.25: Distribution of grave sizes in Gezira Dabarosa 6-G-18, Naqada III. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seals.

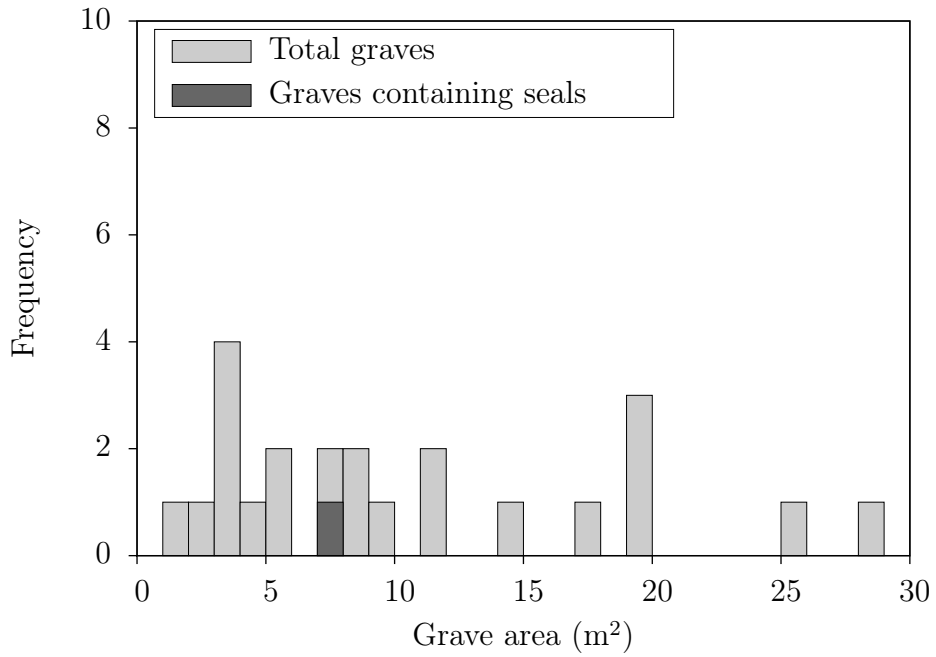


Figure A.26: Distribution of grave sizes in Qustul Cemetery L, Naqada III. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seals.

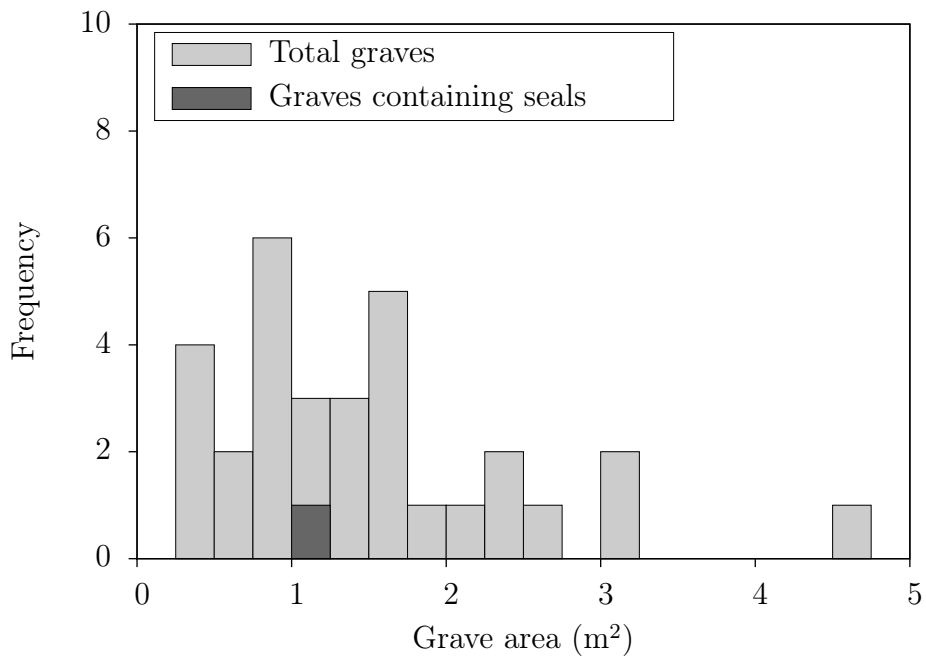
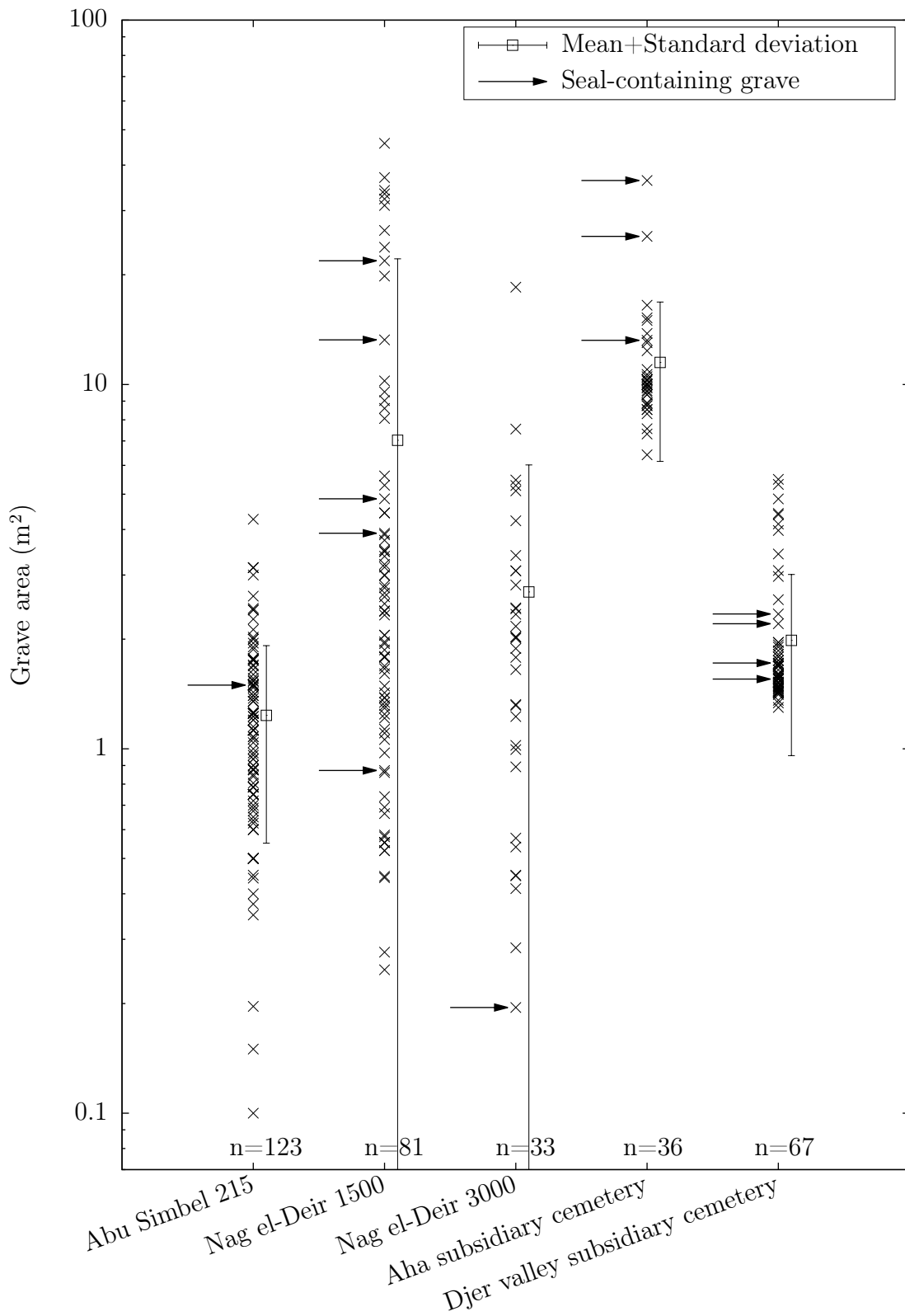


Figure A.27: Distribution of grave sizes in Qustul Cemetery W, Naqada III. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seals.



Cemeteries with graves dated from Dynasty 1–2

Figure A.28: Area of all tomb substructures within cemeteries found to contain seals dated to Dynasty 1–2, plotted on a logarithmic scale. The graves found to contain seals in these cemeteries were dated to Dynasty 1–2. Total number of graves per cemetery (n) is indicated on the graph. Non-subsidiary cemeteries were plotted in order from the northernmost to the southernmost site.

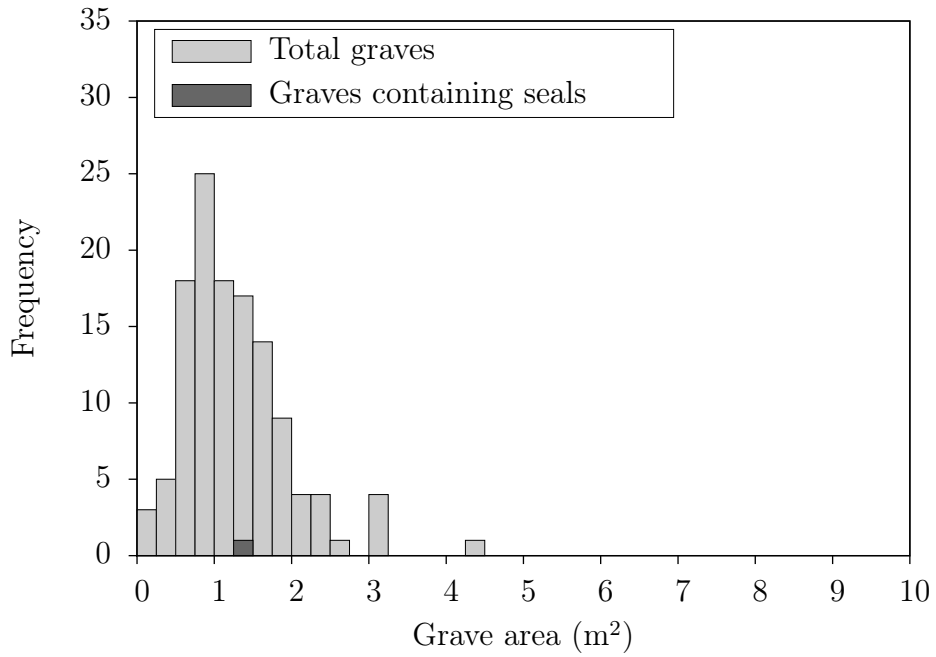


Figure A.29: Distribution of grave sizes in Abu Simbel 215, Dynasty 1–2. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seals.

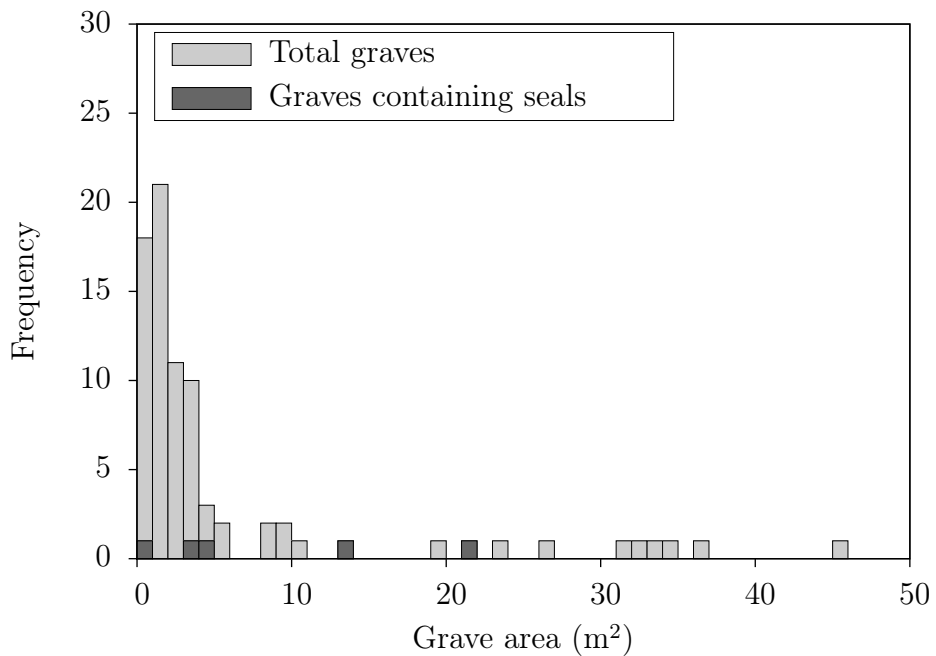


Figure A.30: Distribution of grave sizes in cemetery Nag el-Deir 1500, Dynasty 1–2. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seals.

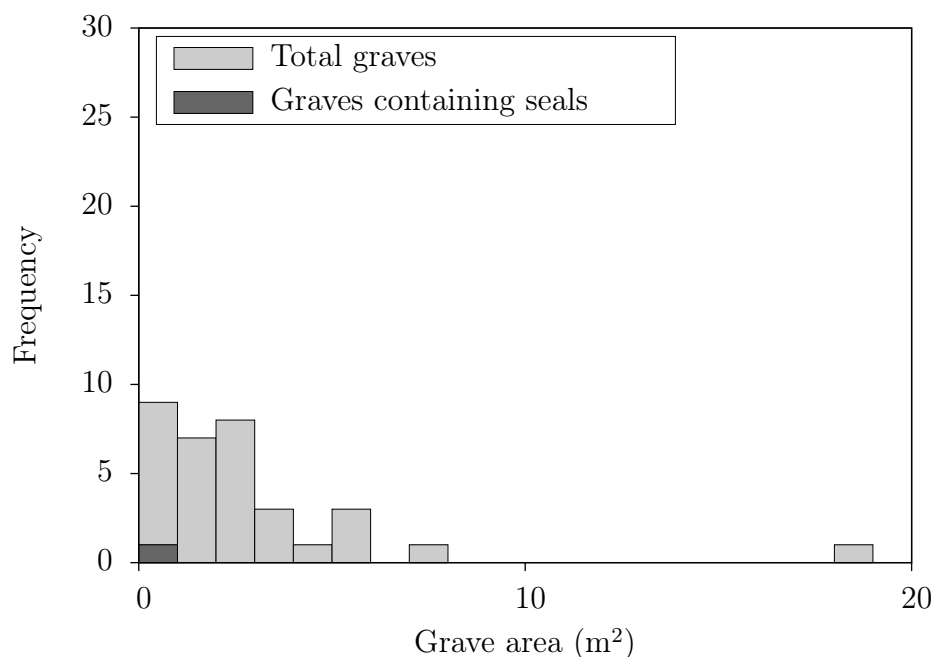


Figure A.31: Distribution of grave sizes in cemetery Nag el-Deir 3000, Dynasty 1-2. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seals.

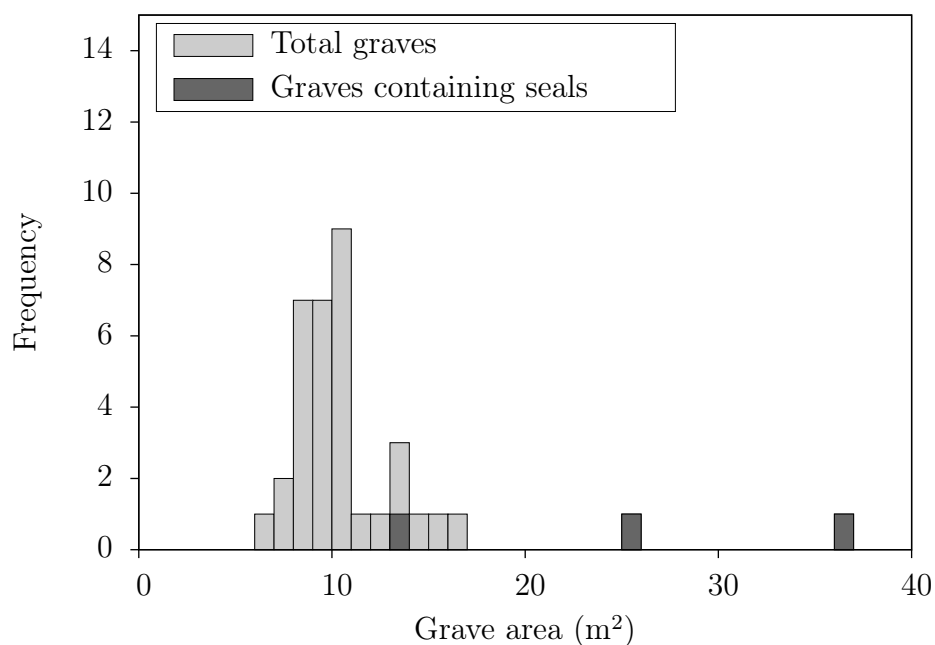


Figure A.32: Distribution of grave sizes in Aha Dynasty 1 subsidiary graves, Abydos. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seals.

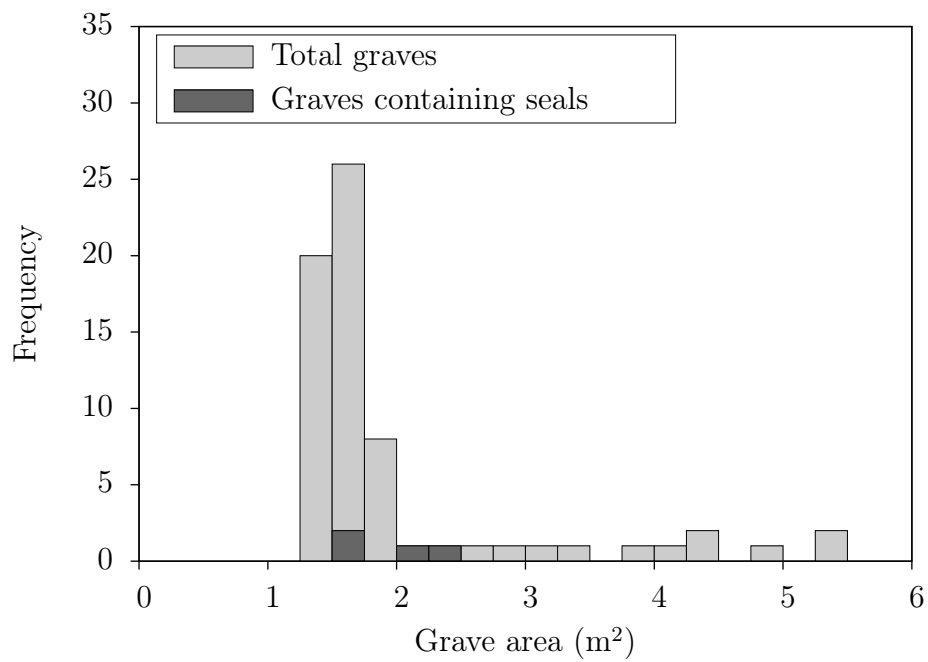
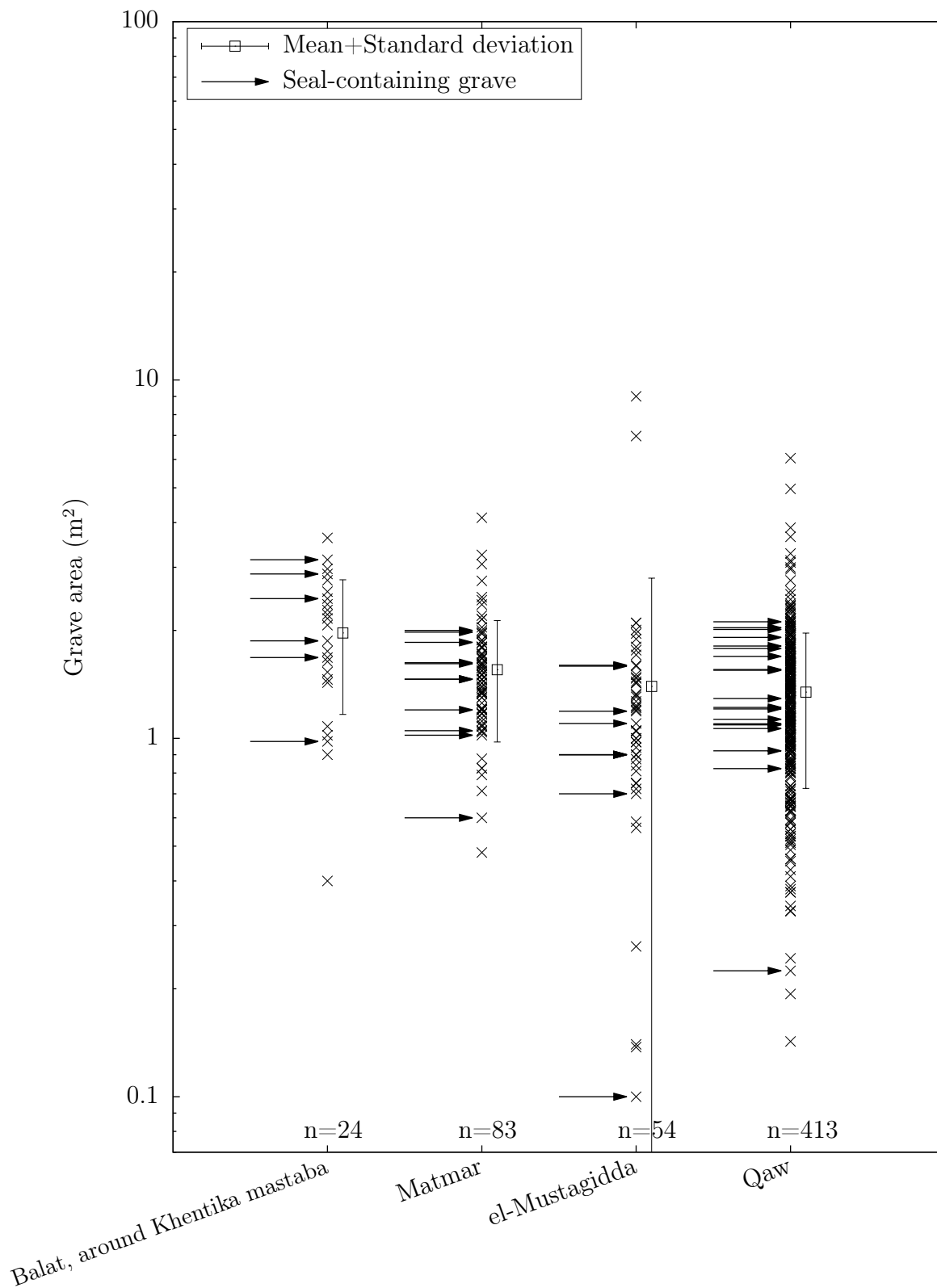


Figure A.33: Distribution of grave sizes in Djer valley Dynasty 1 subsidiary graves, Abydos. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seals.



Cemeteries with graves dated from Dynasty 4-6

Figure A.34: Area of all tomb substructures within cemeteries found to contain seals dated to Dynasty 4-6, plotted on a logarithmic scale. The graves found to contain seals in these cemeteries were dated to approximately Dynasty 4-6. Total number of graves per cemetery (n) is indicated on the graph.

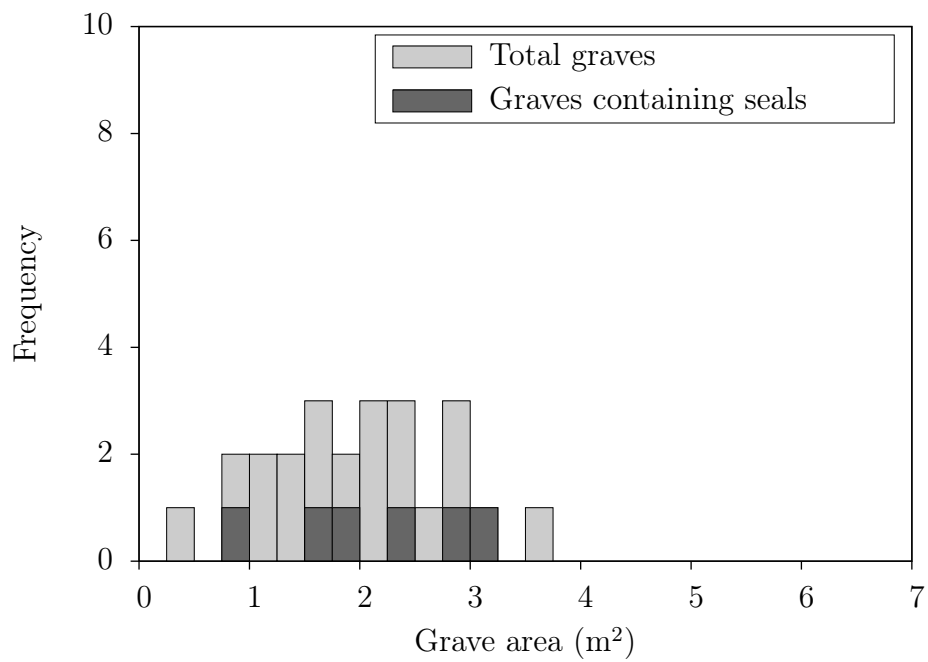


Figure A.35: Distribution of grave sizes in Dynasty 6 graves surrounding the mastaba of Khentika, Ballas. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seals.

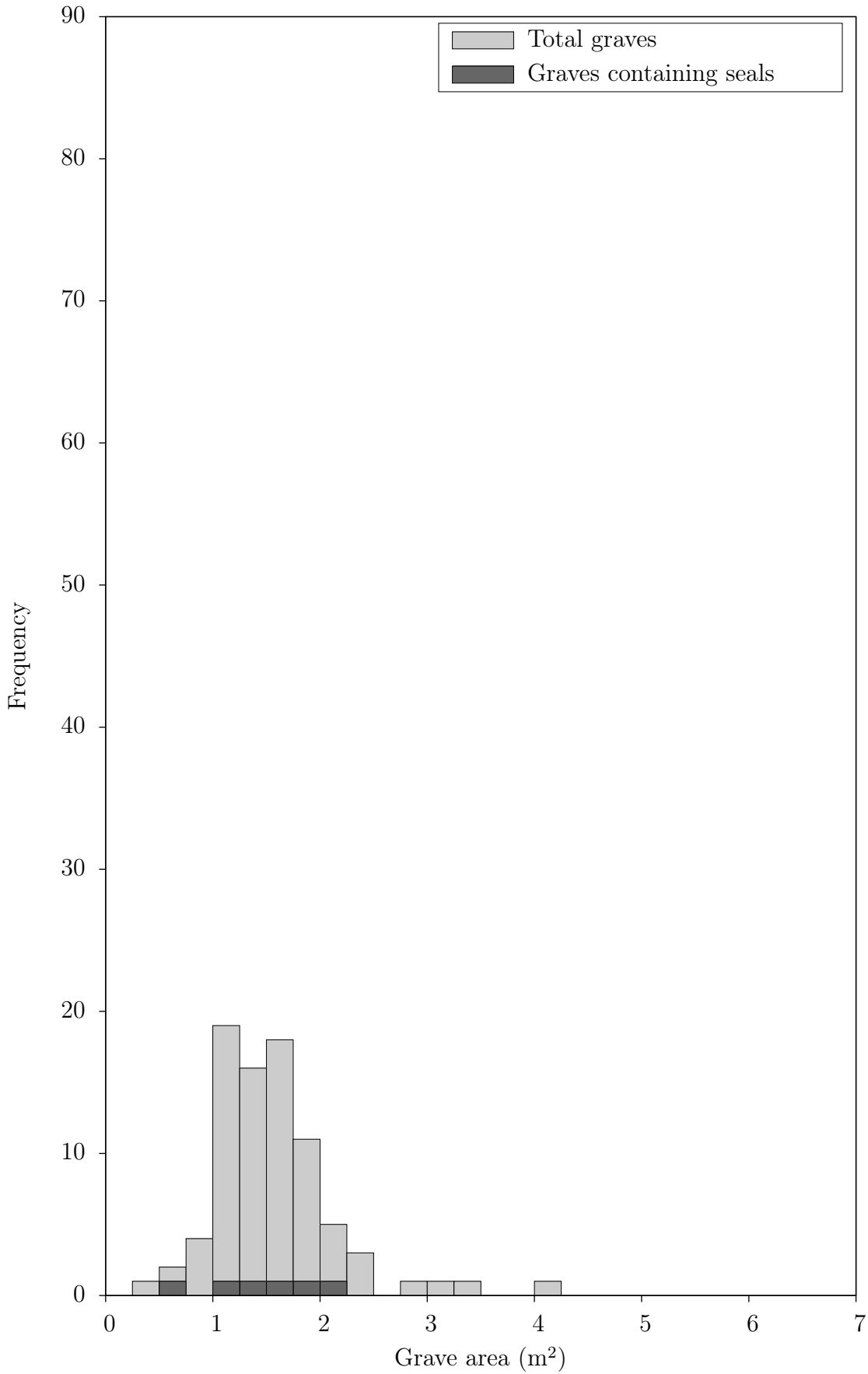


Figure A.36: Distribution of grave sizes in Dynasty 4–6 graves at Matmar. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seals.

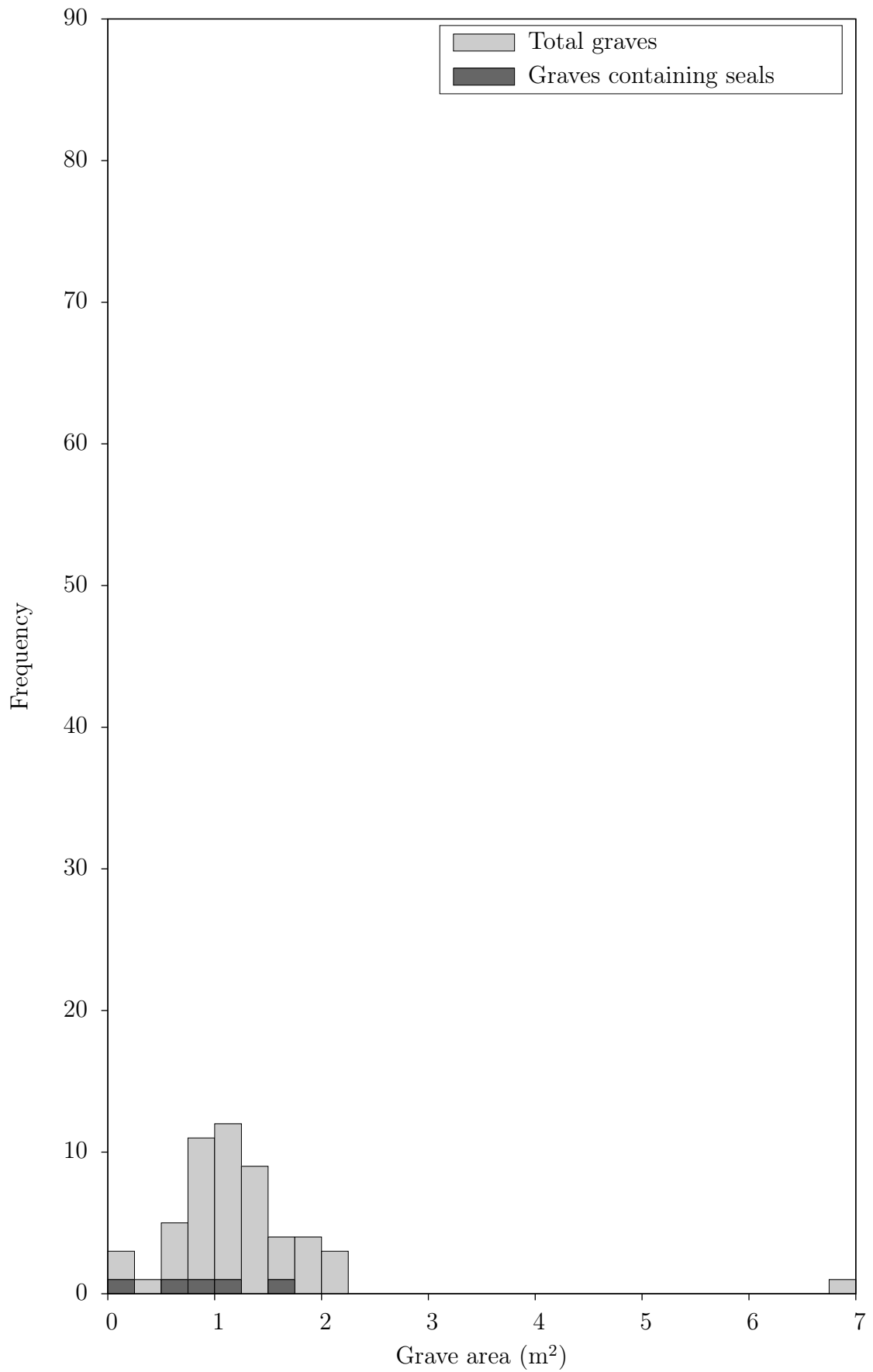


Figure A.37: Distribution of grave sizes in Dynasty 4–6 graves at el-Mustagidda. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seals.

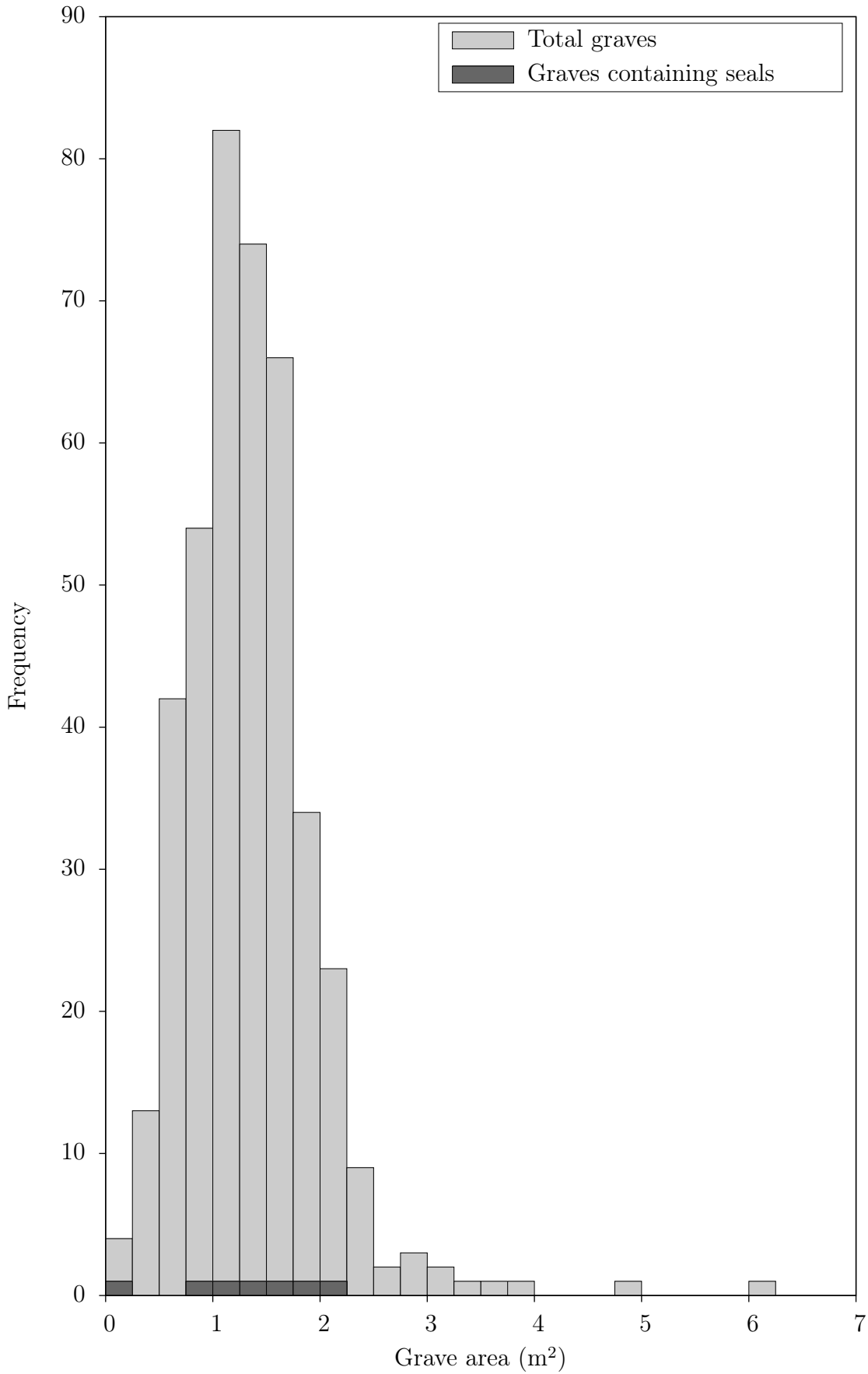


Figure A.38: Distribution of grave sizes in Dynasty 4–6 graves at Qaw. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seals.

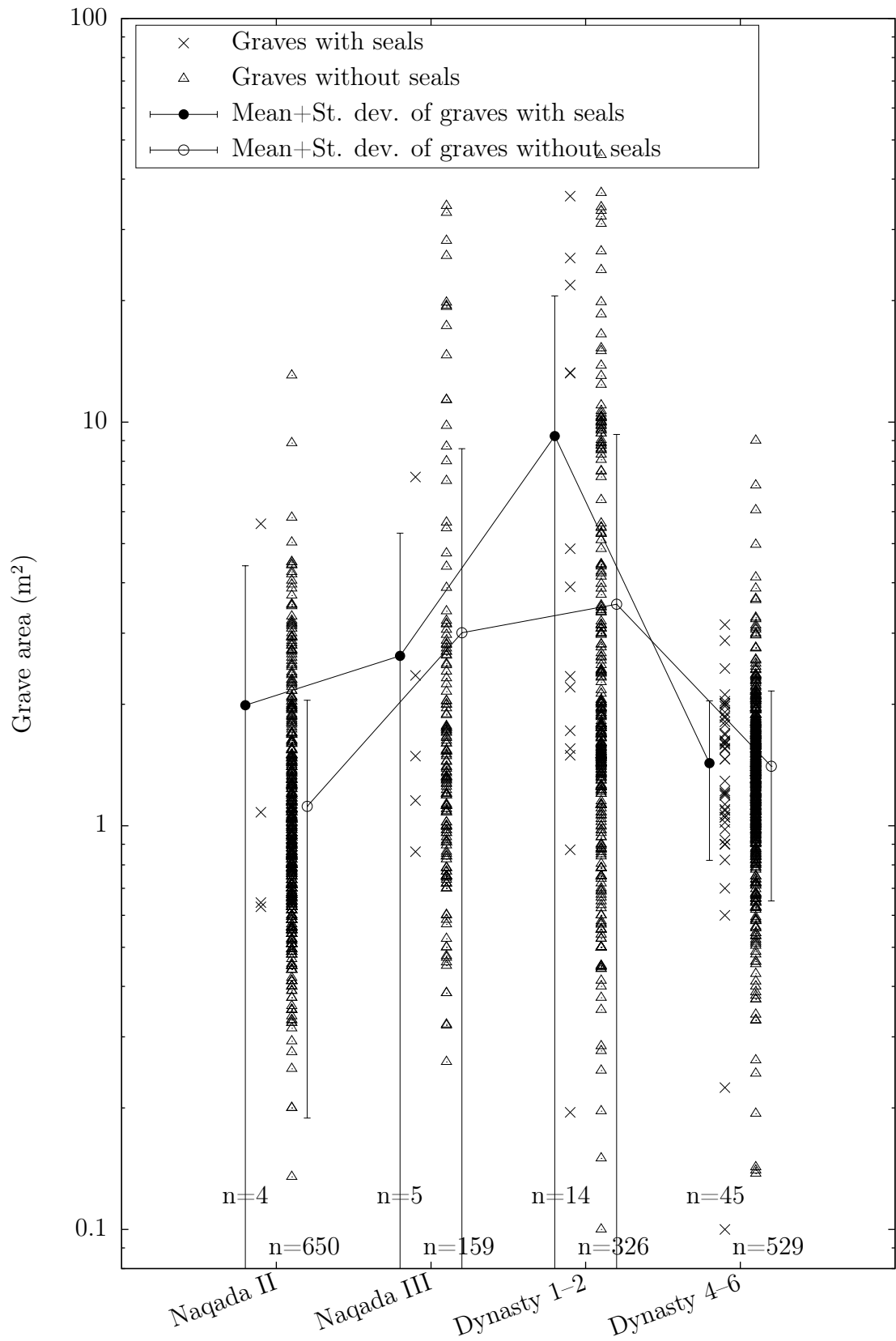


Figure A.39: Area of all tomb substructures within selected cemeteries dated from Naqada II to Dynasty 4-6, that were found to contain seal-containing graves, plotted on a logarithmic scale. Total number of non-seal containing graves and seal-containing graves per era (n) is indicated on the graph.

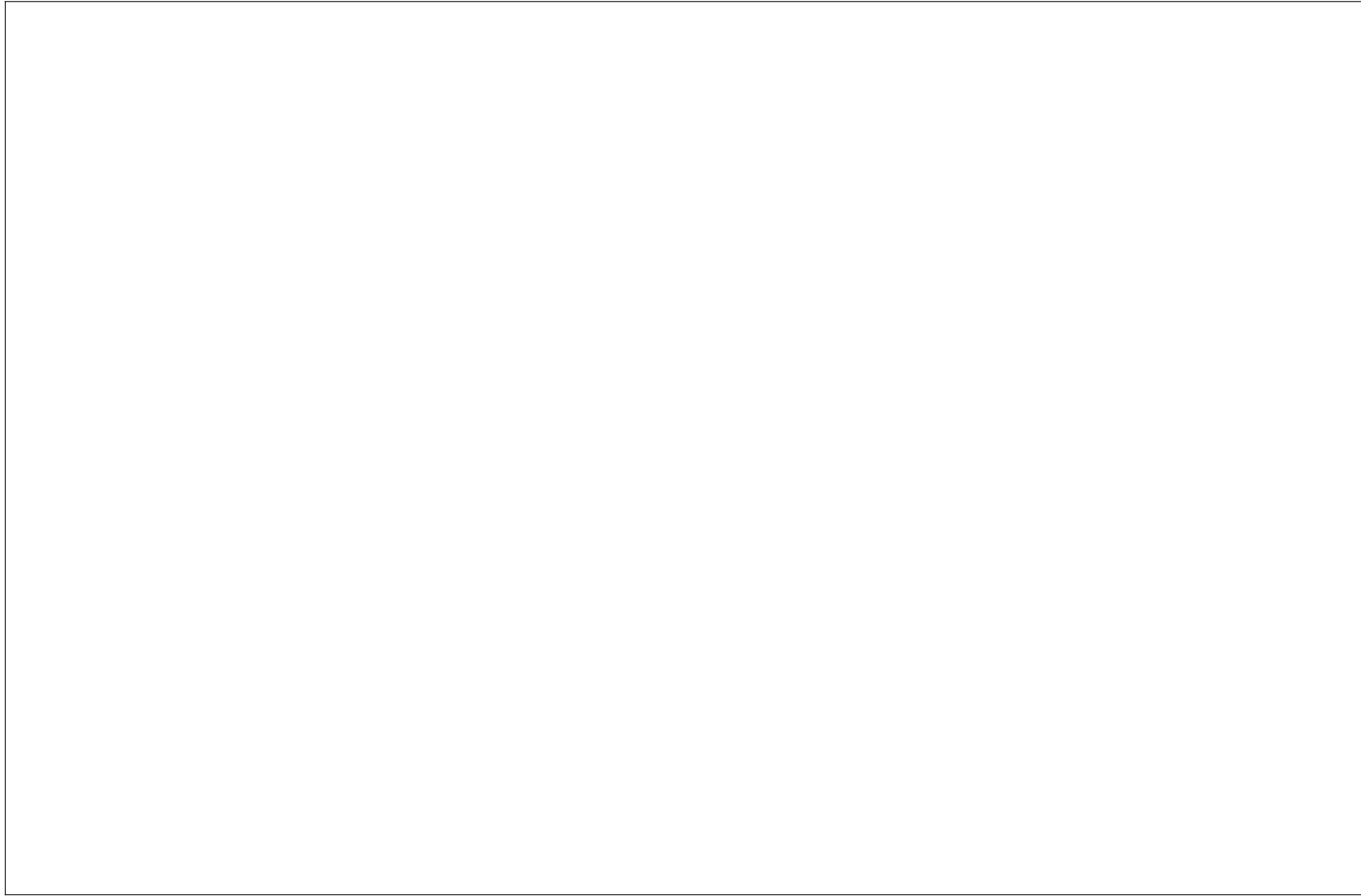


Figure A.40: Nag el-Deir Cemetery 7000. The tombs found to contain a seal are designated by a black circle. Modified from Lythgoe and Dunham (1965).

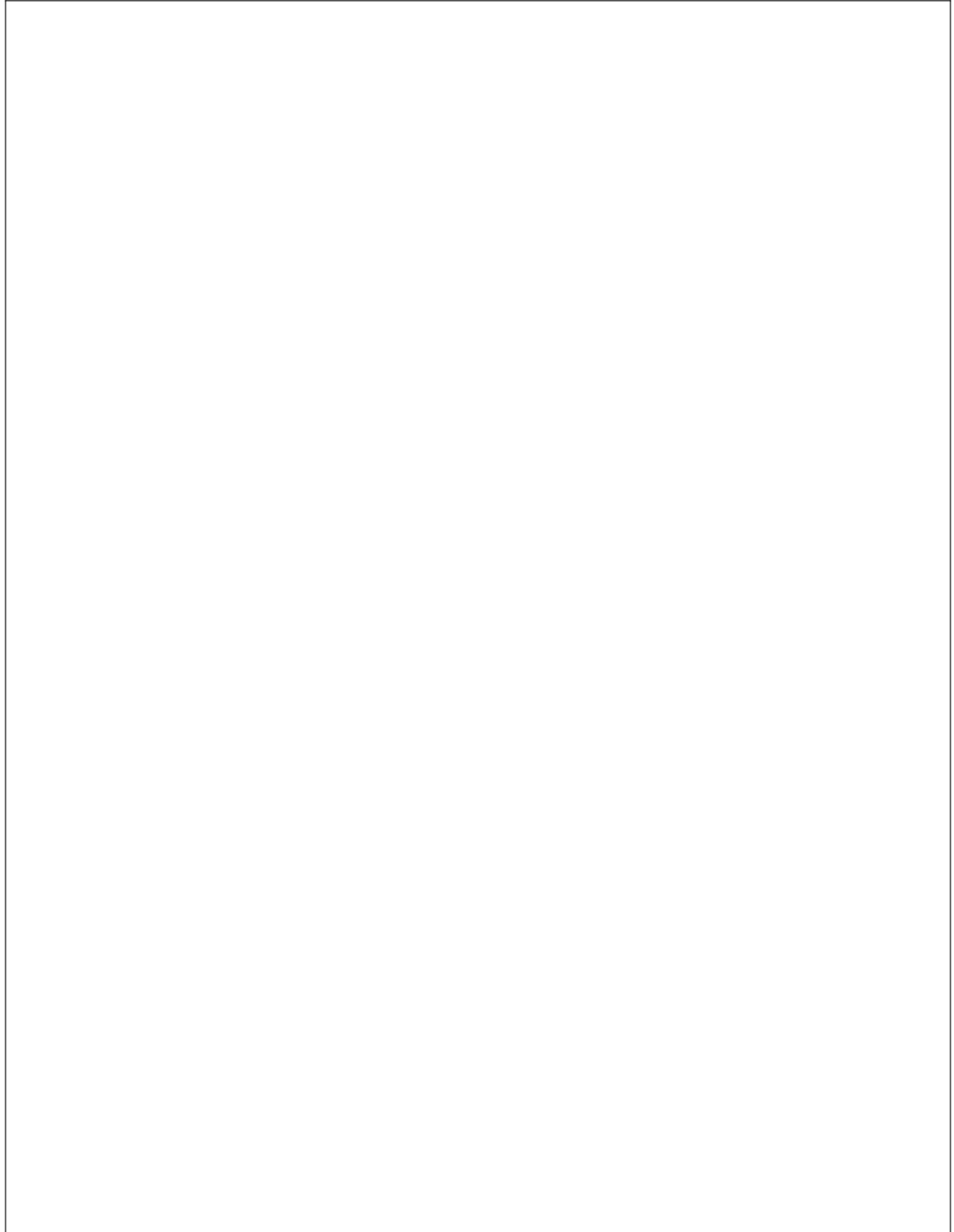


Figure A.41: Qustul Cemetery L. The tomb found to contain a seal is designated by a black circle. Modified from Williams (1986, Plate 4).



Figure A.42: Qustul Cemetery W1. The tomb found to contain a seal is designated by a black rectangle. Modified from Williams (1986, Plate 2).

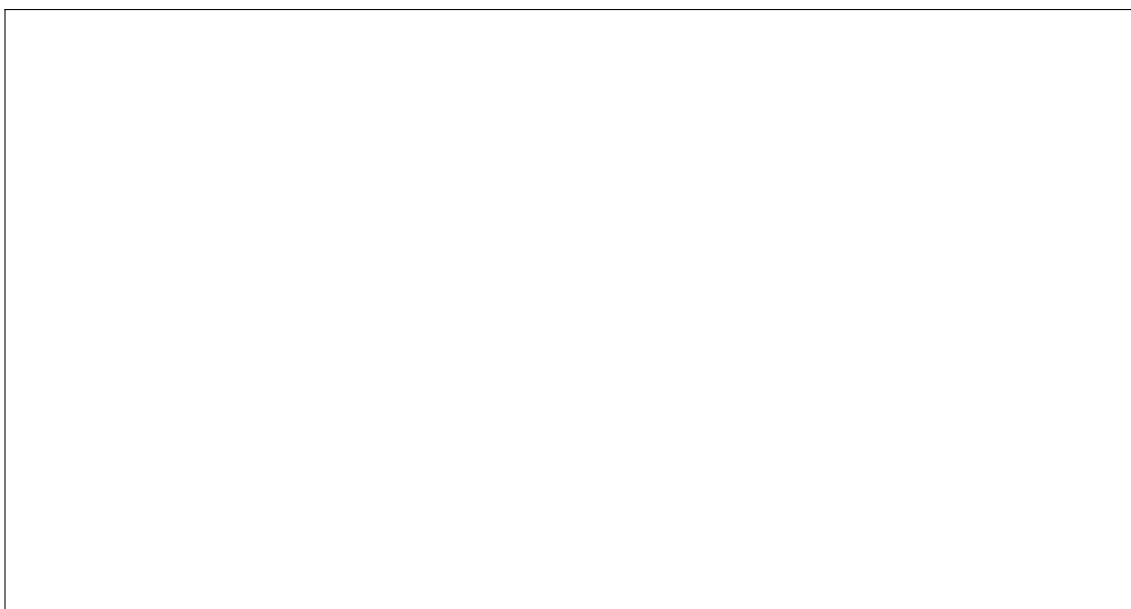


Figure A.43: Qustul Cemetery W2. From Williams (1986, Plate 3).



Figure A.44: Nag el-Deir cemetery 1500. The tombs found to contain seal(s) are designated by black circles. Modified from Reisner (1908, Plate 76).

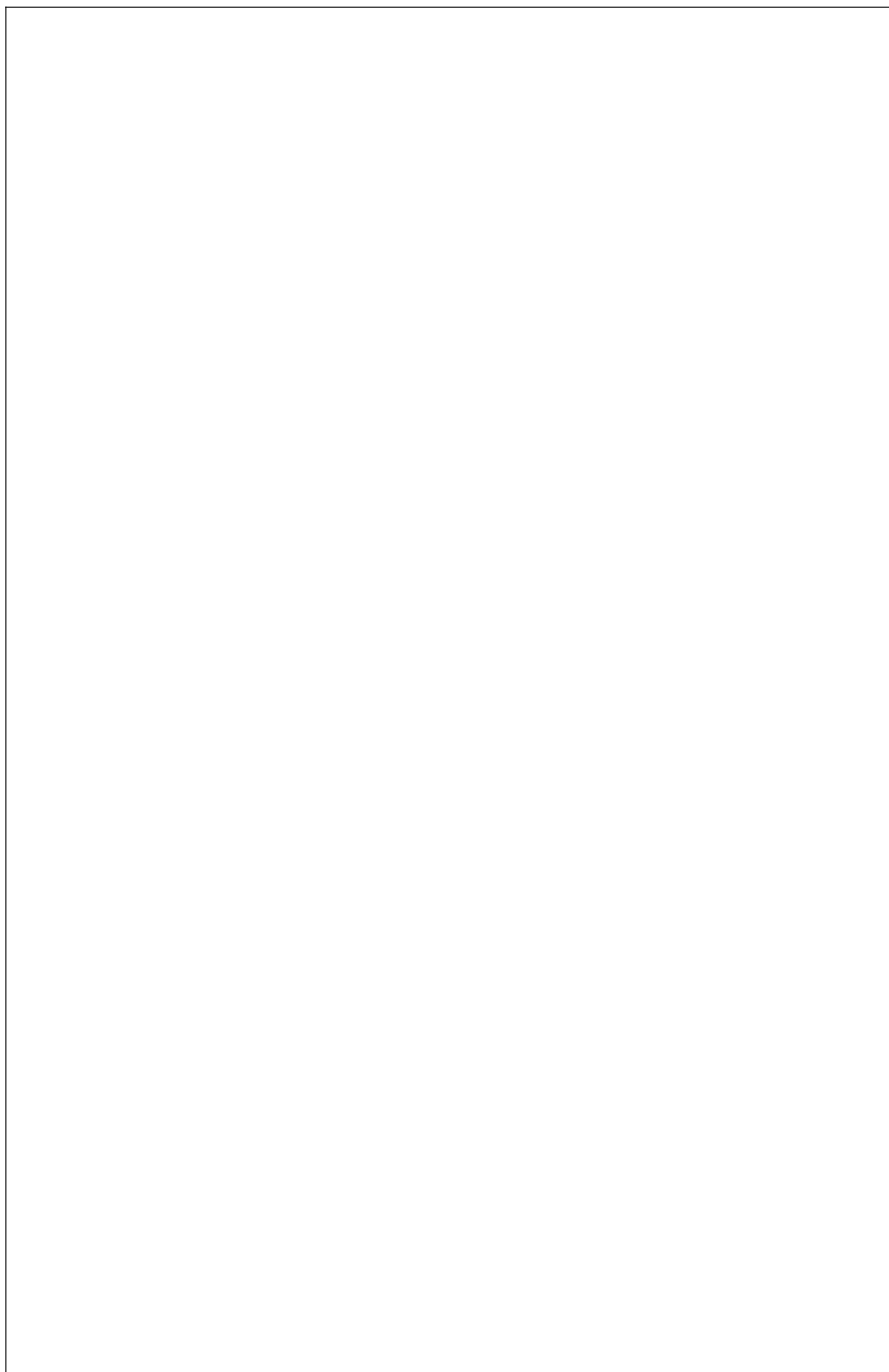


Figure A.45: The valley enclosure of Djer at Abydos. The subsidiary burials found to contain seals are designated by black circles. Modified from Petrie (1925, XVI).

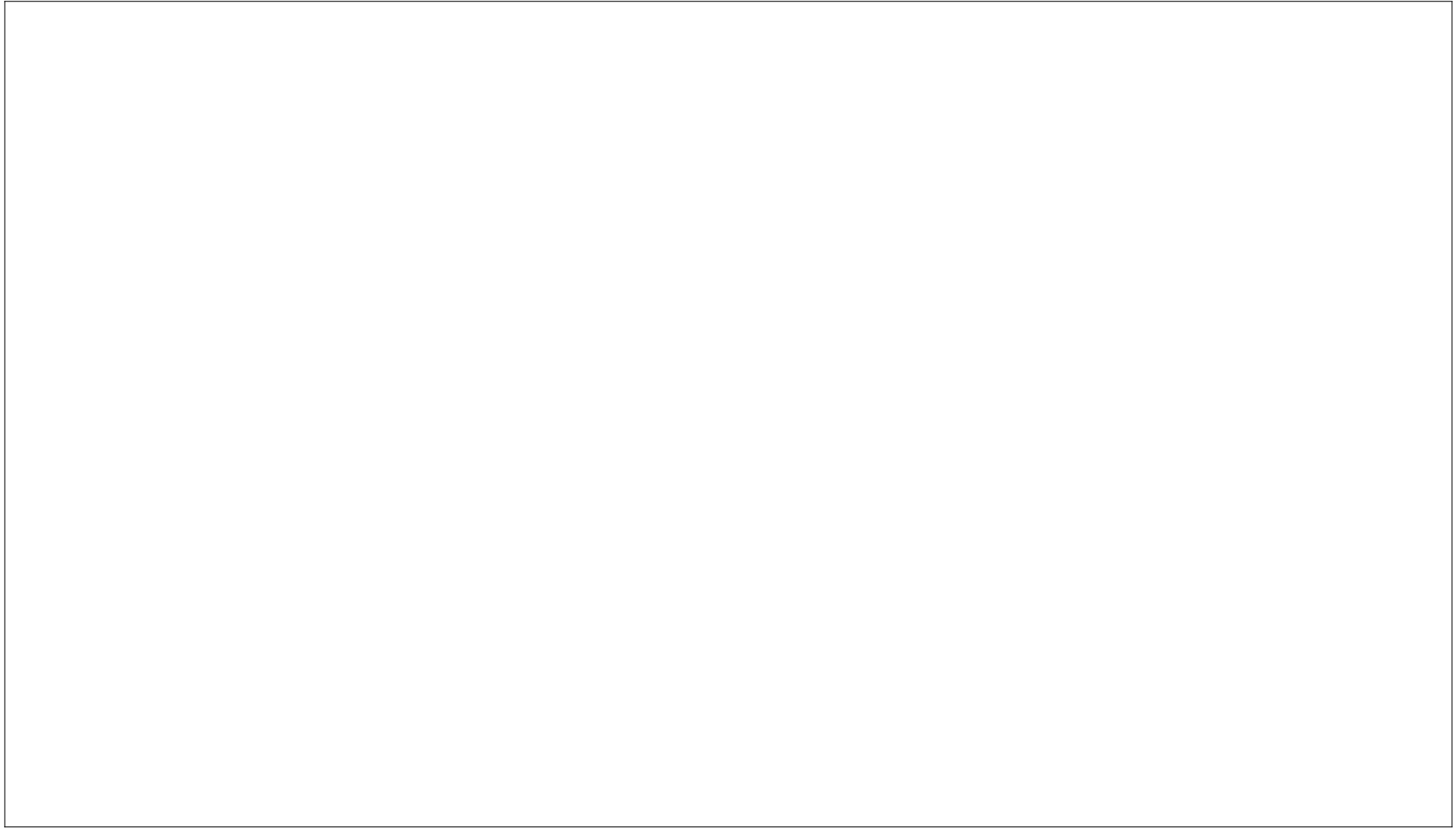


Figure A.46: The royal Cemetery B at Abydos. The subsidiary burials found to contain seals are designated by black circles. Modified from Martin (2011, Figure 2).

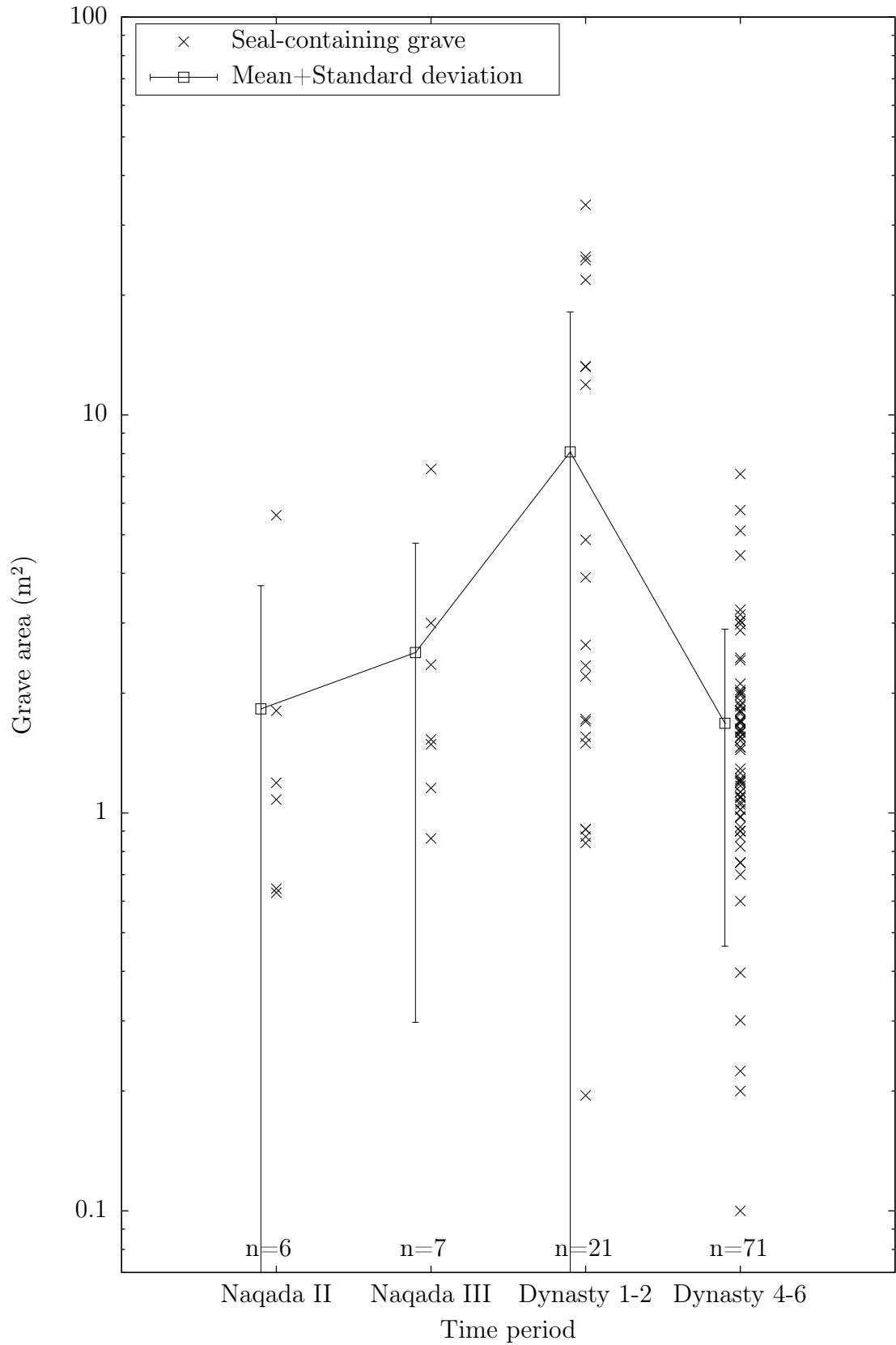


Figure A.47: Area of tomb substructures found to contain seals, from Naqada II to Dynasty 6. Plotted on a logarithmic scale. Data includes measurements from subsidiary burials. Total number of graves per era (n) is indicated on the graph.

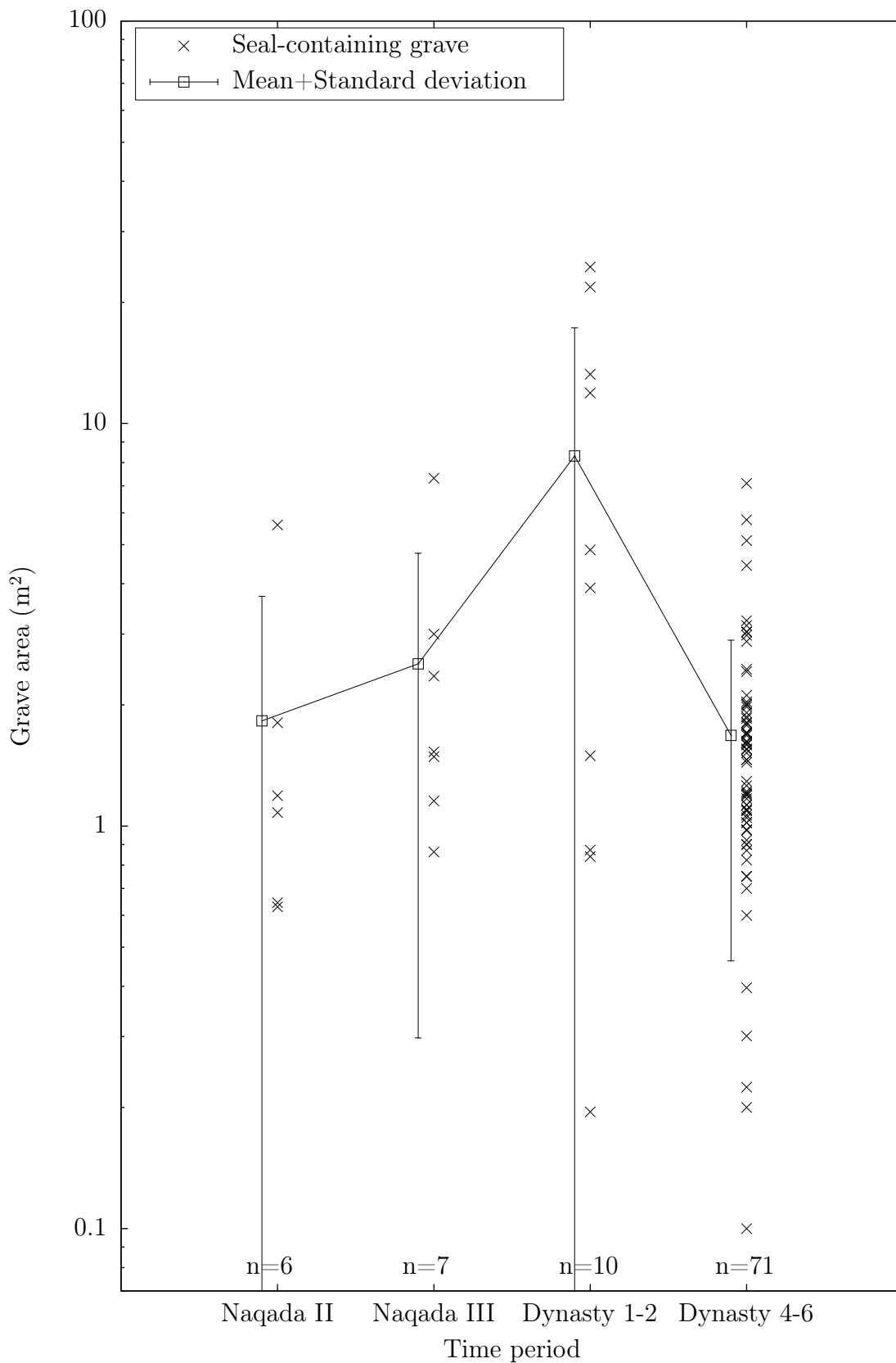


Figure A.48: Area of tomb substructures found to contain seals, from Naqada II to Dynasty 6. Plotted on a logarithmic scale. Data does not include measurements from subsidiary burials. Total number of graves per era (n) is indicated on the graph.

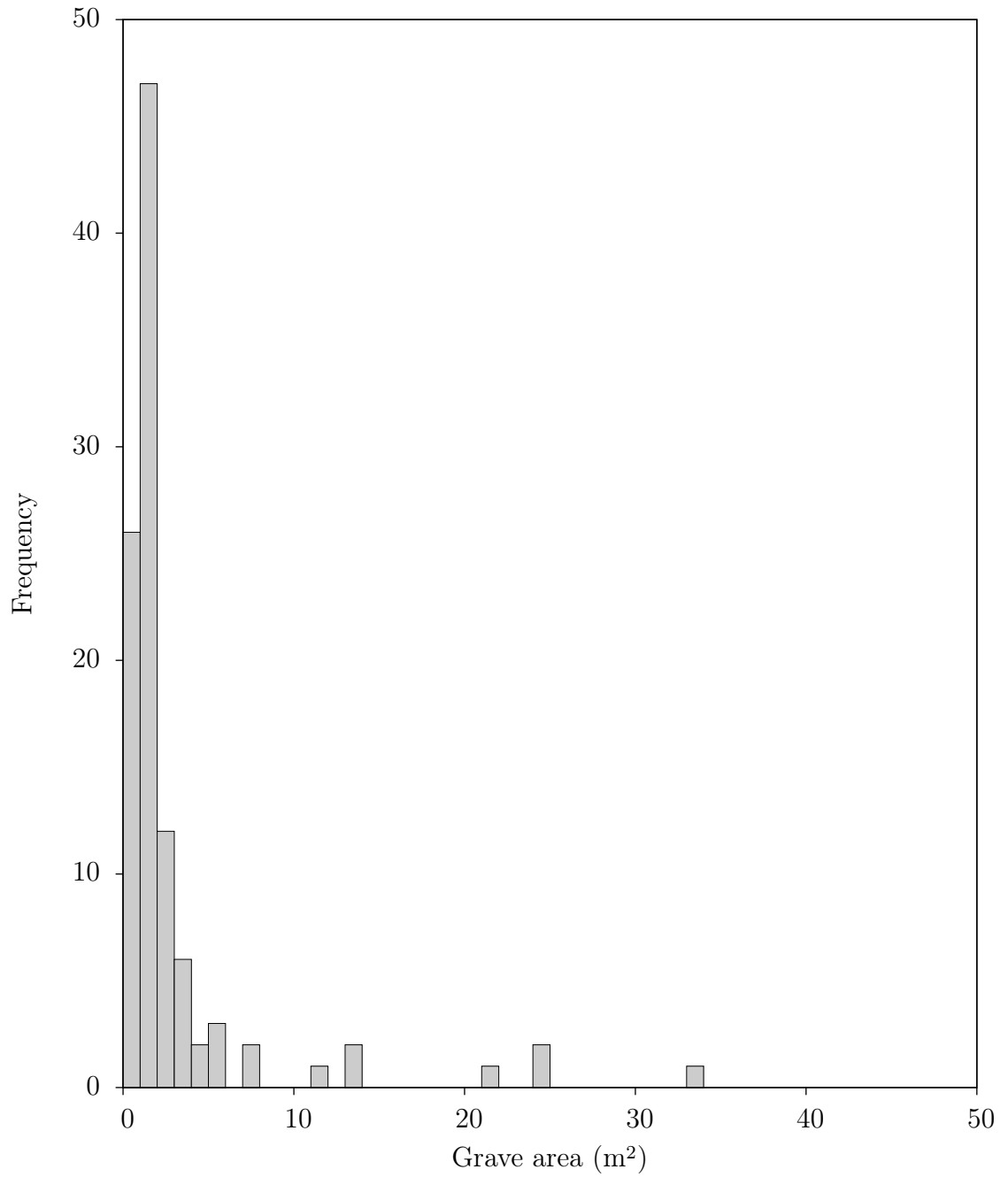


Figure A.49: Distribution of all seal-containing grave sizes from Naqada II to Dynasty 6, a period covering roughly 1300 years. Total number of graves plotted: 104.

Table A.7: Well-documented cemeteries found to contain tombs with seals, total number of seal-containing burials in these cemeteries, average area and standard deviation of seal-containing burials. Data used in Figures A.47 and A.48.

	Total no. of cemeteries	Total no. of graves with seals	Average (m ²)	St. Dev. (m ²)
Naqada II	5	6	1.8	1.9
Naqada III	6	6	2.5	2.3
Dynasty 1–2	10	21	8.1	10
Dynasty 1–2 no subsidiary burials	6	10	8.3	9
Dynasty 4–6	11	71	1.7	1.2

Table A.8: Outliers in the seal-containing burial category.

Era	Burial	Area (m²)
Naqada II	Nag el-Deir N7304	5.6
Naqada III	Helwan 160 H3	3
	Qustul L17	7.3
Dynasty 1–2	Nag el-Deir N1501	4
	Nag el-Deir N1562	4.9
	Abusir Tomb 10B - 2/3	12
	Amra b91	24.5
	Nag el-Deir N1532	13.3
	Abydos, Aha Subsidiary Grave B16 1c	13.2
	Nag el-Deir N1605	21.4
	Abydos, Aha Subsidiary Grave B14	25
Abydos, Aha Subsidiary Grave B13	33.7	
Dynasty 4–6	Saqqara, Tomb M VII, sub-tomb of Senit	5.8
	Saqqara, Tomb M XII, sub-tomb of Wadjet	3
	Balat, mastaba of Medou-Nefer, burial T4	7.1
	Balat, mastaba of Ima-Pepy II, burial Tomb C	5.1
	Balat, mastaba of Khentika, Caveau 5100	4.4
	Balat, mastaba of Ima-Pepy/Ima-Meryre, burial T15	3
	Balat, mastaba of Ima-Pepy/Ima-Meryre, burial T20	3.2
	Balat, graves found outside mastaba complex of Khentika, Tomb 101	3.2

Table A.9: Data on individuals interred with seals by era.

Era	Grave number	Individual(s)	Intact?
Naqada II	Ballas B307	Adult	No
Naqada II	Matmar 3039	NA (plundered)	No
Naqada II	Nag el-Deir N7304	Adult (plundered)	No
Naqada II	Nag el-Deir N7501	Female ('A strongly built woman well on in years')	Yes
Naqada II	Naqada 1863	Female	Yes
Naqada II	Haraga Cemetery H, grave 470	Female	Yes
Naqada III	Faras 4	NA (plundered)	No
Naqada III	Helwan 160 H3	NA (likely plundered)	No
Naqada III	Gezira Dabarosa 6-G-18, grave 55	Adult	Yes
Naqada III	Qustul L17	Apparently adult (going by grave drawing)	No
Naqada III	Qustul W2	Apparently adult (going by grave drawing)	Yes
Naqada III	Saras West cemetery 11-H-6, grave 16	Female, Infant	Yes
Dynasty 1–2	Abusir Tomb 10B - 2/3	NA (Bones drawn on plan, not recorded otherwise)	No
Dynasty 1–2	Wadi north of Abu Simbel, Cemetery 215, Grave 85	Female	No
Dynasty 1–2	el Amra b91	NA (plundered)	No
Dynasty 1–2	Helwan 207 H5	NA	No
Dynasty 1–2	Nag el-Deir N1532	Likely adult going by grave diagram	No
Dynasty 1–2	Nag el-Deir N1562	NA (Plundered)	No
Dynasty 1–2	Nag el-Deir N1605	NA (Plundered)	No
Dynasty 1–2	Nag el-Deir N1501	NA	No
Dynasty 1–2	Nag el-Deir N1604	'Young' individual	No
Dynasty 1–2	Nag el-Deir N3091	'Child'	Yes
Dynasty 1–2	Abydos, Djer Subsidiary Grave 36	NA (Plundered)	No
Dynasty 1–2	Abydos, Djer Subsidiary Grave 59	NA (Plundered)	No

Table A.9: Data on individuals interred with seals by era - (continued)

Era	Grave number	Individual(s)	Intact?
Dynasty 1–2	Abydos, Djer valley enclosure subsidiary grave 467	NA (Plundered)	No
Dynasty 1–2	Abydos, Djer valley enclosure subsidiary grave 511	NA (Plundered)	No
Dynasty 1–2	Abydos, Djer valley enclosure subsidiary grave 654	NA (Plundered)	No
Dynasty 1–2	Abydos, Djer valley enclosure subsidiary grave 772	NA (Plundered)	No
Dynasty 1–2	Abydos, Aha Subsidiary Grave B13	NA (Plundered)	No
Dynasty 1–2	Abydos, Aha Subsidiary Grave B14	NA (Plundered)	No
Dynasty 1–2	Abydos, Aha Subsidiary Grave B16 1c	NA (Plundered)	No
Dynasty 1–2	Saqqara 3500 subsidiary burial 1	Male ('middle-aged')	Yes
Dynasty 1–2	Saqqara 3500 subsidiary burial 2	Female ('old')	Yes
Dynasty 4–6	Elkab burial 166	NA	No
Dynasty 4–6	Tomb M VII, sub-tomb of Senit, Saqqara	NA	No
Dynasty 4–6	Tomb M XII, sub-tomb of Wadjet, Saqqara	NA	No
Dynasty 4–6	mastaba of Medou-Nefer - burial T4, Balat	Male (mature)	Yes
Dynasty 4–6	mastaba of Ima-Pepy II - burial Tomb C, Balat	NA	Yes
Dynasty 4–6	mastaba of Khentika - burial Caveau 5100, Balat	Female	Yes
Dynasty 4–6	mastaba of Ima-Pepy/Ima-Meryre - burial T5, Balat	Female	Yes
Dynasty 4–6	mastaba of Ima-Pepy/Ima-Meryre - burial T22, Balat	Child	Yes
Dynasty 4–6	mastaba of Ima-Pepy/Ima-Meryre - burial T10, Balat	Male	Yes
Dynasty 4–6	mastaba of Ima-Pepy/Ima-Meryre - burial T20, Balat	Female (mature)	Yes

Table A.9: Data on individuals interred with seals by era - (continued)

Era	Grave number	Individual(s)	Intact?
Dynasty 4-6	mastaba of Ima-Pepy/Ima-Meryre - burial T15, Balat	Female	Yes
Dynasty 4-6	Cemetery outside Khentika mastaba, Tomb 30, Balat	Female	Yes
Dynasty 4-6	Cemetery outside Khentika mastaba, Tomb 101, Balat	Female (young)	Yes
Dynasty 4-6	Cemetery outside Khentika mastaba, Tomb 105, Balat	Female, child	No
Dynasty 4-6	Cemetery outside Khentika mastaba, Tomb 113	Female	Yes
Dynasty 4-6	Cemetery outside Khentika mastaba, Tomb 114	Female	No
Dynasty 4-6	Cemetery outside Khentika mastaba, Tomb 118	Female (young)	Yes
Dynasty 4-6	Nag el-Deir N627	Child	No
Dynasty 4-6	Nag el-Deir N505 burial 1	NA	No
Dynasty 4-6	Nag el-Deir N505 burial 2	NA	No
Dynasty 4-6	Nag el-Deir N505 burial 3	NA	No
Dynasty 4-6	Nag el-Deir N506	NA	No
Dynasty 4-6	Nag el-Deir N508 burial I	Infant	Yes
Dynasty 4-6	Nag el-Deir N567	NA	Yes
Dynasty 4-6	Nag el-Deir N609	NA	No
Dynasty 4-6	Nag el-Deir N615	NA	Yes
Dynasty 4-6	Nag el-Deir N731	NA	No
Dynasty 4-6	Nag el-Deir N734	NA	No
Dynasty 4-6	Nag el-Deir N751	NA	Yes
Dynasty 4-6	Nag el-Deir N780	NA	Yes
Dynasty 4-6	Nag el-Deir N898	Female	Yes
Dynasty 4-6	Nag el-Deir N 953 burial II	NA	Yes
Dynasty 4-6	Mostagedda 2673	Female	Yes
Dynasty 4-6	Mostagedda 2618	Female	Yes
Dynasty 4-6	Mostagedda 1420	Female	Yes
Dynasty 4-6	Mostagedda 239	NA	No
Dynasty 4-6	Mostagedda 514C	Female, Female, Child	Yes
Dynasty 4-6	Mostagedda 2614	Female	No
Dynasty 4-6	Mostagedda 10002	Child	Yes

Table A.9: Data on individuals interred with seals by era - (continued)

Era	Grave number	Individual(s)	Intact?
Dynasty 4–6	Mostagedda 10012	Female	No
Dynasty 4–6	Mostagedda 10020	Female	Yes
Dynasty 4–6	Matmar 3208	Female	Yes
Dynasty 4–6	Matmar 3230	Female	No
Dynasty 4–6	Matmar 3210	NA	No
Dynasty 4–6	Matmar 3217	Female	Yes
Dynasty 4–6	Matmar 5301	Female	Yes
Dynasty 4–6	Matmar 5304	Female	Yes
Dynasty 4–6	Matmar 3214	Female	Yes
Dynasty 4–6	Matmar 849	Female	No
Dynasty 4–6	Matmar 3315	Female	Yes
Dynasty 4–6	Matmar 822	Female	Yes
Dynasty 4–6	Matmar 5323	Female	Yes
Dynasty 4–6	Qaw 5531	Female?	No
Dynasty 4–6	Qaw 1145	Female	Yes
Dynasty 4–6	Qaw 955	NA	Yes
Dynasty 4–6	Qaw 686	Female	Yes
Dynasty 4–6	Qaw 1165	Female	No
Dynasty 4–6	Qaw 3141	NA	Yes
Dynasty 4–6	Qaw 712	Female	Yes
Dynasty 4–6	Qaw 1126	Female	Yes
Dynasty 4–6	Qaw 3159	Female	No
Dynasty 4–6	Qaw 3125	Female	Yes
Dynasty 4–6	Qaw 436	Male	No
Dynasty 4–6	Qaw 462	NA	Yes
Dynasty 4–6	Qaw 3217	NA	No
Dynasty 4–6	Qaw 1023	Female	Yes
Dynasty 4–6	Qaw 4913	NA	No
Dynasty 4–6	Qaw 5543	NA	No
Dynasty 4–6	Qaw 1977	Female	Yes
Dynasty 4–6	Qaw 7848	Female	No
Dynasty 4–6	Qaw 7572	NA	No

Table A.10: Cemeteries with tombs found to contain seal impressions. Cemeteries with seal impression-containing tombs of unrecorded dimensions were not included. Grey highlighting indicates the totality of tomb area data (m²) was analysed in Figures A.52–A.56, A.59–A.62, A.65–A.75, Tables A.15 and A.16. White highlighting indicates only the areas of seal-containing tombs from these cemeteries were included in the analysis in Figures A.76–A.79 and Table A.17.

Cemetery name	Graves dated to	Total no. of burials	No. of burials containing seal impressions	Seal-containing graves dated to	Sources for numbers/dates
Abydos cemetery U	Naqada II	30	11	Naqada II	Hendrickx and van den Brink 2002, 358; Dreyer <i>et al.</i> 2000, 2003, Abb. 1
Abydos cemetery U	Naqada IIIA1-III A2	33	9	Naqada III	Hendrickx and van den Brink 2002, 358; Dreyer <i>et al.</i> 2000, 2003, Abb. 1
Hierakonpolis cemetery HK6	Naqada IC–Dynasty 3	43	1	Naqada III	Hierakonpolis Expedition 2015

Table A.10: Cemeteries with tombs found to contain seal impressions - (continued)

Cemetery name	Graves dated to	Total no. of burials	No. of burials containing seal impressions	Seal-containing graves dated to	Sources for numbers/dates
Ashkeit, Site 308	circa Naqada III	36	1	Naqada III	Nordström 1972, 117–118; Takamiya 2004, Table 3
Ashkeit, Site 332	circa Naqada III	28	1	Naqada III	Nordström 1972, 117–118; Takamiya 2004, Table 3
Tell el-Farkha	Naqada III	39	2	Naqada III	Dębowska-Ludwin 2009; Dębowska-Ludwin 2012
Tarkhan	Naqada III–Dynasty 1	2115	3	Naqada III–Dynasty 1	Hendrickx and van den Brink 2002, 351–352; Ellis 1996, 152
Abydos, Umm el-Qaab, Cemetery B	Dynasty 1–2	3	3	Naqada III	Martin 2011, 15

Table A.10: Cemeteries with tombs found to contain seal impressions - (continued)

Cemetery name	Graves dated to	Total no. of burials	No. of burials containing seal impressions	Seal-containing graves dated to	Sources for numbers/dates
Helwan	Naqada III, Dynasty 1–2 (Naqada IIIC1–D)	10258	5	Naqada III, Dynasty 1–2	Hendrickx and van den Brink 2002, 351
Tell el-Farkha	Dynasty 1–2	12	1	Dynasty 1–2	Dębowska-Ludwin 2009; Dębowska-Ludwin 2012
Abu Rawash Cemetery 400	Naqada III–Dynasty 1–2 (Naqada IIIB–C1)	113	1	Dynasty 1–2	Klasens 1959; Hendrickx and van den Brink 2002, 351
Abu Rawash Cemetery M	Dynasty 1–2 (Naqada IIIC1–D)	25	1	Dynasty 1–2	Klasens 1961
Abydos, Umm el-Qaab, Cemetery B	Dynasty 1–2	12	10	Dynasty 1–2	Martin 2011, 15
Abydos, Umm el-Qaab, subsidiary tombs of Djer	Dynasty 1 (Naqada IIIC1)	317	7	Dynasty 1	Martin 2011, 15

Table A.10: Cemeteries with tombs found to contain seal impressions - (continued)

Cemetery name	Graves dated to	Total no. of burials	No. of burials containing seal impressions	Seal-containing graves dated to	Sources for numbers/dates
Abydos, Aha III funerary enclosure	Dynasty 1	3	1	Dynasty 1	Bestock 2009, 86, Figure 60
Abusir	Dynasty 1	117	1	Dynasty 1	Radwan 2000, Fig. 1
Giza mastaba V	Dynasty 1	1	1 (single mastaba)	Dynasty 1	Petrie 1907, 4, Plate III, VI
Saqqara mastabas	Dynasty 1–2	21	21	Dynasty 1–2	Quibell 1923, Plate I, II; Emery 1949, 1954, 1958
Saqqara mastaba 3504 subsidiaries	Dynasty 1	62	1	Dynasty 1	Emery 1954
Saqqara mastaba 3506 subsidiaries	Dynasty 1	10	3	Dynasty 1	Emery 1958
Saqqara, subsidiary graves of Den	Dynasty 1	231	4	Dynasty 1	(Kaiser 1985)

Table A.10: Cemeteries with tombs found to contain seal impressions - (continued)

Cemetery name	Graves dated to	Total no. of burials	No. of burials containing seal impressions	Seal-containing graves dated to	Sources for numbers/dates
Saqqara, grave of Hotepsekhemwy	Dynasty 2	1	1 (single tomb)	Dynasty 2	Kaplony 1963a, 150; Lacher-Raschdorff 2014, 142
Saqqara, grave of Ninetjer	Dynasty 2	1	1 (single tomb)	Dynasty 2	(Regulski and Kahl 2010; Lacher-Raschdorff 2014)
Nag el-Deir 1500	Dynasty 1–2 (Naqada IIIC1–D)	81	1	Dynasty 1–2	Reisner 1908
Nag el-Deir 3000	Dynasty 2 (Naqada IIID)	33	1	Dynasty 1–2	Reisner 1908
el-Kubaniya south	Naqada IIA–Dynasty 1	616	1	Dynasty 1	Hendrickx and van den Brink 2002, 365

Table A.10: Cemeteries with tombs found to contain seal impressions - (continued)

Cemetery name	Graves dated to	Total no. of burials	No. of burials containing seal impressions	Seal-containing graves dated to	Sources for numbers/dates
Turah el-Asmant	Naqada III C1–Dynasty 2	200+	1	Dynasty 1	Hendrickx and van den Brink 2002, 350
Beit Khallaf	Dynasty 3	5	5	Dynasty 3	Garstang and Sethe 1903
Giza, Cemetery G 2100	Dynasty 4–6	204	1	Dynasty 4	Reisner 1942; Reisner and Smith 1955; Giza Archives 2014
Giza, Cemetery G 4000	Dynasty 4–6	332	7	Dynasty 4–5 (1 illegible sealing found, tomb dynasty placement unknown)	Reisner 1942; Reisner and Smith 1955; Giza Archives 2014

Table A.10: Cemeteries with tombs found to contain seal impressions - (continued)

Cemetery name	Graves dated to	Total no. of burials	No. of burials containing seal impressions	Seal-containing graves dated to	Sources for numbers/dates
Giza, Cemetery G 1000	Dynasty 4–6	NA	1	Unknown (sealing illegible)	Reisner 1942; Reisner and Smith 1955; Giza Archives 2014
Giza, Cemetery G 2300	Dynasty 4–6	NA	2	Dynasty 6	Reisner 1942; Reisner and Smith 1955; Giza Archives 2014
Giza, Cemetery G 5000	Dynasty 4–6	NA	4	Dynasty 4–5 (1 illegible sealing found, tomb dynasty placement unknown)	Reisner 1942; Reisner and Smith 1955; Giza Archives 2014

Table A.10: Cemeteries with tombs found to contain seal impressions - (continued)

Cemetery name	Graves dated to	Total no. of burials	No. of burials containing seal impressions	Seal-containing graves dated to	Sources for numbers/dates
Giza, Cemetery G 7000	Dynasty 4–6	NA	5	Dynasty 4–5 (1 illegible sealing found, tomb dynasty placement unknown)	Reisner 1942; Reisner and Smith 1955; Giza Archives 2014
Abusir	Dynasty 5–6	NA	2	Dynasty 5–6	Verner <i>et al.</i> 2002; Bárta <i>et al.</i> 2009

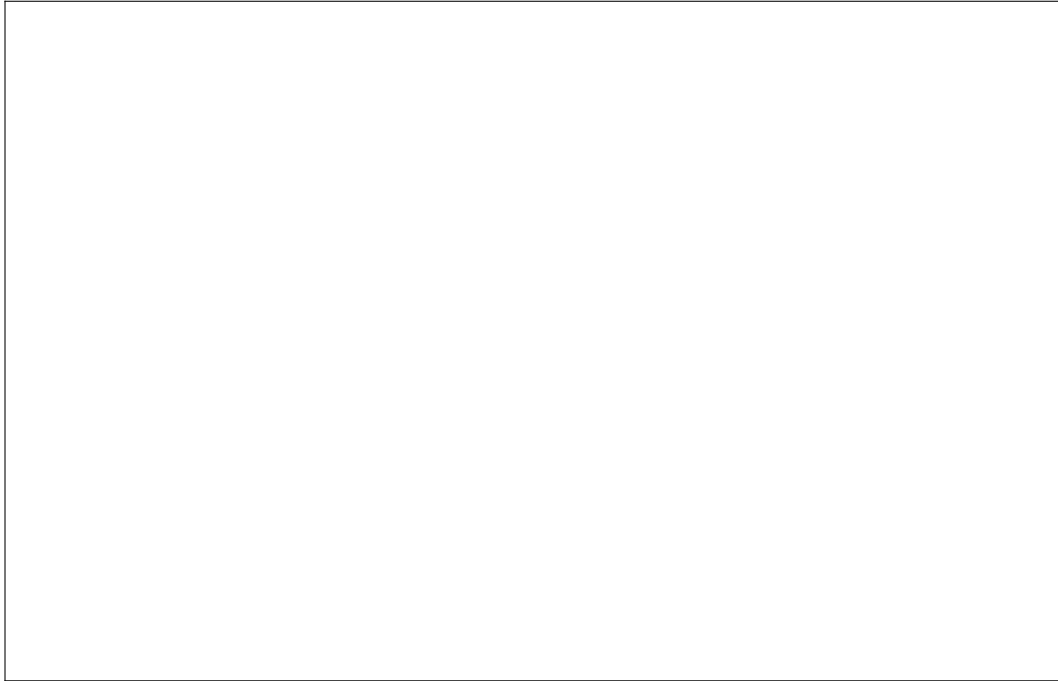


Figure A.50: Plan of Saqqara mastaba tomb 3471. Note that the compartments labelled Y, V, S, O, K, H, and E were dug into the subsoil. From Emery (1949, 13).

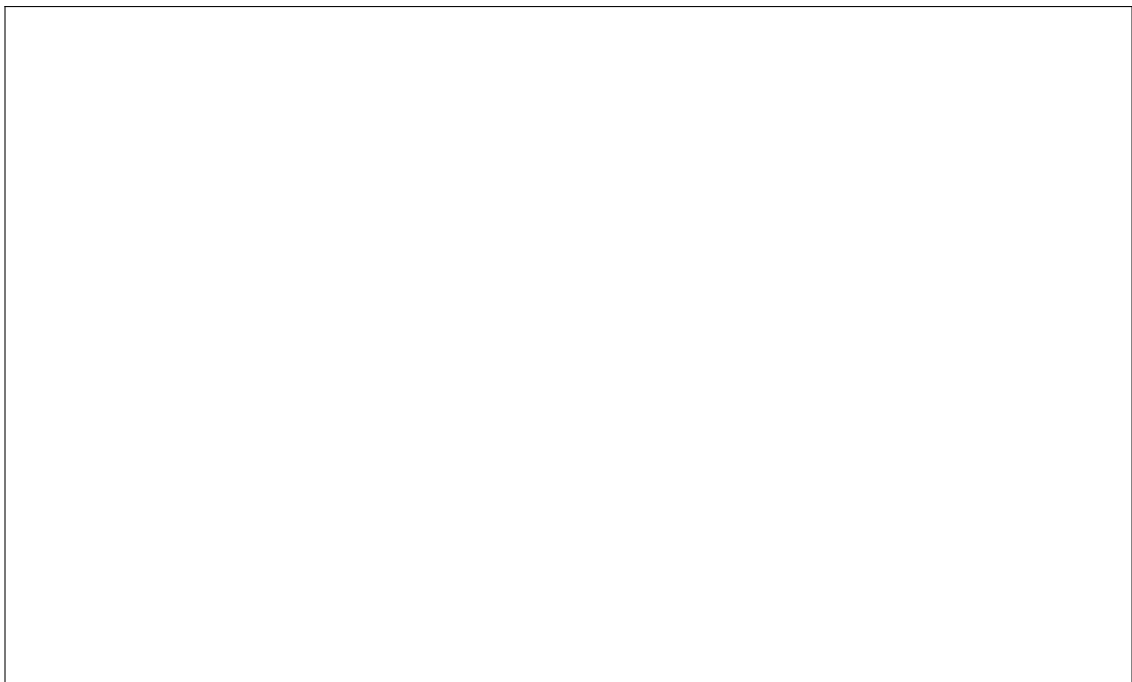


Figure A.51: Photograph showing the superstructure of Saqqara mastaba tomb 3471, as seen from the North. From Emery (1949, Plate 3, A).

Table A.11: Naqada II graves found to contain seal impressions.

Grave number	Seal impression fragment quantity	Disturbed/ undisturbed	Area of grave (m ²)	Inner/ outer measurement?	Source
Abydos elite Cemetery U, U-127	9	Disturbed	8.1	Inner	Dreyer <i>et al.</i> 1993, 26–27; Hartung 1998, 189–193
Abydos elite Cemetery U, U-133	3	Disturbed	8	Inner	Dreyer <i>et al.</i> 1996, 15–17; Hartung 1998, 194
Abydos elite Cemetery U, U-134	4	Disturbed	4.2	Inner	Dreyer <i>et al.</i> 1996, 17–18; Hartung 1998, 194–196
Abydos elite Cemetery U, U-153	3	Disturbed	2	Inner	Dreyer <i>et al.</i> 2000, 47; Hartung 1998, 197
Abydos elite Cemetery U, U-156	1	Disturbed	4.2	Inner	Dreyer <i>et al.</i> 2003, 73
Abydos elite Cemetery U, U-170	4	Disturbed	3.2	Inner	Dreyer <i>et al.</i> 2000, 47–48; Hartung 1998, 197–200
Abydos elite Cemetery U, U-210	3	Disturbed	9	Inner	Dreyer <i>et al.</i> 1996, 20; Hartung 1998, 200–202
Abydos elite Cemetery U, U-335	1	Disturbed	13.9	Inner	Dreyer <i>et al.</i> 2000, 52
Abydos elite Cemetery U, U-343	3	Disturbed	4.5	Inner	Dreyer <i>et al.</i> 2000, 54–55
Abydos elite Cemetery U, U-361	2	Disturbed	8.4	Inner	Dreyer <i>et al.</i> 2000, Abb. 1; Hartung 1998, 202–204

Table A.11: Naqada II graves found to contain seal impressions - (continued)

Grave number	Seal impression fragment quantity	Disturbed/ undisturbed	Area of grave (m ²)	Inner/ outer measurement?	Source
Abydos elite Cemetery U, U-362	1	Disturbed	9.4	Inner	Dreyer <i>et al.</i> 2000, 335; Hartung 1998, 204

Table A.12: Naqada III graves found to contain seal impressions.

Grave number	Seal impression fragment quantity	Disturbed/ undisturbed	Area of grave (m ²)	Inner/ outer measurement?	Source
Abydos elite Cemetery U, U-s	2+	Disturbed	16.8	Inner	Dreyer <i>et al.</i> 1990, 57–58; Dreyer <i>et al.</i> 2003, 79. Exact no. of sealings not known, but 2+ definitely found.
Abydos elite Cemetery U, U-w	2+	Disturbed	17.3	Inner	Dreyer <i>et al.</i> 1990, 60; Dreyer <i>et al.</i> 2003, 79. Exact no. of sealings not known, but 2+ definitely found.
Abydos elite Cemetery U, U-o	1	Disturbed	10.3	Inner	Dreyer <i>et al.</i> 1996, 26–27; Hartung 2001, 229
Abydos elite Cemetery U, U-j	360	Disturbed	68.4	Inner	Dreyer 1998, 4; Hartung 2001, 216
Abydos elite Cemetery U, U-k	3	Disturbed	16.6	Inner	Dreyer <i>et al.</i> 1993, 35–36; Hartung 2001, 227
Abydos elite Cemetery U, U-g	1	Disturbed	7.2	Inner	Dreyer <i>et al.</i> 1993, 28–29, listed here as U-h; Hartung 1998, 204
Abydos elite Cemetery U, U-h	1	Disturbed	7.7	Inner	Dreyer <i>et al.</i> 1993, Abb. 3, listed here as U-g; Hartung 1998, 204
Abydos elite Cemetery U, U-i	4	Disturbed	14.2	Inner	Dreyer <i>et al.</i> 1993, 32–33; Hartung 2001, 230

Table A.12: Naqada III graves found to contain seal impressions - (continued)

Grave number	Seal impression fragment quantity	Disturbed/ undisturbed	Area of grave (m ²)	Inner/ outer measurement?	Source
Abydos elite Cemetery U, U-a	1	Disturbed	31	Inner	Dreyer <i>et al.</i> 1993, 26; Hartung 2001, 230
Abydos royal Cemetery B, Chambers B1, B2, tomb of ruler Iri-Hor	2+	Disturbed	43.4	Outer	Kaiser and Dreyer 1982, Abb. 4. Several sealed fragments said to exist in Kaiser and Dreyer (1982, 230).
Abydos royal Cemetery B, Chambers B7, B9, tomb of ruler Sekhen/Ka	1	Disturbed	50.1	Outer	Kaiser and Dreyer 1982, Abb. 1. Sealings total from Kaplony (1963a, 62).
Abydos royal Cemetery B, Chambers B17, B18, tomb of ruler Narmer	23	Disturbed	58.1	Outer	Kaiser and Dreyer 1982, Abb. 1. Sealings total from Kaplony (1963a, 69).
Ashkeit, Site 308, Grave 63	1	Disturbed	1.5	Inner	Nordström 1972, 167–168
Ashkeit, Site 332, Grave 42	1	Undisturbed	2.4	Inner	Nordström 1972, 178–179
Farkha grave 30	1	Undisturbed	2	Outer	Dębowska-Ludwin 2012, 64
Farkha grave 49	1	Disturbed	0.3	Outer	Dębowska-Ludwin 2009, 473
Hierakonpolis elite cemetery HK6 Tomb 10	1	Disturbed	8.93	Inner	Adams and Friedman 1992, 330; van den Brink 1992, 265

Table A.12: Naqada III graves found to contain seal impressions - (continued)

Grave number	Seal impression fragment quantity	Disturbed/ undisturbed	Area of grave (m ²)	Inner/ outer measurement?	Source
Tarkhan mastaba grave 414	45	Disturbed	6	Inner	Petrie <i>et al.</i> 1913, 9. Sealings total from Kaplony 1963a, 65.

Table A.13: Dynasty 1–2 graves found to contain seal impressions.

Grave number	Seal impression fragment quantity	Disturbed/ undisturbed	Area of grave (m ²)	Inner/ outer measurement?	Source
Abu Rawash, Grave 469	1	Disturbed	6	Inner	Klasens 1959, 42, 57–58, Pl. XXVII,3
Abu Rawash, tomb M25	1	Disturbed	4.1	Inner	Klasens 1961, 110, 123–124, Fig. 10, Pl. XXV
Abusir, Grave XIV	1	Disturbed	20.5	Outer	Radwan 1995, 313; Radwan 2000, Fig. 1
Abydos royal Cemetery B, Chambers B10, B15, B19, tomb of ruler Aha	42	Disturbed	302.4	Outer	Kaiser and Dreyer 1982, Abb. 2. Sealings total from Kaplony (1963a, 61).
Abydos royal Cemetery B, Tomb O, tomb of ruler Djer	167	Disturbed	309.6	Outer	Dreyer <i>et al.</i> 2011, Abb. 1. Sealings total from Kaplony (1963a, 75–77), minus the 7 sealings found in subsidiary burials according to Amélineau (1904).
Abydos royal Cemetery B, Tomb Z, tomb of ruler Djet	54	Disturbed	161.6	Outer	Petrie 1900, Plate LXI. Sealings total from Kaplony (1963a, 82–83).
Abydos royal Cemetery B, Tomb Y, tomb of ruler Merneith	56	Disturbed	228.4	Outer	Petrie 1900, Plate LXI. Sealings total from Kaplony (1963a, 90–92).

Table A.13: Dynasty 1–2 graves found to contain seal impressions - (continued)

Grave number	Seal impression fragment quantity	Disturbed/ undisturbed	Area of grave (m ²)	Inner/ outer measurement?	Source
Abydos royal Cemetery B, Tomb T, tomb of ruler Den	227	Disturbed	453.6	Outer	Dreyer <i>et al.</i> 1993, Abb. 13; Müller 2012, 18. Sealings total from Kaplony (1963a, 95–96, 99–103, 127).
Abydos royal Cemetery B, Tomb X, tomb of ruler Adjib	34	Disturbed	102.6	Outer	Petrie 1900, Plate LXI. Sealings total from Kaplony (1963a, 137–138).
Abydos royal Cemetery B, Tomb U, tomb of ruler Semerkhet	17	Disturbed	123.2	Inner	Dreyer <i>et al.</i> 2011, 72. Sealings total from Kaplony (1963a, 142).
Abydos royal Cemetery B, Tomb Q, tomb of ruler Qa'a	29	Disturbed	352.4	Outer	Dreyer <i>et al.</i> 1996, Abb. 19. Sealings total from Kaplony (1963a, 144–145).
Abydos royal Cemetery B, Tomb P, tomb of ruler Peribsen	233	Disturbed	270	Outer	Dreyer <i>et al.</i> 2006, Abb. 13. Sealings total from Kaplony (1963a, 154–155, 157–158).
Abydos royal Cemetery B, Tomb V, tomb of ruler Khasekhemwy	281	Disturbed	1014.4	Outer	Dreyer <i>et al.</i> 2003, Abb. 16. Sealings total from Kaplony (1963a, 160–161).
Abydos royal Cemetery B, Tomb O, Djer subsidiary burial 27	1	Disturbed	4.2	Inner	Amélineau 1904, 63–66

Table A.13: Dynasty 1–2 graves found to contain seal impressions - (continued)

Grave number	Seal impression fragment quantity	Disturbed/ undisturbed	Area of grave (m ²)	Inner/ outer measurement?	Source
Abydos royal Cemetery B, Tomb O, Djer subsidiary burial 33	1	Disturbed	4.9	Inner	Amélineau 1904, 74–75
Abydos royal Cemetery B, Tomb O, Djer subsidiary burial 39	1	Disturbed	4.2	Inner	Amélineau 1904, 79–81
Abydos royal Cemetery B, Tomb O, Djer subsidiary burial 80	1	Disturbed	2.7	Inner	Amélineau 1904, 119–121
Abydos royal Cemetery B, Tomb O, Djer subsidiary burial 83	1	Disturbed	4	Inner	Amélineau 1904, 123–126
Abydos royal Cemetery B, Tomb O, Djer subsidiary burial 97	1	Disturbed	2.1	Inner	Amélineau 1904, 230–231
Abydos royal Cemetery B, Tomb O, Djer subsidiary burial 100	1	Disturbed	1.5	Inner	Amélineau 1904, 236
Abydos Aha III Enclosure north-east subsidiary grave	1	Undisturbed	6.9	Outer	Bestock 2009, 86, Figure 60
Farkha grave 50	1	Undisturbed	11.6	Outer	Dębowska-Ludwin 2009, 473
Giza mastaba V	10	Disturbed	404	Outer	Daressy 1905, 103; Petrie 1907, 4, Plate III, VI

Table A.13: Dynasty 1–2 graves found to contain seal impressions - (continued)

Grave number	Seal impression fragment quantity	Disturbed/ undisturbed	Area of grave (m ²)	Inner/ outer measurement?	Source
Helwan 1371 H2	2	Disturbed	68.2	Outer	Saad 1947, 109, XXXVIII, LII
Helwan 1380 H2	1	Disturbed	9	Outer	Saad 1947, 110, LIV, Map 3
Helwan 505 H4	3	Disturbed	40.8	Outer	Saad 1951, 15–17, XII, XIII, Plan 11
Helwan 4/1	7	Disturbed	75.5	Likely inner	Köhler <i>et al.</i> 2014, 13–14, 74–75, 95–131
Helwan 4/35	1	Disturbed	10.8	Likely inner	Köhler <i>et al.</i> 2014, 22, 81, 293–303
Kubaniya South Grave P225	1	Disturbed	1	Likely inner	Junker 1919, 135
Nag-el Deir N1514	1	Disturbed	37	Likely inner	Reisner 1908, 44–46; Reisner 1936, 131
Nag-el Deir N3023	1	Disturbed	1.8	Outer	Reisner 1908, 84, 100, Plate 43; Reisner 1936, 131
Saqqara mastaba 2185	11	Disturbed	74.7	Outer	Quibell 1923, 16, Plate V, IX; Reisner 1936, 29–30
Saqqara mastaba 2171	1	Disturbed	40.4	Inner	Quibell 1923, 23; Reisner 1936, 138–139

Table A.13: Dynasty 1–2 graves found to contain seal impressions - (continued)

Grave number	Seal impression fragment quantity	Disturbed/ undisturbed	Area of grave (m ²)	Inner/ outer measurement?	Source
Saqqara mastaba 2302	2	Disturbed	122.8	Inner	Quibell 1923, 28–29; Reisner 1936, 138–139
Saqqara mastaba 2322	4	Disturbed	26.6	Inner	Quibell 1923, 34; Reisner 1936, 141
Saqqara mastaba 2498	4	Disturbed	28	Inner	Quibell 1923, 44–46; Reisner 1936, 139–140
Saqqara mastaba 3471	42	Disturbed	89.6	Inner	Emery 1949, 14, 17–18. Sealings total from Kaplony (1963a, 81).
Saqqara mastaba 3036	2+	Disturbed	120	Outer	Emery 1949, 75, Plate 14. Sealings total from Kaplony (1963a, 135–136).
Saqqara mastaba 3038	8+	Disturbed	124.6	Outer	Emery 1949, 82, Plate 22. Sealings total from Kaplony (1963a, 140–141).
Saqqara mastaba 3111	73+	Disturbed	98.8	Outer	Emery 1949, 98, Plate 36. Sealings total from Kaplony (1963a, 141).
Saqqara mastaba X	4+	Disturbed	32.4	Inner	Emery 1949, 109, Plate 43. Sealings total from Emery (1949, 135).
Saqqara mastaba 3121	2+	Disturbed	58.2	Inner	Emery 1949, 119, Plate 48. Sealings total from Emery (1949, 119).

Table A.13: Dynasty 1–2 graves found to contain seal impressions - (continued)

Grave number	Seal impression fragment quantity	Disturbed/ undisturbed	Area of grave (m ²)	Inner/ outer measurement?	Source
Saqqara mastaba 3120	2+	Disturbed	17.1	Inner	Emery 1949, 123, Plate 53. Sealings total from Emery (1949, 123).
Saqqara mastaba 3504	225	Disturbed	122.7	Inner	Emery 1954, 5, 114–127, Plate II. Sealings total from Kaplony (1963a, 85–87).
Saqqara mastaba 3503	85	Disturbed	37	Inner	Emery 1954, 128, 133, 168–170
Saqqara mastaba 3505	39	Disturbed	56.7	Inner	Emery 1958, 5,9–10, 32, Plate 4
Saqqara mastaba 3506	181	Disturbed	201.1	Inner	Emery 1958, 37, 62–66, Plate 40, 43. Sealings total from Kaplony (1963a, 95–96, 99–103, 127), minus two found in subsidiary burials 1 and 10.
Saqqara mastaba 3507	15	Disturbed	16.5	Inner	Emery 1958, 77, 79, 95
Saqqara mastaba 3500	16	Disturbed	108.2	Inner	Emery 1958, 103, 109, Plate 114
Saqqara mastaba 3035	20+	Disturbed	118.6	Inner	Emery 1938, 3, Plate 1. Sealings total from Kaplony (1963a, 130–131).
Saqqara mastaba 3357	217	Disturbed	40.5	Inner	Emery 1939, 18, 77

Table A.13: Dynasty 1–2 graves found to contain seal impressions - (continued)

Grave number	Seal impression fragment quantity	Disturbed/ undisturbed	Area of grave (m ²)	Inner/ outer measurement?	Source
Saqqara mastaba 3504, Subsidiary burial 14	1	Undisturbed	1.8	Inner	Emery 1954, 29–30, Fig. 10
Saqqara mastaba 3506, Subsidiary burial 1	1	Disturbed	1.458	Inner	Emery 1958, 42, 46–47 Plate 43
Saqqara mastaba 3506, Subsidiary burial 3	1	Disturbed	1.3695	Inner	Emery 1958, 42, 46–47 Plate 47
Saqqara mastaba 3506, Subsidiary burial 10	1	Disturbed	1.575	Inner	Emery 1958, 42, 46–47 Plate 47
Saqqara Den subsidiary cemetery burial 190	1	Undisturbed	2.99	Outer	Macramallah 1940, 5, 58
Saqqara Den subsidiary cemetery burial 219	1	Disturbed	3.84	Likely inner	Macramallah 1940, 5, 63
Saqqara Den subsidiary cemetery burial 230	1	Disturbed	9.7	Likely inner	Macramallah 1940, 5, 66
Saqqara Den subsidiary cemetery burial 231	1	Disturbed	7.22	Likely inner	Macramallah 1940, 5, 67

Table A.13: Dynasty 1–2 graves found to contain seal impressions - (continued)

Grave number	Seal impression fragment quantity	Disturbed/ undisturbed	Area of grave (m ²)	Inner/ outer measurement?	Source
Saqqara, tomb of Hotepsekhemwy	9	Disturbed	1226	Likely inner	Lacher-Raschdorff 2014, 142. Sealings total from Kaplony (1963a, 150)
Saqqara, tomb of Ninetjer	536	Disturbed	883.8	Likely inner	Lacher-Raschdorff 2014, 255, 259. Sealings total from Regulski and Kahl (2010, 225)
Tarkhan mastaba 1060	8+	Disturbed	162.8	Inner	Petrie 1914a, Plate XVIII, XXX. Sealings total from Kaplony (1963a, 85).
Tarkhan 2039, subsidiary grave of mastaba 2038	1	Undisturbed	1.34	Likely inner	Petrie 1914a, Plate XLII
Tura Grave 137/76	6	Disturbed	47	Outer	el Sadeek and Murphy 1983, 161

Table A.14: Dynasty 3–6 graves found to contain seal impressions.

Grave number	Seal impression fragment quantity	Disturbed/ undisturbed	Area of grave (m ²)	Inner/ outer measurement?	Source
Abusir, Djedkare royal family cemetery, mastaba of Hedjetnebu	6	Disturbed	7.4	Inner	Verner <i>et al.</i> 2002, 85–98
Abusir South, mastaba of Qar Junior	16	Disturbed	16.9	Inner	Bárta <i>et al.</i> 2009, 160–164, 243–252
Beit Khallaf K1	52	Disturbed	37.1	Likely inner	Reisner 1936, 172–174. Sealings total from Kaplony (1963a, 166–167).
Beit Khallaf K2, impression containing north chamber only	4	Disturbed	80.1	Likely inner	Reisner 1936, 174–176. Sealings total from Kaplony (1963a, 170).
Beit Khallaf K3	3	Disturbed	41.1	Likely inner	Reisner 1936, 177–178. Sealings total from Kaplony (1963a, 168).
Beit Khallaf K4	1	Disturbed	27.2	Likely inner	Reisner 1936, 178–179. Sealings total from Kaplony (1963a, 168).
Beit Khallaf K5	11	Disturbed	91.6	Likely inner	Reisner 1936, 176–177. Sealings total from Kaplony (1963a, 168–169).

Table A.14: Dynasty 3–6 graves found to contain seal impressions - (continued)

Grave number	Seal impression fragment quantity	Disturbed/ undisturbed	Area of grave (m ²)	Inner/ outer measurement?	Source
Saqqara mastaba 2305	2	Disturbed	94.9	Likely inner	Reisner 1936, 158–159. Sealings total from Quibell (1913, 3, 39). 2 fragments joined together counted as 1 sealing.
Giza G 1151 shaft A	1 (illegible)	Disturbed	8.5	Inner	Giza Archives 2014, UM3109, UM3110
Giza G 1457 shaft A	3	Disturbed	8.5	Inner	Giza Archives 2014, UM3295, C13475_NS
Giza G 2130 shaft A	1	Disturbed	21	Inner	Reisner 1942, 432–433; Reisner and Smith 1955, 50
Giza G 2375 shaft A	1	Disturbed	6.3	Inner	Reisner and Smith 1955, 53–54; Giza Archives 2014, UM1366, UM2140, UM1090
Giza G 2381 shaft A	1	Undisturbed	6.2	Inner	Reisner and Smith 1955, 54; Giza Archives 2014, UM1374, UM2162, UM2163

Table A.14: Dynasty 3–6 graves found to contain seal impressions - (continued)

Grave number	Seal impression fragment quantity	Disturbed/ undisturbed	Area of grave (m ²)	Inner/ outer measurement?	Source
Giza G 4410 shaft A	2	Disturbed	12.1	Inner	Reisner 1942, 514; Reisner and Smith 1955, 52; Giza Archives 2014, UM1365
Giza G 4220 shaft A	1 (illegible)	Disturbed	17.6	Inner	Giza Archives 2014, UM1366, UM3813, UM3814
Giza G 4430 shaft A	3	Disturbed	4.5	Inner	Reisner 1942, 487; Reisner and Smith 1955, 50; Giza Archives 2014, UM3848
Giza G 4520 shaft A	1	Undisturbed	11.8	Inner	Reisner 1942, 505–506; Reisner and Smith 1955, 52; Giza Archives 2014, UM3864, UM2383
Giza G 4631 shaft B	1	Disturbed	8.8	Inner	Reisner 1942, 497; Reisner and Smith 1955, 51–52; Giza Archives 2014, UM3854
Giza G 4715 shaft B	1	Disturbed	5.6	Inner	Reisner and Smith 1955, 52–53; Giza Archives 2014, UM3809, UM1334, UM1366, OR04_p035

Table A.14: Dynasty 3–6 graves found to contain seal impressions - (continued)

Grave number	Seal impression fragment quantity	Disturbed/ undisturbed	Area of grave (m ²)	Inner/ outer measurement?	Source
Giza G 4721 shaft A	1	Disturbed	4.8	Inner	Reisner and Smith 1955, 53; Giza Archives 2014, UM1365, UM3783, C6208_NS
Giza G 4733 shaft E	1	Disturbed	12	Inner	Reisner and Smith 1955, 53; Giza Archives 2014, UM1365, UM3763, C6209_NS, C6204_NS
Giza G 5080 shaft B	2	Disturbed	23.3	Inner	Reisner 1942, 143; Reisner and Smith 1955, 51; Giza Archives 2014, UM1742, B8311_NS, B8312_NS
Giza G 5140 shaft B	1 (illegible)	Disturbed	8.8	Inner	Giza Archives 2014, UM1366, UM1824, B8305_NS, B8309_NS
Giza G 5190 shaft A	1	Disturbed	3.7	Inner	Giza Archives 2014, UM1826, UM1827, C3353_NS
Giza G 5470 shaft B	1	Disturbed	11.9	Inner	Junker 1938, 13, 224, 226; Giza Archives 2014, UM1598, UM1599

Table A.14: Dynasty 3–6 graves found to contain seal impressions - (continued)

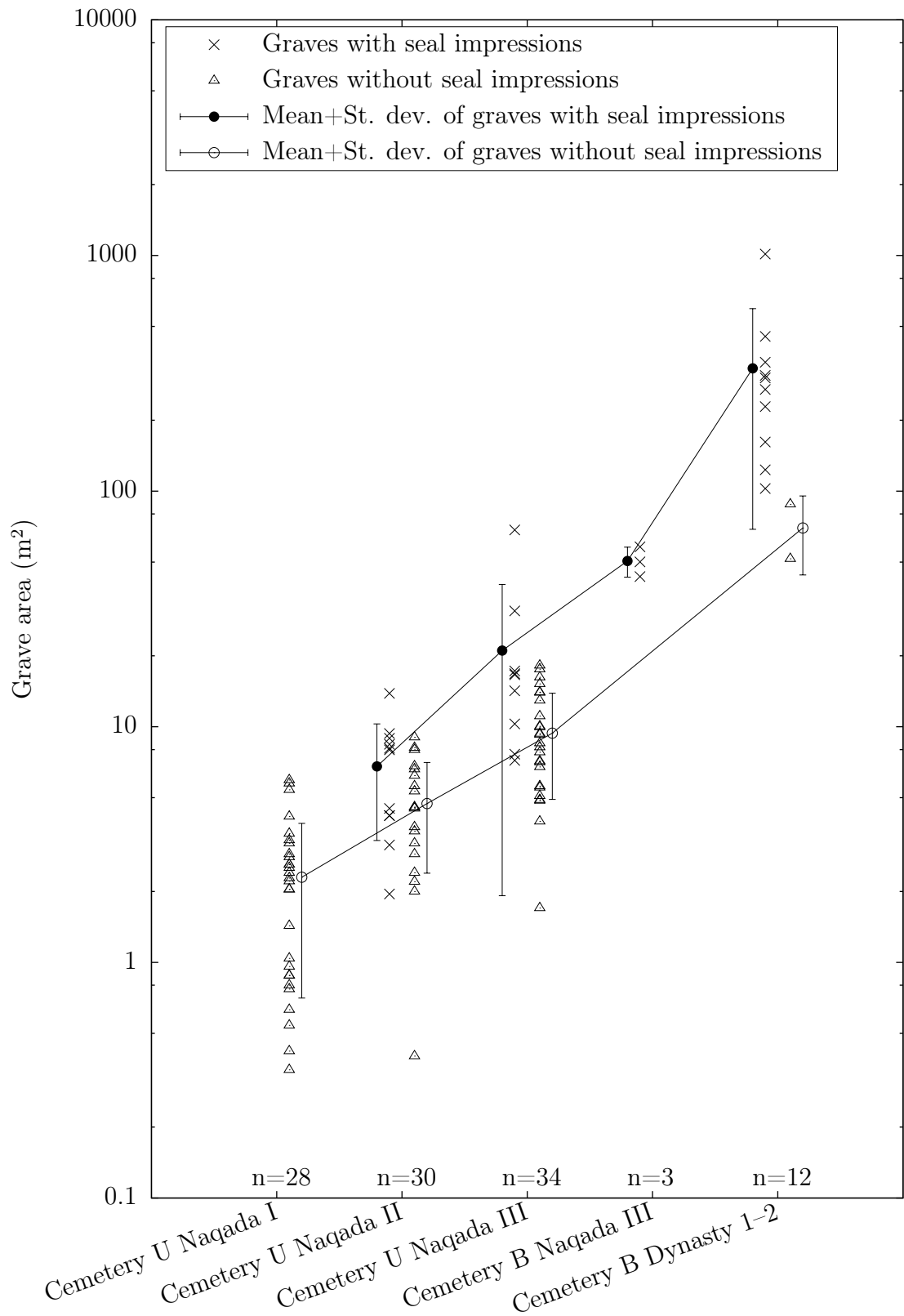
Grave number	Seal impression fragment quantity	Disturbed/ undisturbed	Area of grave (m ²)	Inner/ outer measurement?	Source
Giza G 7000 X, tomb of Hetepheres	ca. 10	Undisturbed	14.2	Inner	Reisner and Smith 1955, 14–15, 20, Fig. 47
Giza G 7112 shaft A	1	Undisturbed	3.3	Inner	Giza Archives 2014, UM1365, UM4274, UM4275
Giza G 7249 shaft A	1	Undisturbed	3	Inner	Giza Archives 2014, UM4120, UM4121; Reisner and Smith 1955, 53
Giza G 7663 shaft A	1	Disturbed	6	Inner	Giza Archives 2014, UM4045; Reisner and Smith 1955, 52
Giza G 7766 shaft B	1	Disturbed	21.8	Inner	Giza Archives 2014, UM4311, UM4312, UM1366

Table A.15: Periods during which cemetery was in use, total number of recorded graves, average area and standard deviation of burials in cemeteries found to contain burials with seal impressions. Data highlighted in grey from the non-seal impression containing Naqada I era Cemetery U at Abydos included for comparative purposes. Data used in Figures A.52, A.59, A.65, and A.71.

Graves dated to	Cemetery name	Total graves	Average (m ²)	St. Dev. (m ²)
Naqada I	Abydos cemetery U	28	2.3	1.59
Naqada II	Abydos cemetery U	30	5.48	2.94
Naqada III	Abydos cemetery U	33	12.43	11.6
Naqada III	Abydos cemetery B	3	50.51	7.35
Naqada III	Ashkeit cemetery 308	36	1.22	0.68
Naqada III	Ashkeit cemetery 332	28	1.18	0.56
Naqada III	Farkha	39	2.81	2.83
Dynasty 1–2	Abydos cemetery B	12	288.12	258.88
Dynasty 1–2	Farkha	12	1.76	3.16
Dynasty 1–2	Nag el-Deir 1500, 1600	81	7.03	15.10
Dynasty 2	Nag el-Deir 3000	33	2.69	3.32
Dynasty 1–2	Saqqara mastabas	20	76.71	49.34
Dynasty 1	Saqqara, subsidiary cemetery of Den	231	1.7	1.03
Dynasty 3	Beit Khallaf	5	55.41	28.52
Dynasty 4–6	Giza cemetery G 2100	204	2.16	4.14
Dynasty 4–6	Giza cemetery G 4000	328	2.4	3.65

Table A.16: Graves in the Abydos cemeteries, tabulated by era and amount of seal impression-containing burials. Grave data from Naqada I prior to the introduction of sealing technology into Egypt is included here for comparative purposes.

	Total no. of graves	No. of graves with seal impressions	% of graves with seal impressions
Cemetery U, Naqada I era	28	0	0%
Cemetery U, Naqada II era	30	11	37%
Cemetery U, Naqada III era	34	9	26%
Cemetery B, Naqada III era	3	3	100%
Cemetery B, Dynasty 1–2 era	12	10	83%



Seal impression-containing burials at cemeteries U and B, Abydos

Figure A.52: Area of tomb substructures at Abydos elite cemeteries U and B, from Naqada I to Dynasty 2. Plotted on a logarithmic scale. Data does not include measurements from subsidiary burials. Total number of seal impression-containing graves per era (n) is indicated on the graph. Grave data from Naqada I prior to the introduction of sealing technology into Egypt is included here for comparative purposes.

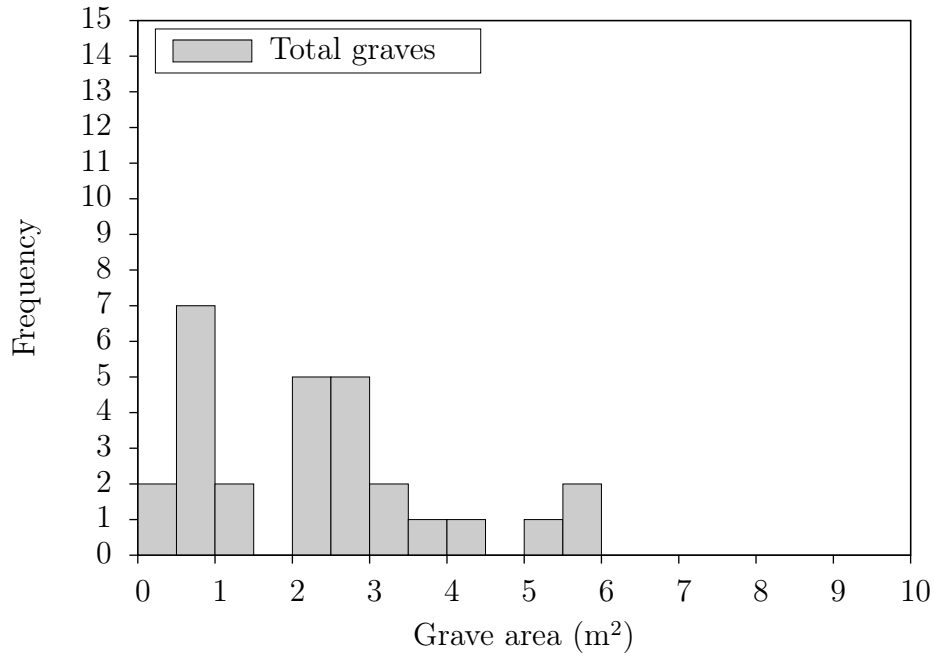


Figure A.53: Distribution of grave surface areas during Naqada I at Abydos Cemetery U. The height of each bar represents the total number of graves within the indicated area range.

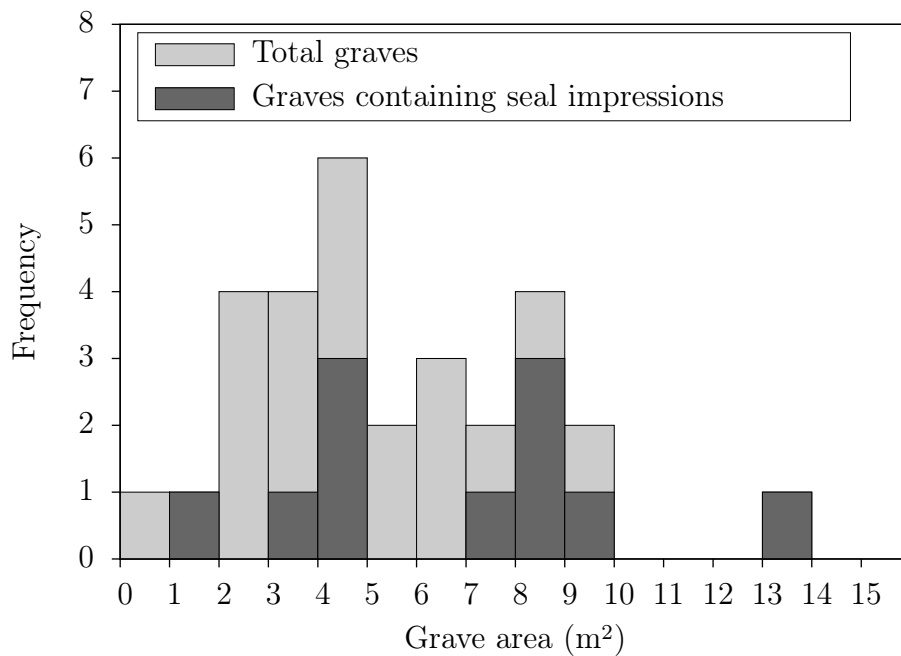


Figure A.54: Distribution of grave surface areas during Naqada II at Abydos Cemetery U. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seal impressions.

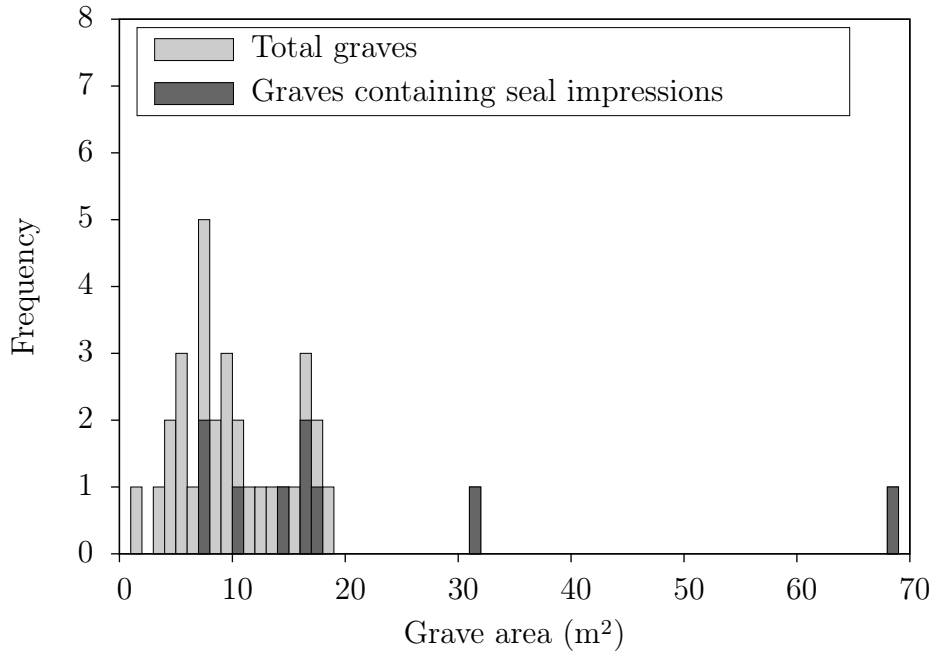


Figure A.55: Distribution of grave surface areas during Naqada III at Abydos Cemetery U. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seal impressions.

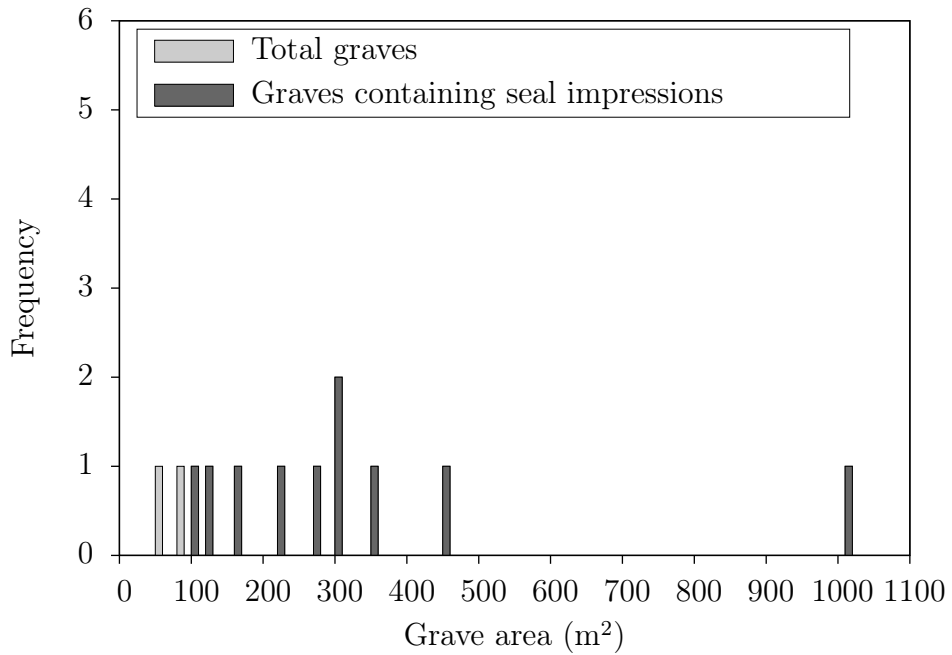


Figure A.56: Distribution of grave surface areas during Dynasty 1-2 at Abydos Cemetery B.



Figure A.57: Abydos Cemetery U. The Naqada II tombs found to contain seal impression(s) are designated by black circles. Modified from Dreyer *et al.* (2000, 2003, Abb. 1).

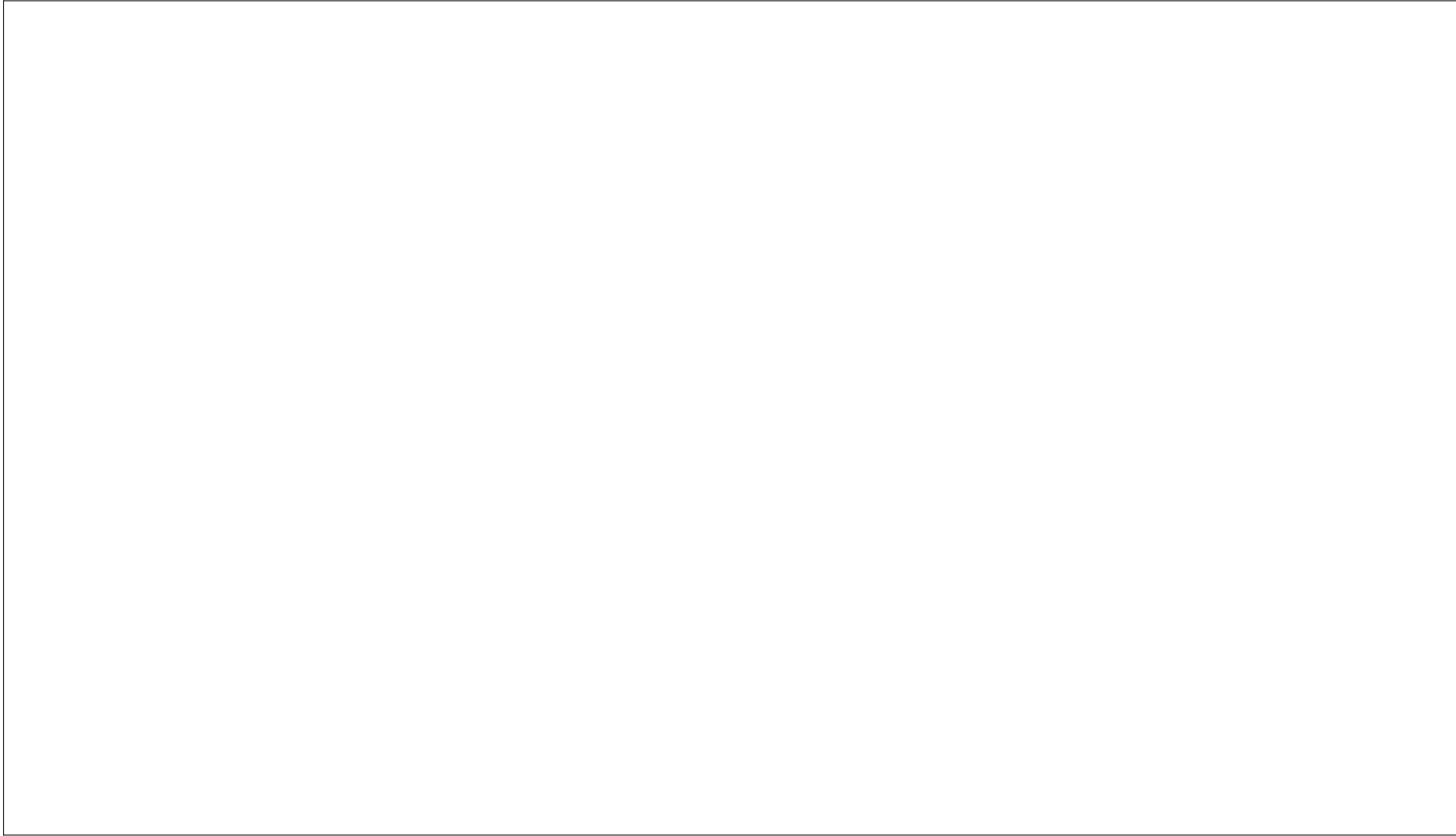


Figure A.58: Abydos Cemetery U. The Naqada III tombs found to contain seal impression(s) are designated by black circles. Modified from Dreyer *et al.* (2000, 2003, Abb. 1).

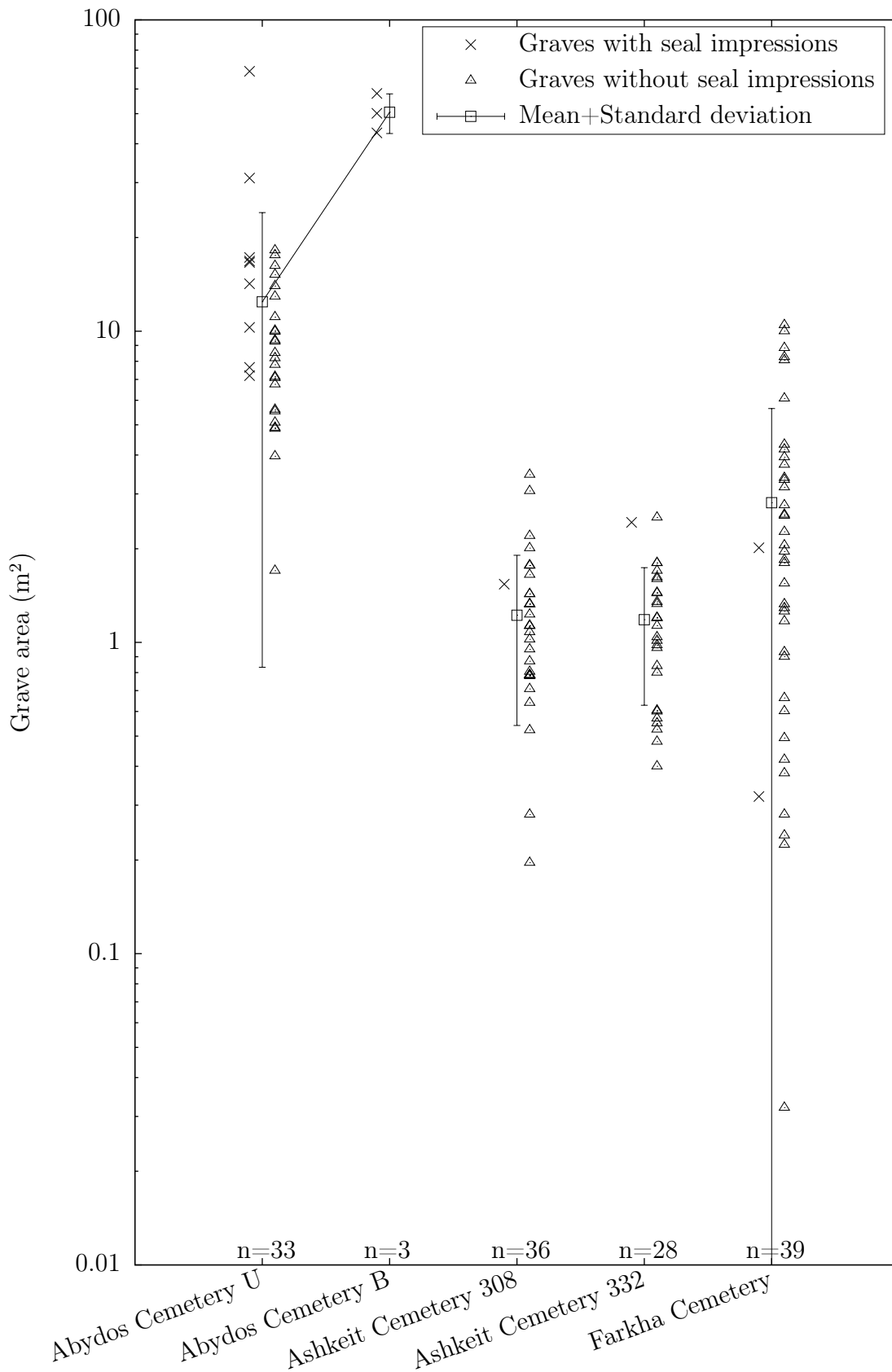


Figure A.59: Area of all tomb substructures within cemeteries dated to Naqada III, that were found to contain seal impression-containing graves, plotted on a logarithmic scale. Total number of graves per cemetery (n) is indicated on the graph. Cemetery U and B at Abydos follow each other chronologically, hence the line indicating change in grave area going from one average point to another.

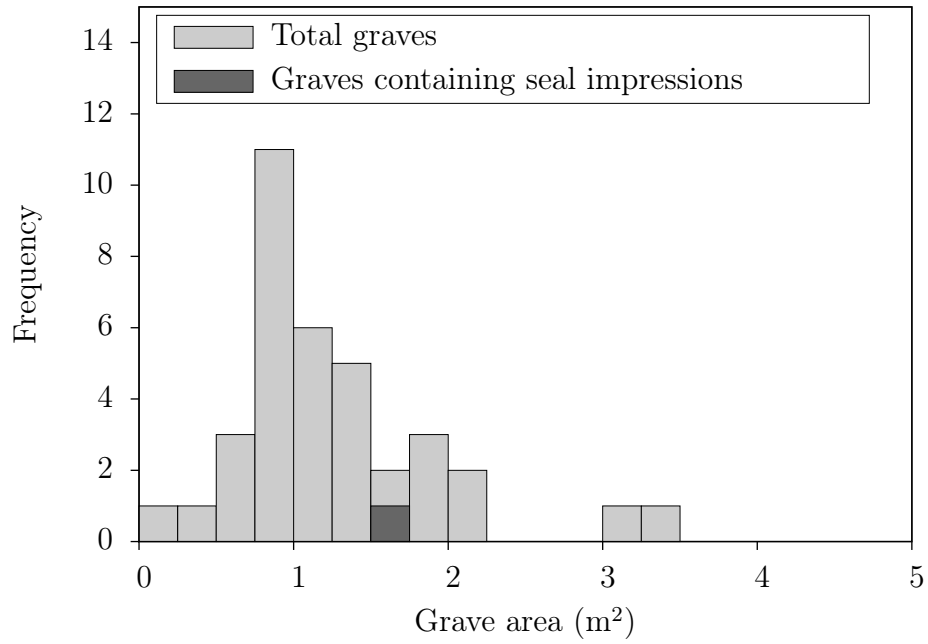


Figure A.60: Distribution of grave sizes at Ashkeit 308 during Naqada III. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seal impressions.

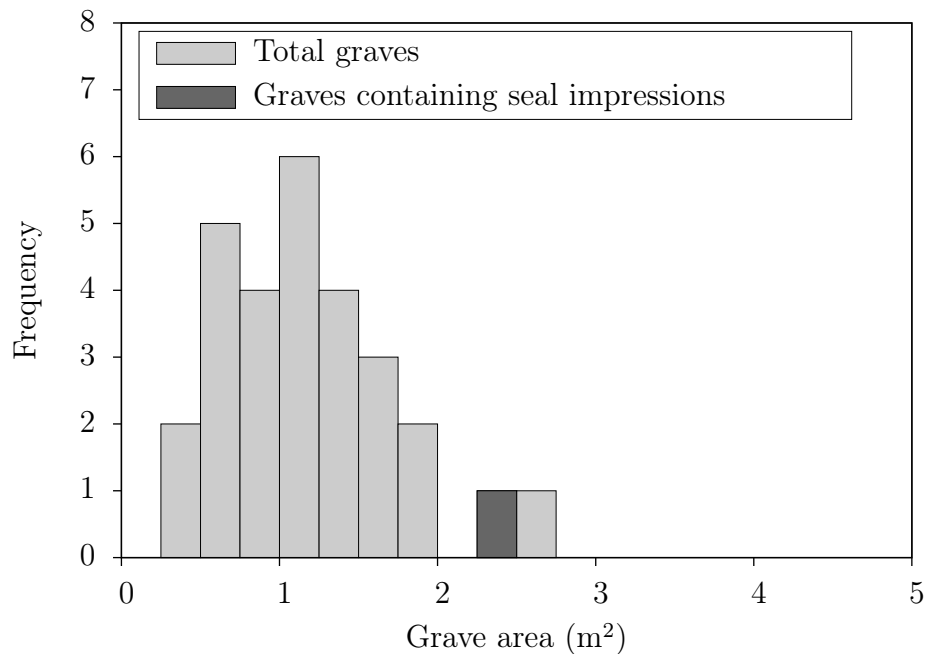


Figure A.61: Distribution of grave sizes at Ashkeit 332 during Naqada III. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seal impressions.

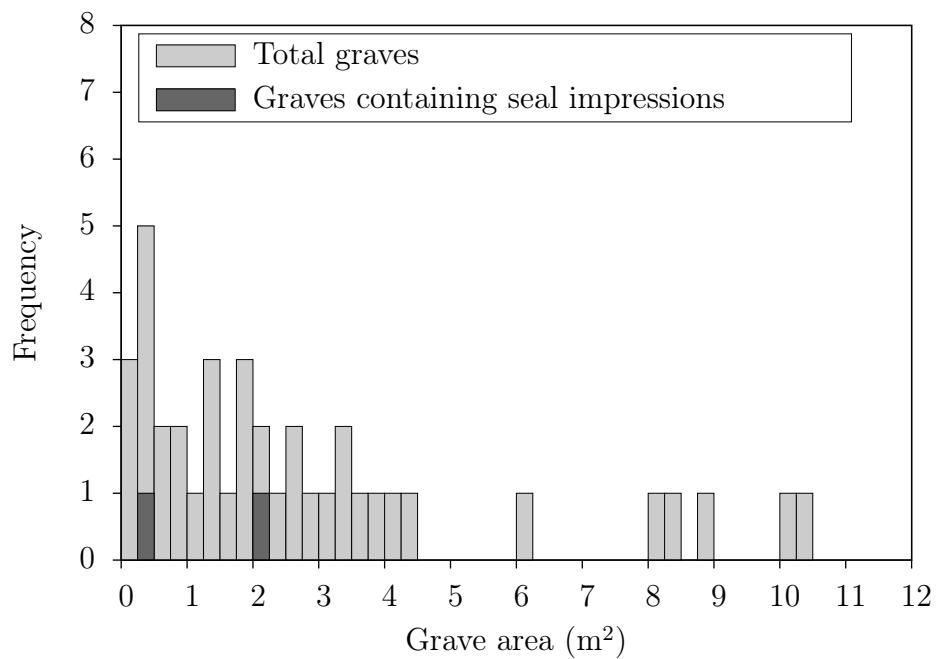


Figure A.62: Distribution of grave sizes during Naqada III at Tell el-Farkha. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seal impressions.

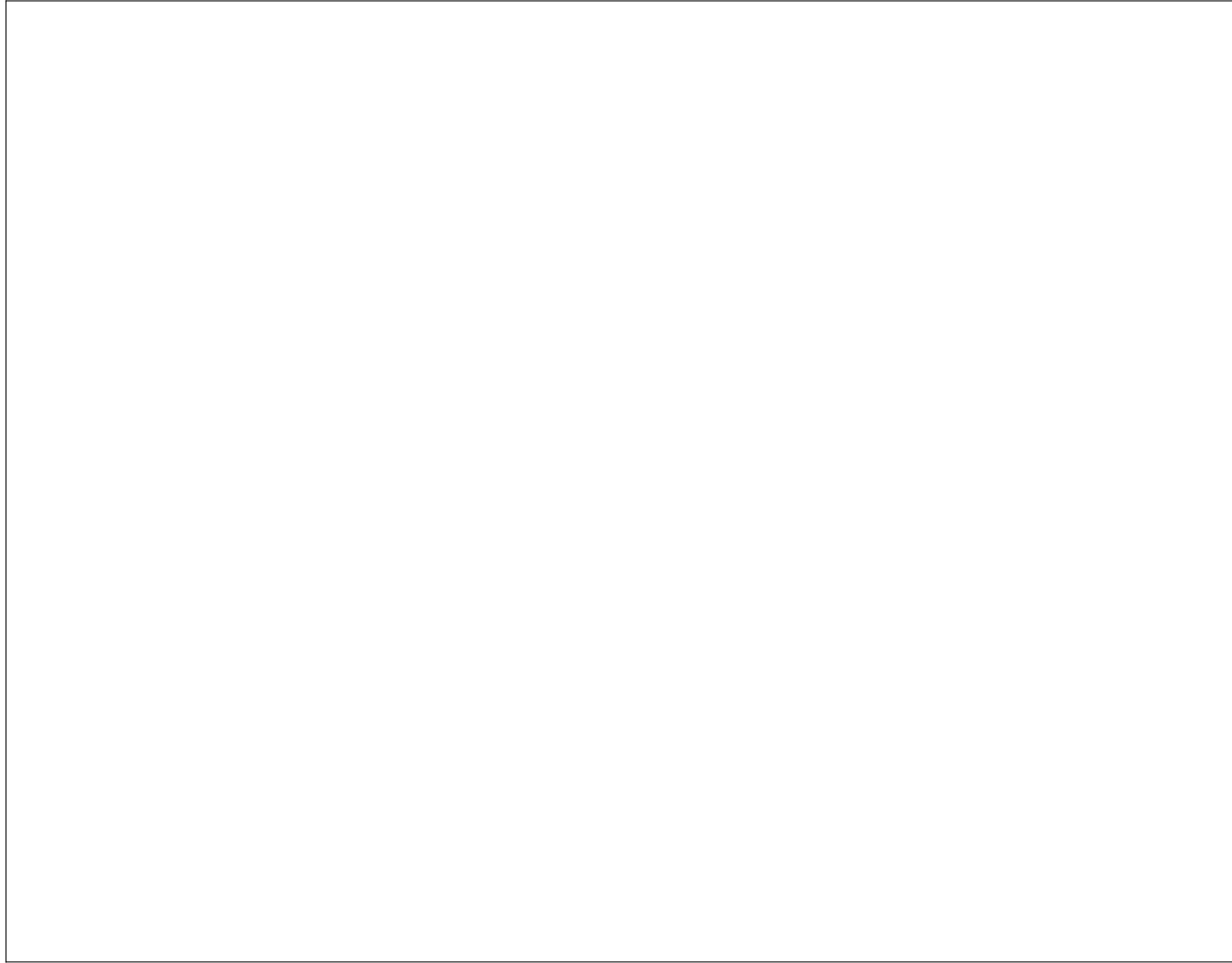


Figure A.63: Nag el-Deir cemetery 1500. The tomb found to contain a seal impression is designated by a black circle. Modified from Reisner (1908, Plate 76).

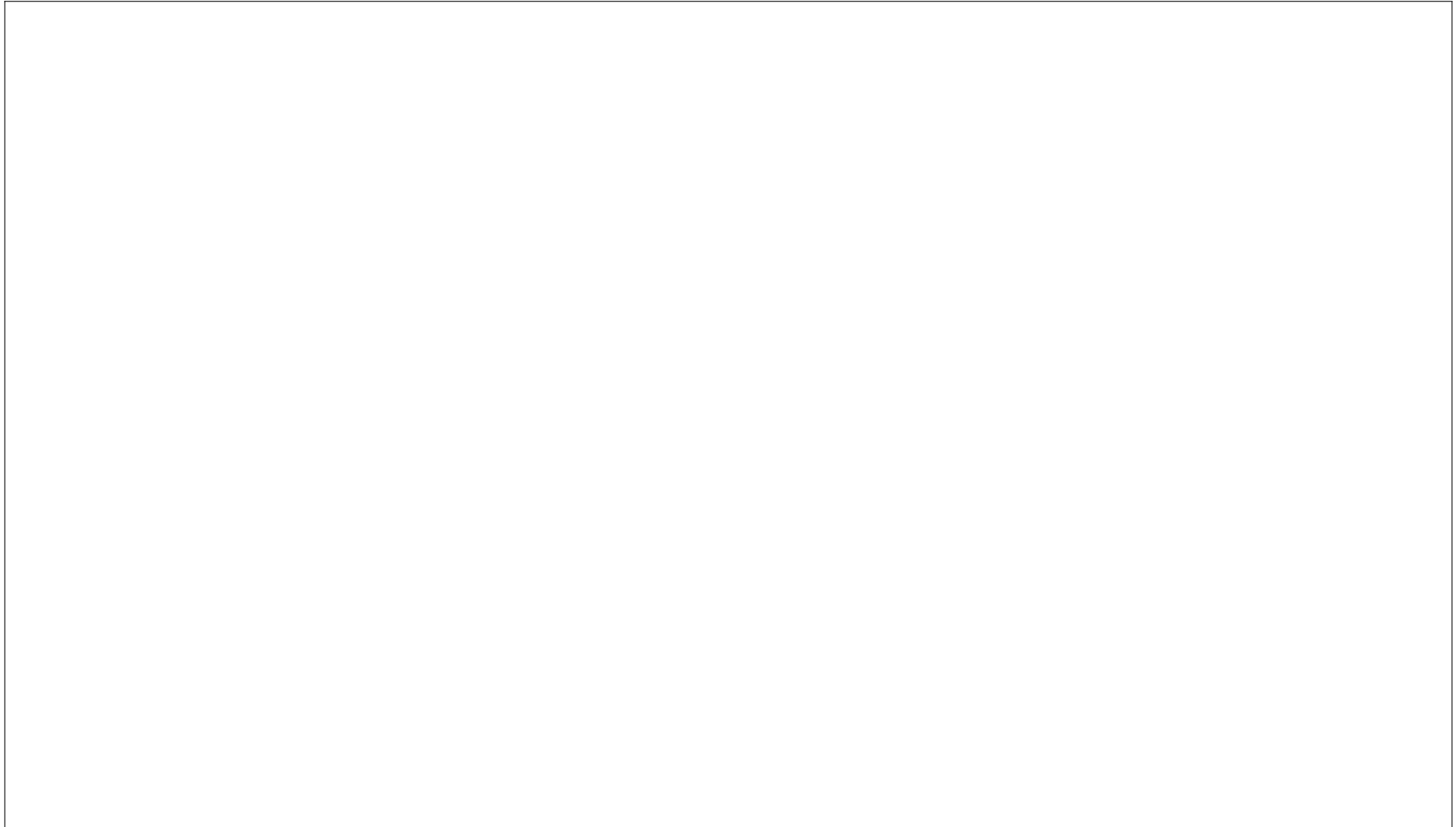


Figure A.64: The royal Cemetery B at Abydos. The subsidiary burials found to contain seal impressions are designated by black circles. Modified from Martin (2011, Figure 2).

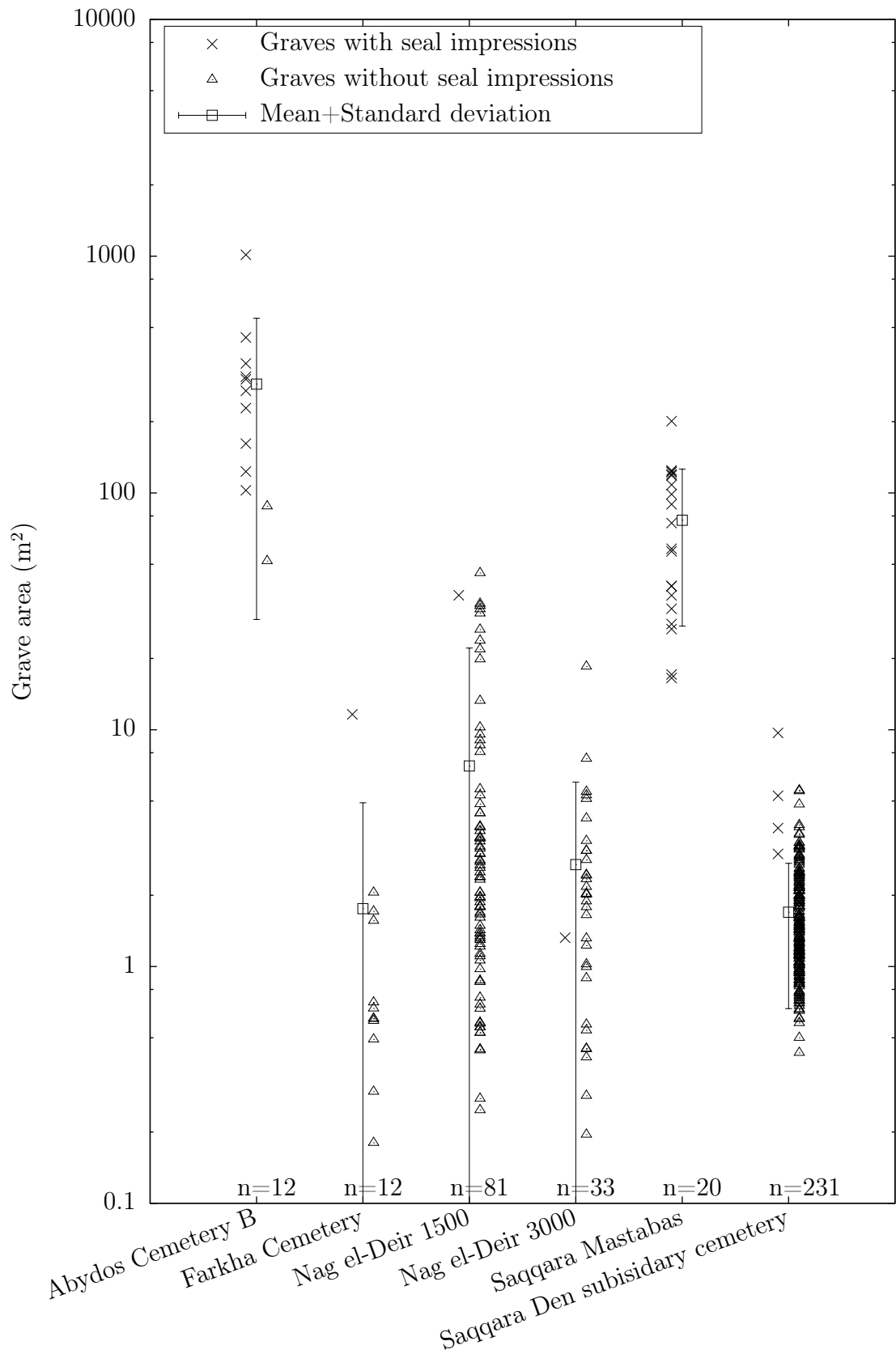


Figure A.65: Area of all tomb substructures within cemeteries dated to Dynasty 1–2, that were found to contain seal impression-containing graves, plotted on a logarithmic scale. Total number of graves per cemetery (n) is indicated on the graph.

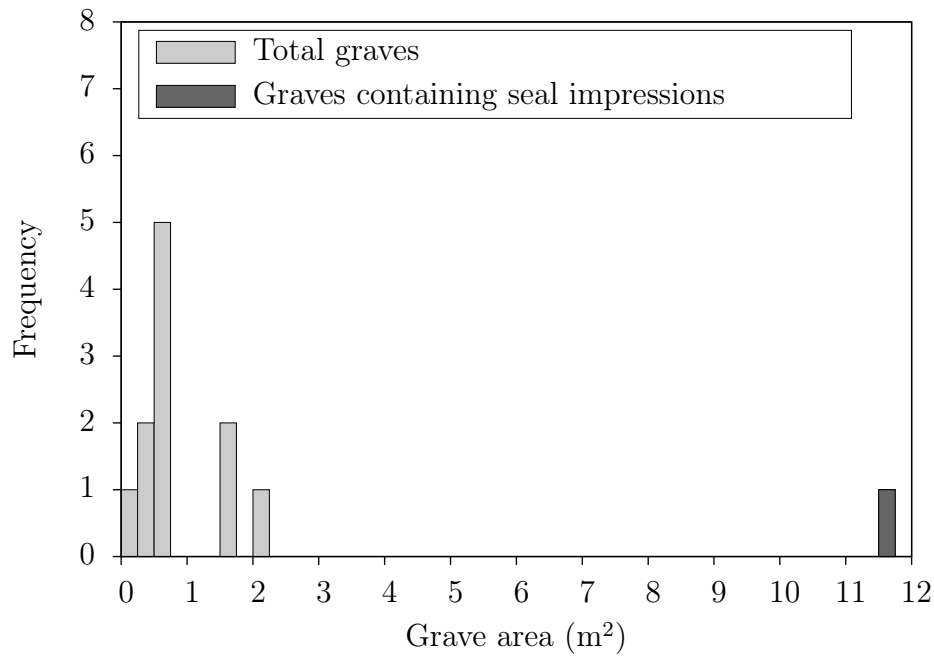


Figure A.66: Distribution of grave sizes during Dynasty 1–2 at Tell el-Farkha. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seal impressions.

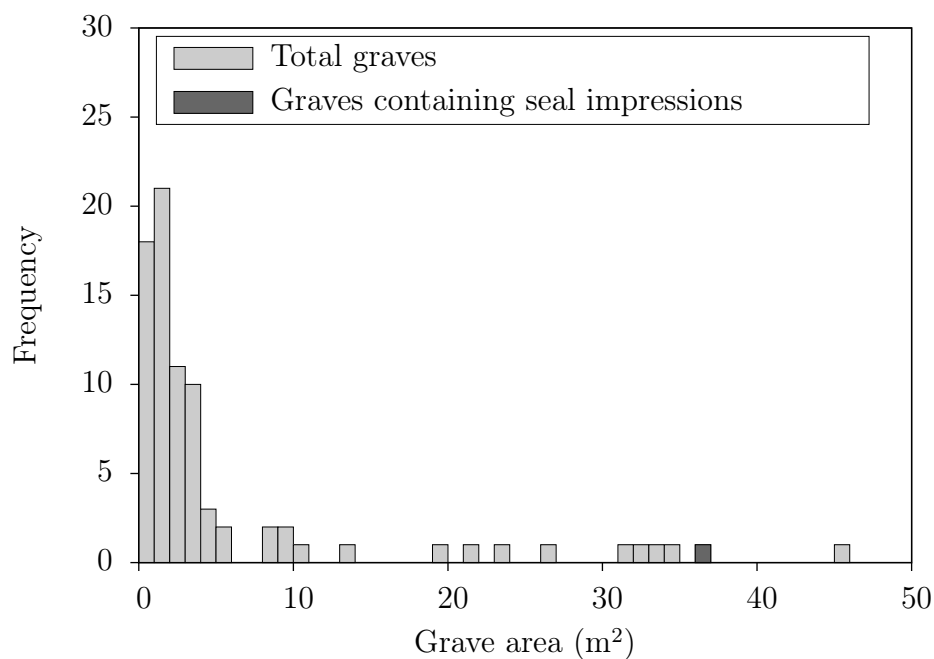


Figure A.67: Distribution of grave sizes during Dynasty 1–2, cemetery Nag el-Deir 1500. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seal impressions.

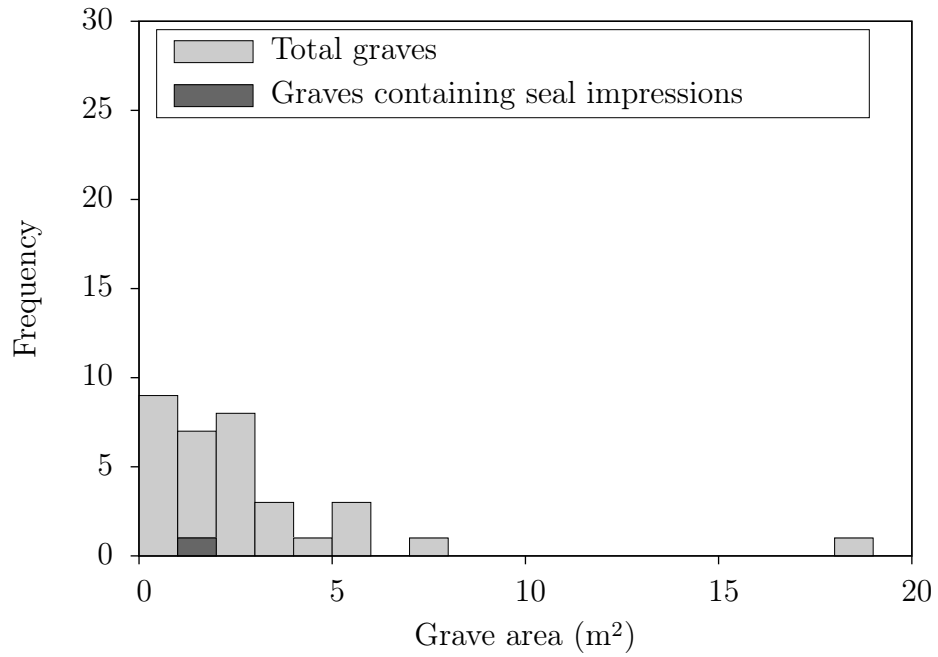


Figure A.68: Distribution of grave sizes during Dynasty 1-2, cemetery Nag el-Deir 3000. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seal impressions.

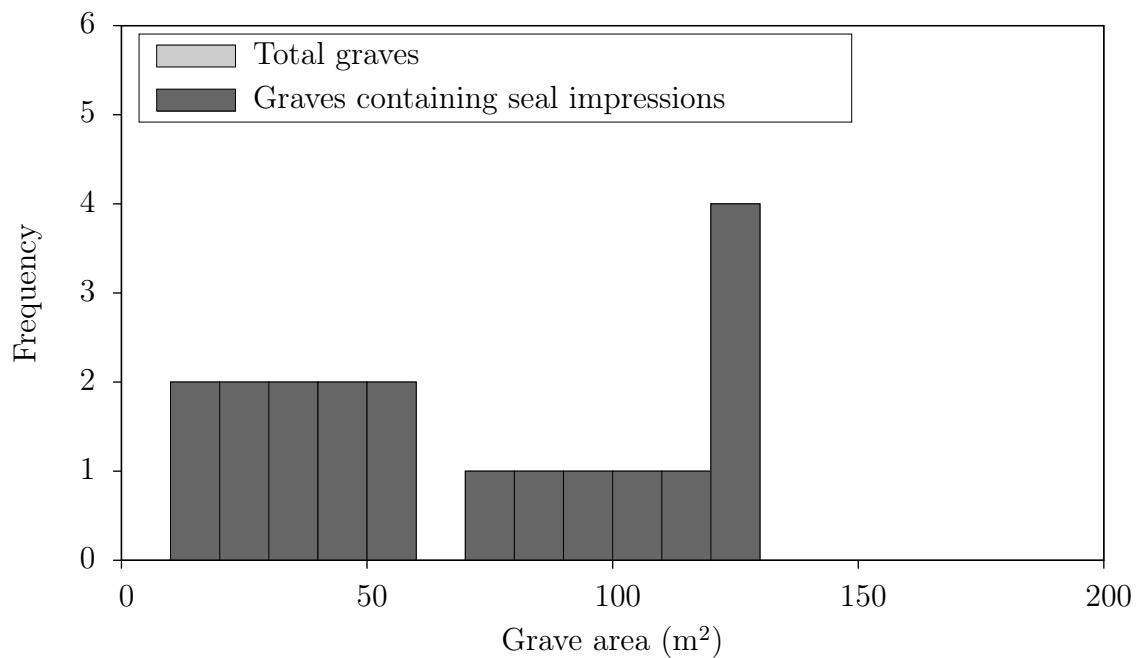


Figure A.69: Distribution of grave sizes during Dynasty 1-2 at Saqqara. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seal impressions.

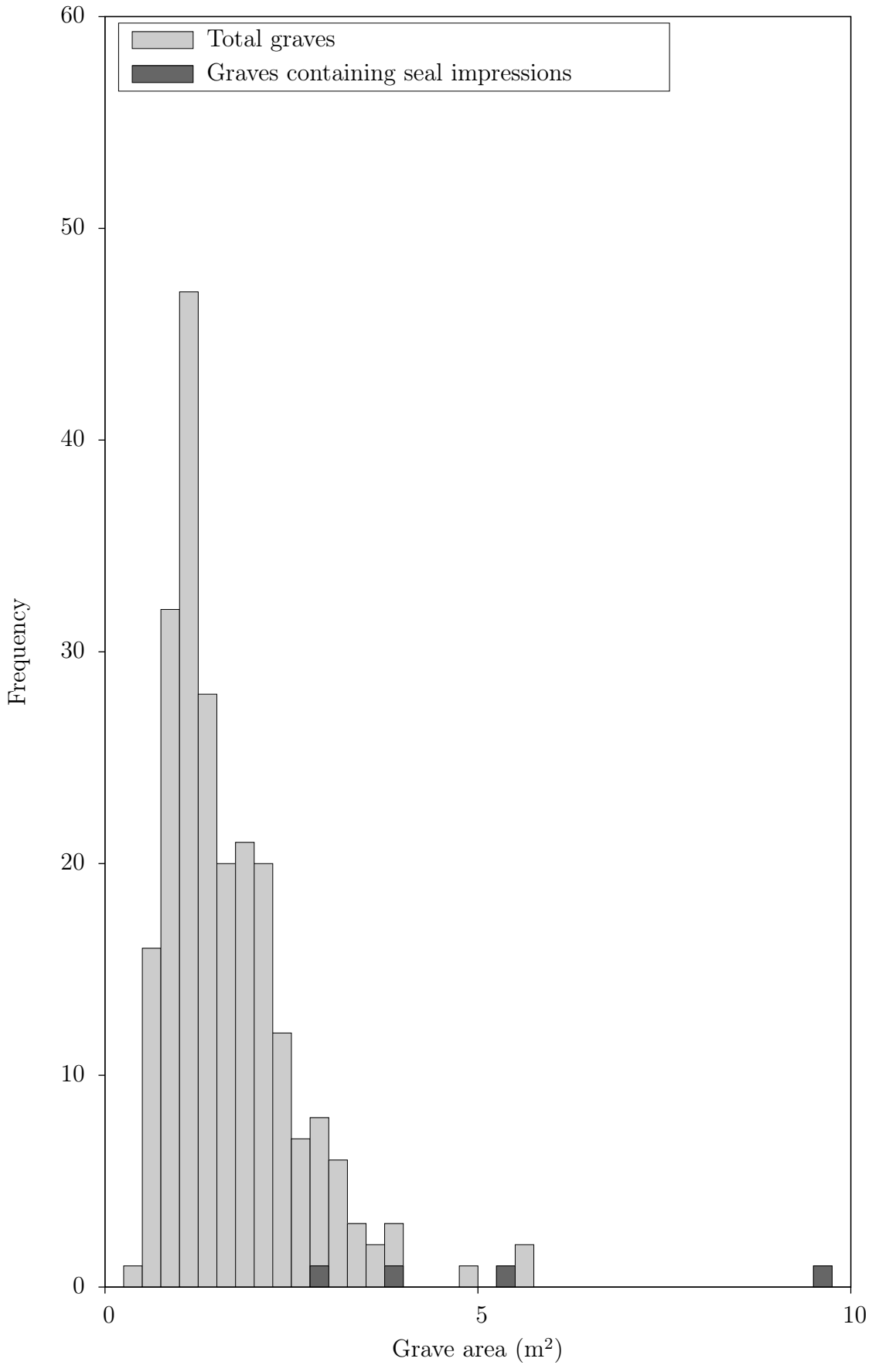


Figure A.70: Distribution of grave sizes in Den subsidiary graves, during Dynasty 1 in Saqqara. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seal impressions.

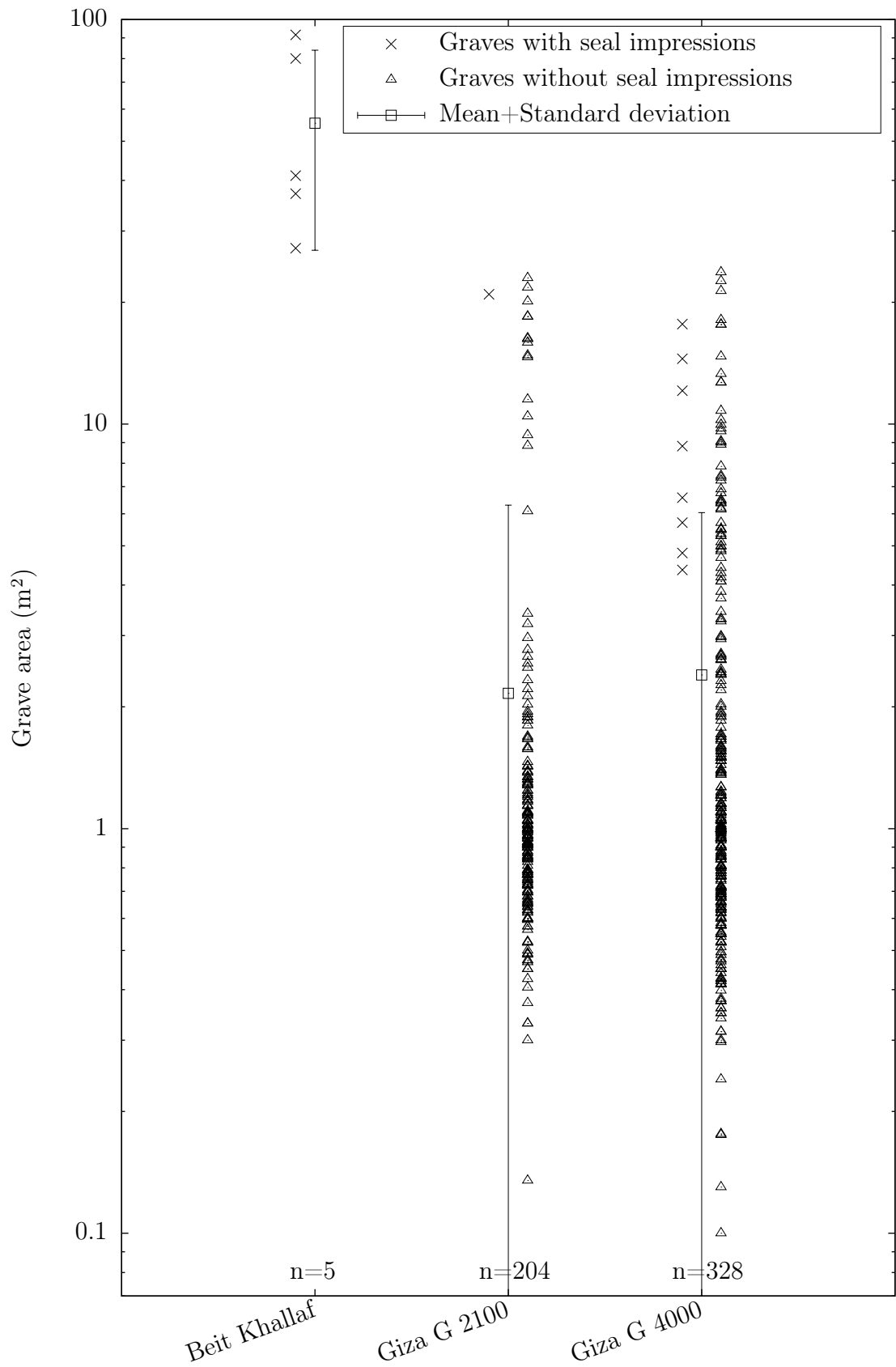


Figure A.71: Area of all tomb substructures within cemeteries dated to Dynasty 3–6, that were found to contain seal impression-containing graves, plotted on a logarithmic scale. Total number of graves per cemetery (n) is indicated on the graph.

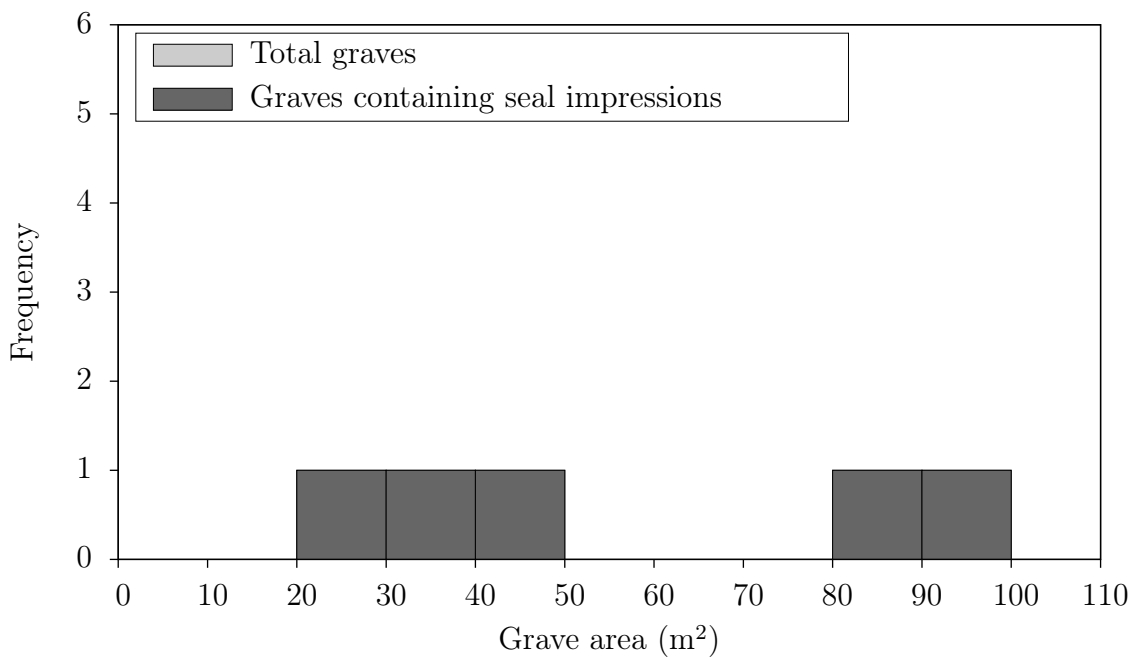


Figure A.72: Distribution of grave sizes during Dynasty 3 at Beit Khallaf. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seal impressions.

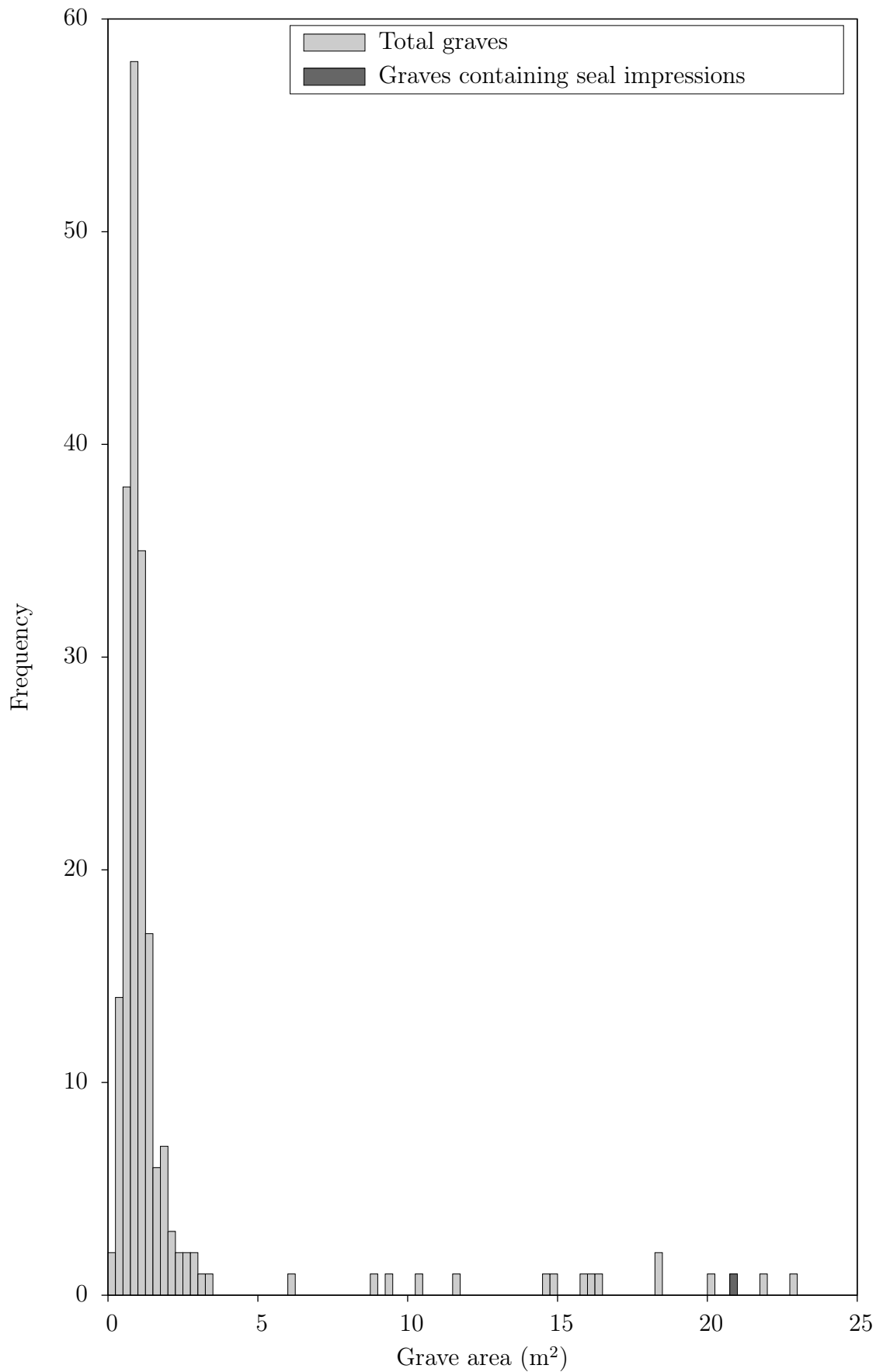


Figure A.73: Distribution of grave sizes during Dynasty 4–6 at Giza cemetery G 2100. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seal impressions.

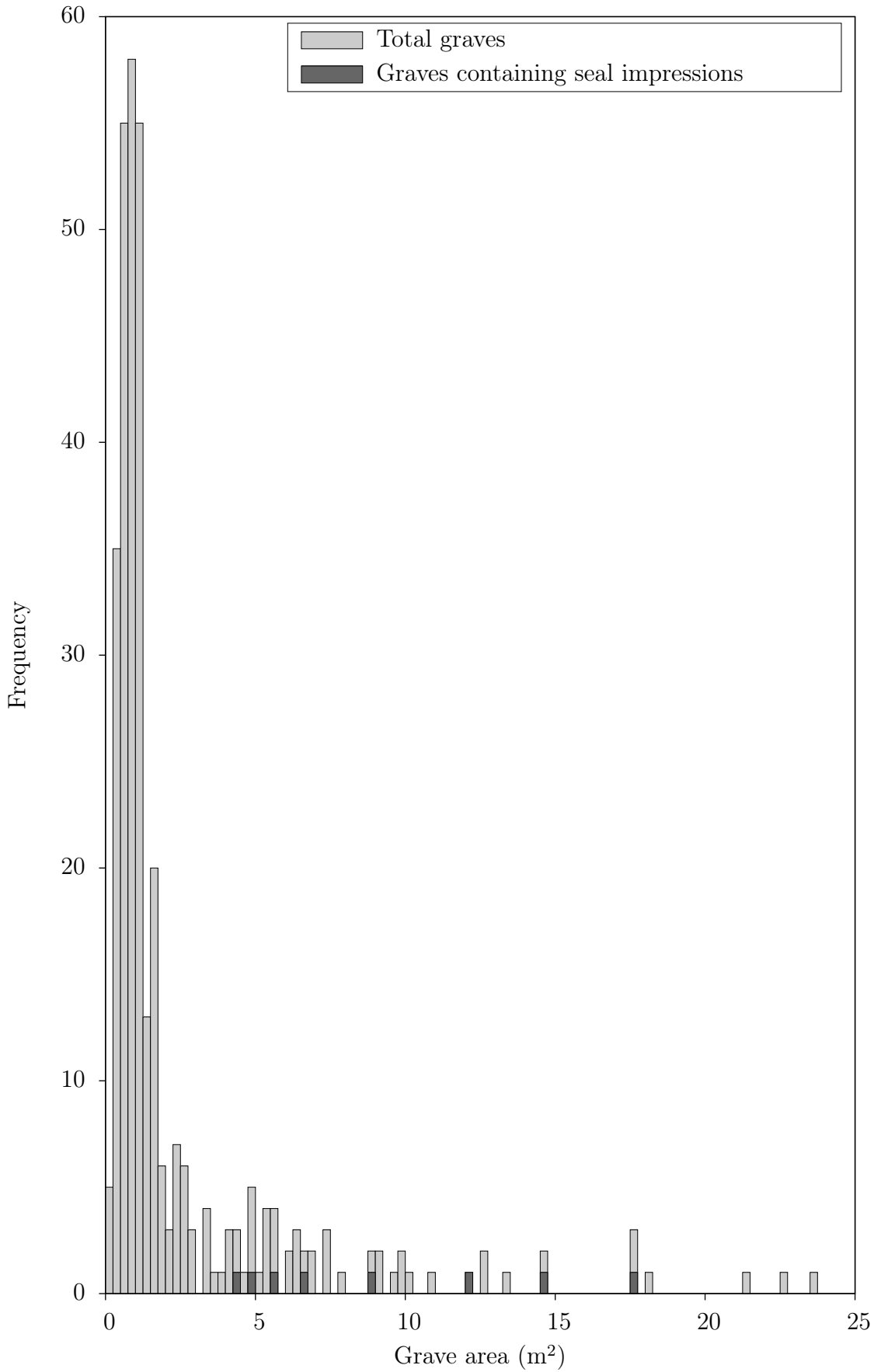


Figure A.74: Distribution of grave sizes during Dynasty 4–6 at Giza cemetery G 4000. The height of each bar represents the total number of graves within the indicated area range. The dark grey portion represents the fraction of the total that was found to contain seal impressions.

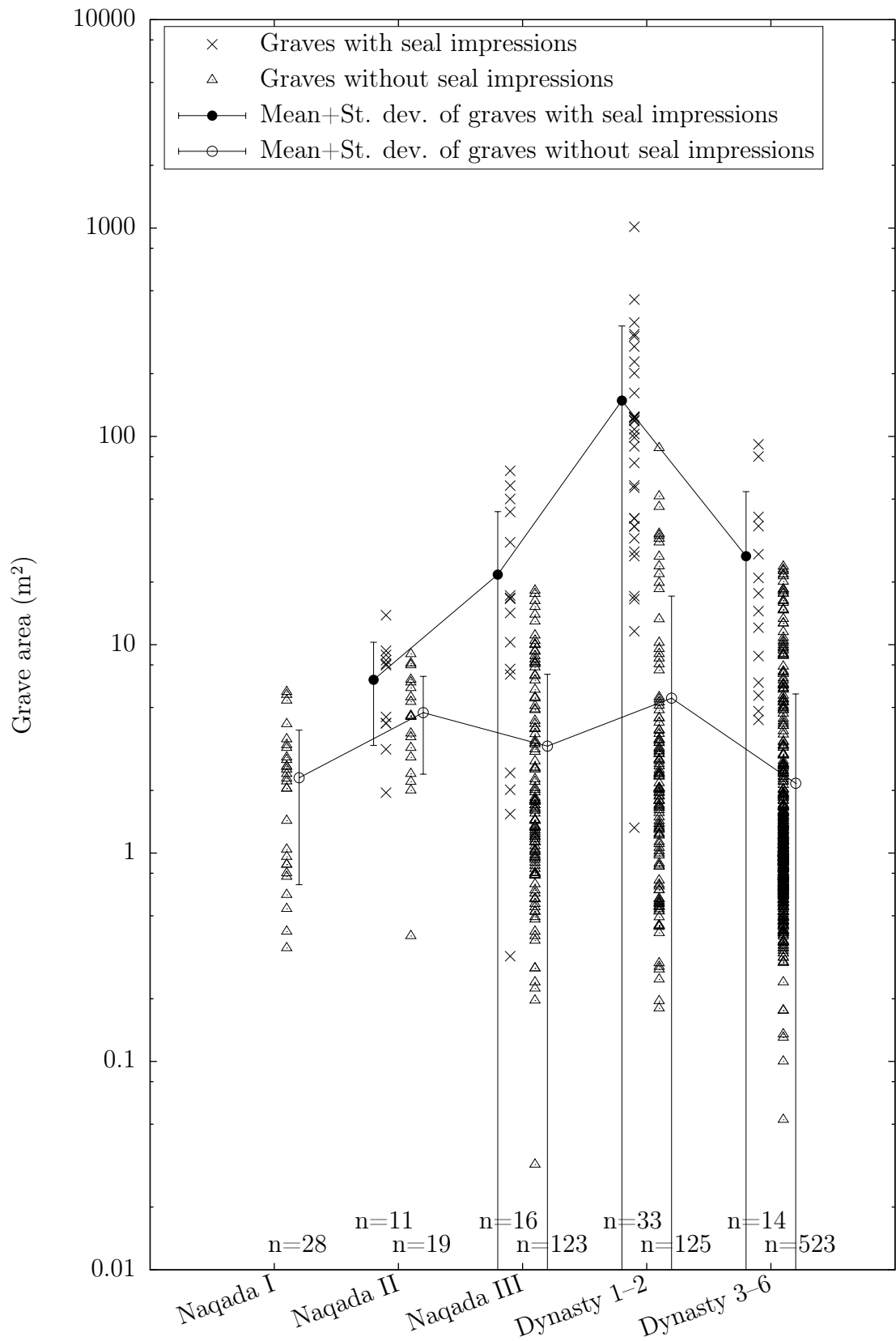


Figure A.75: Area of all tomb substructures within selected cemeteries dated from Naqada II to Dynasty 3–6, that were found to contain seal impression-containing graves, plotted on a logarithmic scale. Data from Naqada I burials at Abydos Cemetery U, prior to the introduction of seals to Egypt, is included for comparative purposes. Total number of non-seal impression containing graves and seal impression-containing graves per era (n) is indicated on the graph.

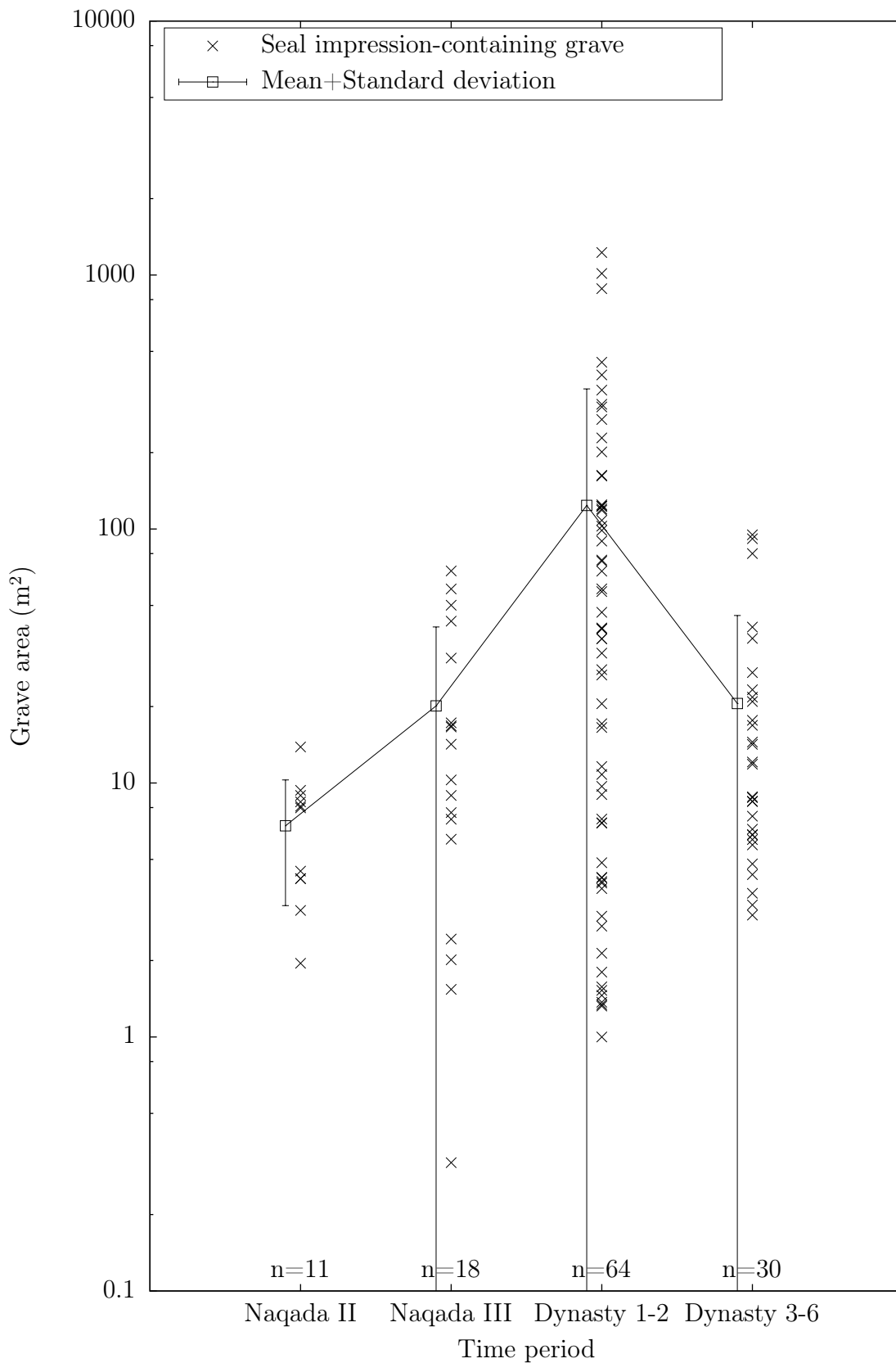


Figure A.76: Area of tomb substructures found to contain seal impressions, from Naqada II to Dynasty 6. Plotted on a logarithmic scale. Data includes measurements from subsidiary burials. Total number of graves per era (n) indicated on the graph.

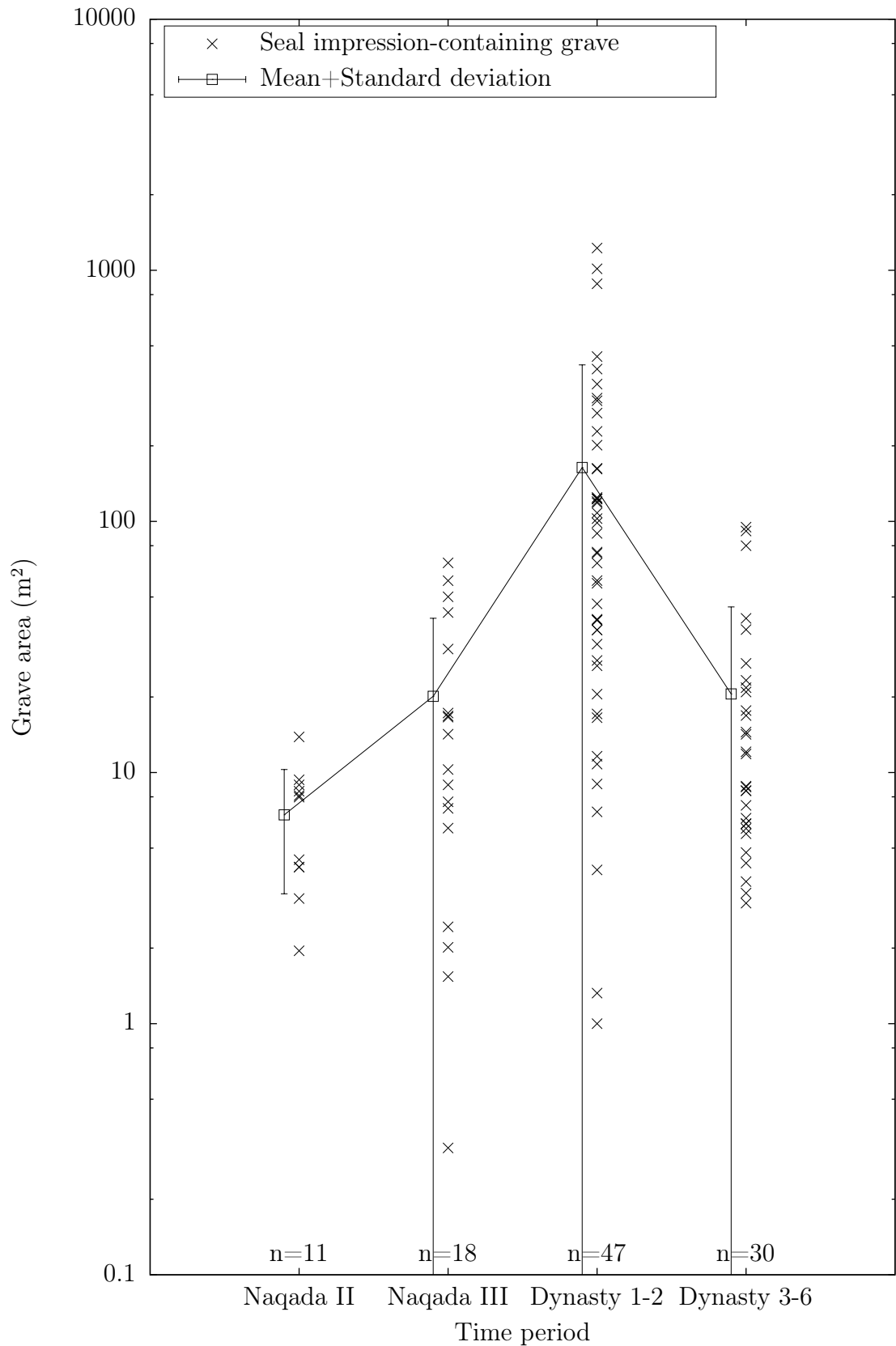


Figure A.77: Area of tomb substructures found to contain seal impressions, from Naqada II to Dynasty 6. Plotted on a logarithmic scale. Data does not include measurements from subsidiary burials. Total number of graves per era (n) indicated on the graph.

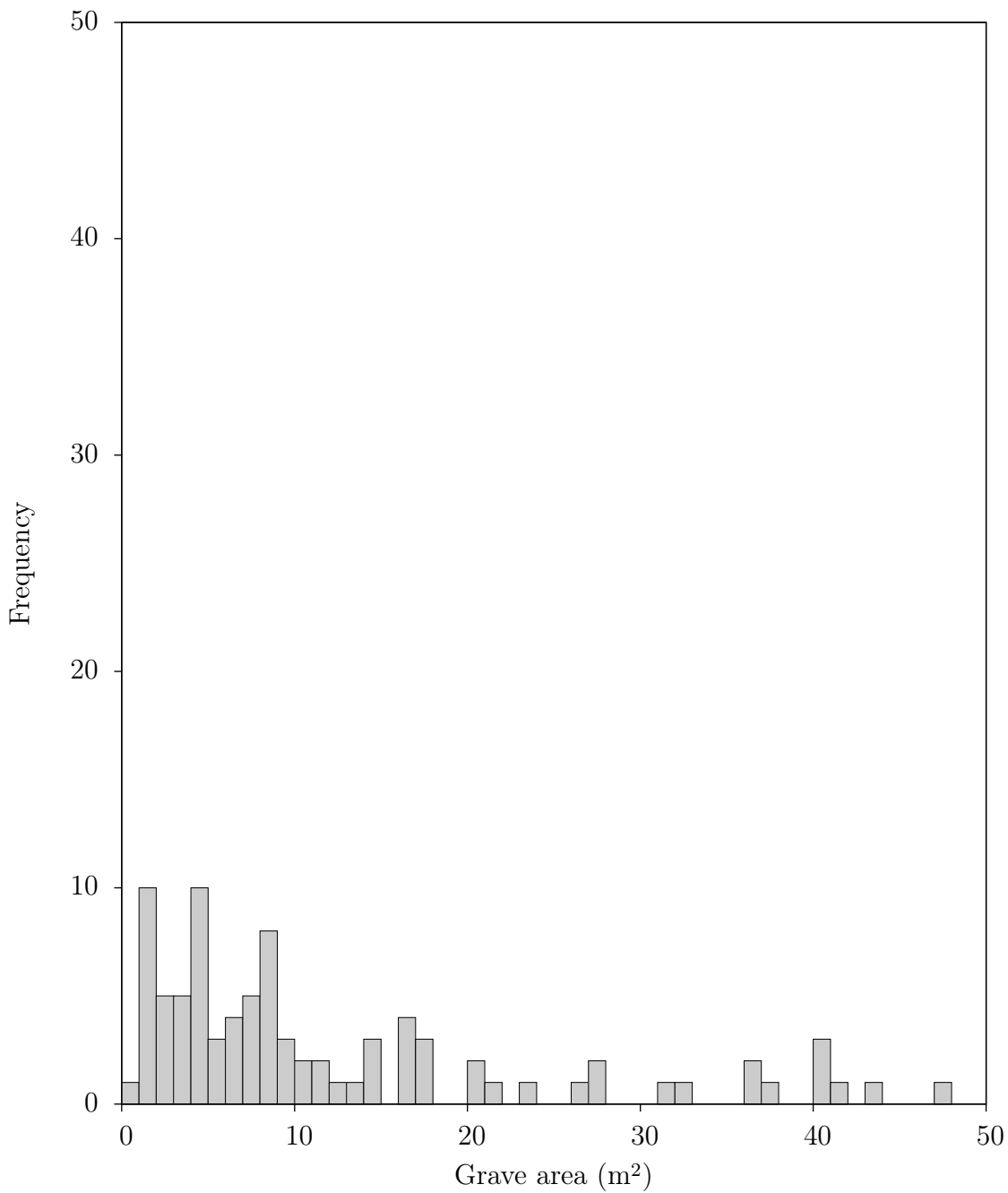


Figure A.78: Distribution of seal impression-containing grave sizes from 0–50 m² from Naqada II to Dynasty 6, a period covering roughly 1300 years. Plotted for comparison with Figure A.49.

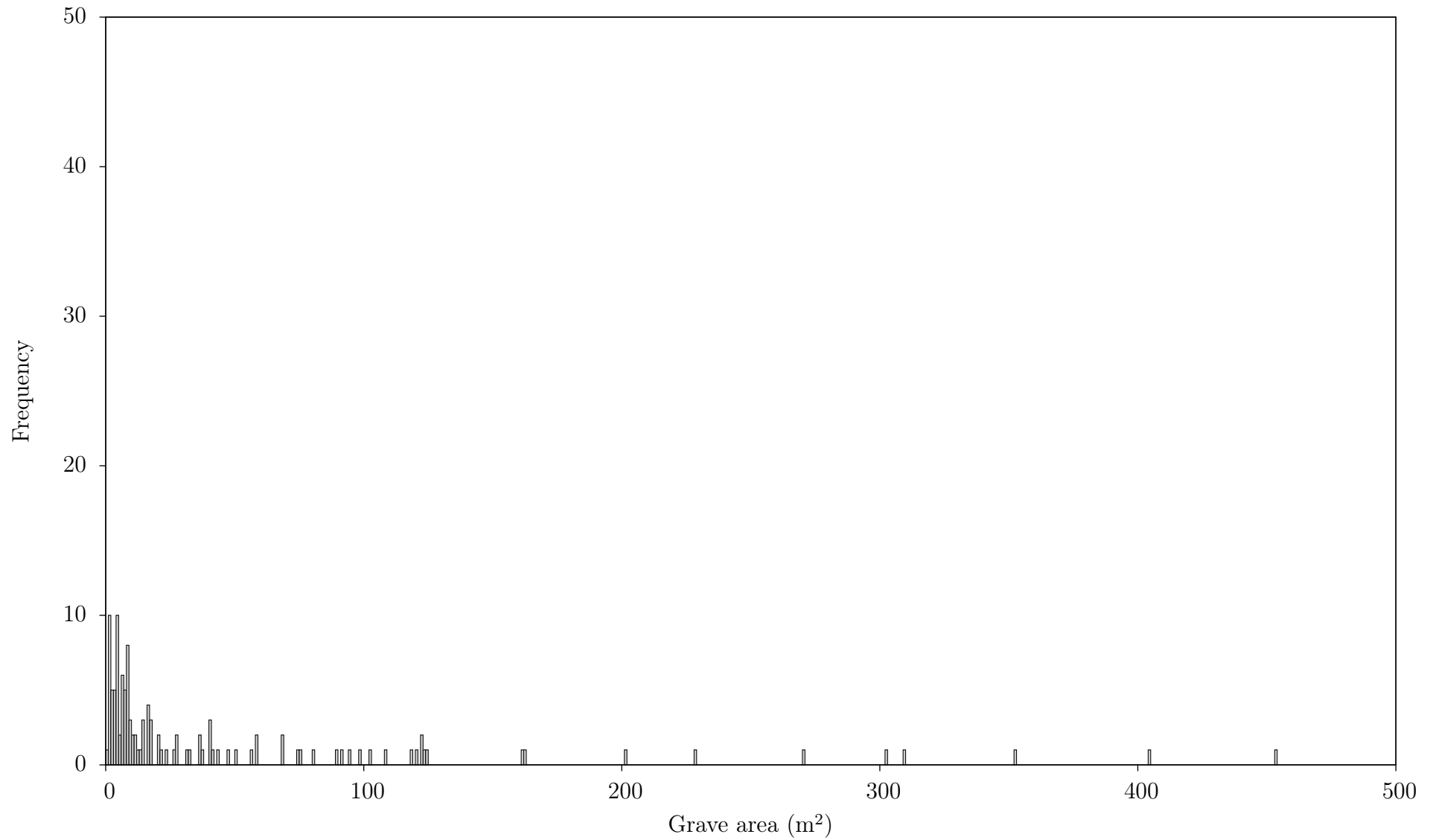


Figure A.79: Distribution of all seal impression-containing grave sizes from Naqada II to Dynasty 6, a period covering roughly 1300 years. Total number of graves plotted: 121. The tombs of Hotepsekhemwy, Ninetjer, and Khasekhemwy were too large to be plotted on this graph.

Table A.17: Well-documented cemeteries found to contain tombs with seal impressions, total number of seal impressions-containing burials in these cemeteries, average area and standard deviation of seal impressions-containing burials. Data used in Figures A.76 and A.77.

	Total no. of cemeteries	Total no. of graves	Average (m ²)	St. Dev. (m ²)
Naqada II	1	11	6.8	3.5
Naqada III	6	18	20.1	21.0
Dynasty 1-2	36	64	123.8	232.2
Dynasty 1-2, no subsidiary burials	34	47	163.8	256.4
Dynasty 3-6	10	30	20.6	25.1

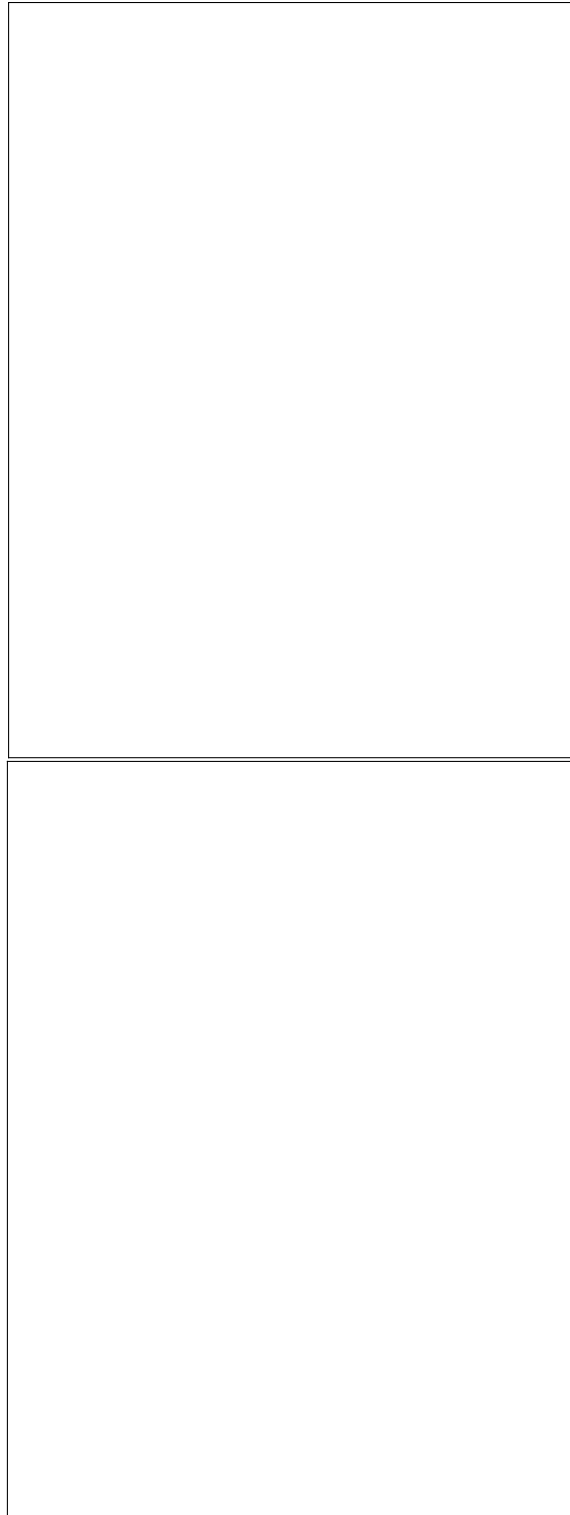


Figure A.80: Two Dynasty 1 subsidiary graves, each containing a single sealed jar. The left photograph shows the northeastern subsidiary grave of the Aha III valley enclosure at Abydos. The right photograph shows subsidiary burial 14 of Saqqara mastaba 3504. Note that in both tombs, the jar sealed with seal impressions is placed behind the back of the skeleton. Arrows indicates the sealed jar placed in each burial. Modified from Bestock (2009, Plate 14) and Emery (1954, Plate XXI).

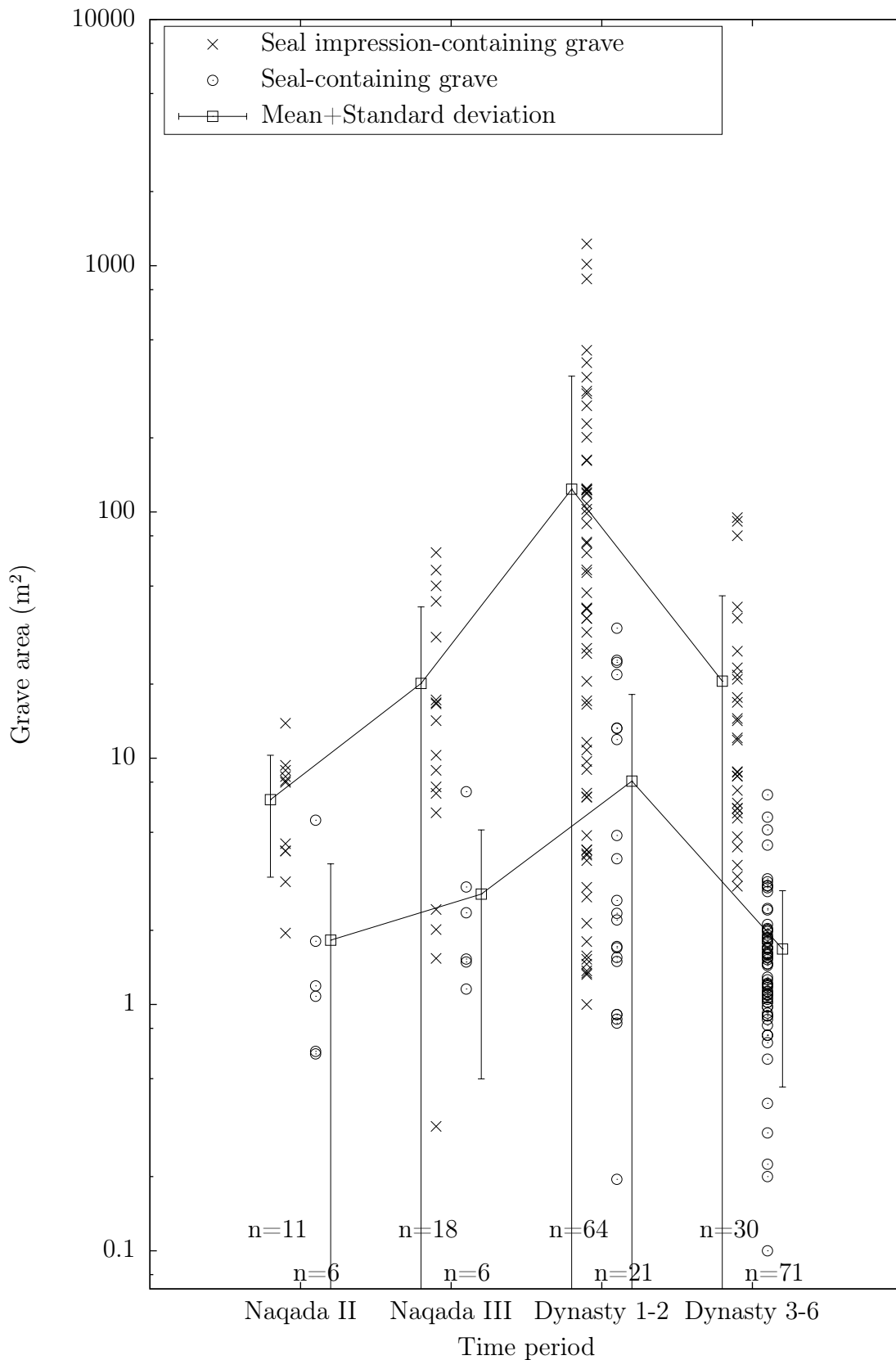


Figure A.81: Area of tomb substructures found to contain seal impressions, and area of tomb substructures found to contain seals, from Naqada II to Dynasty 6. Plotted on a logarithmic scale. Data includes measurements from subsidiary burials.

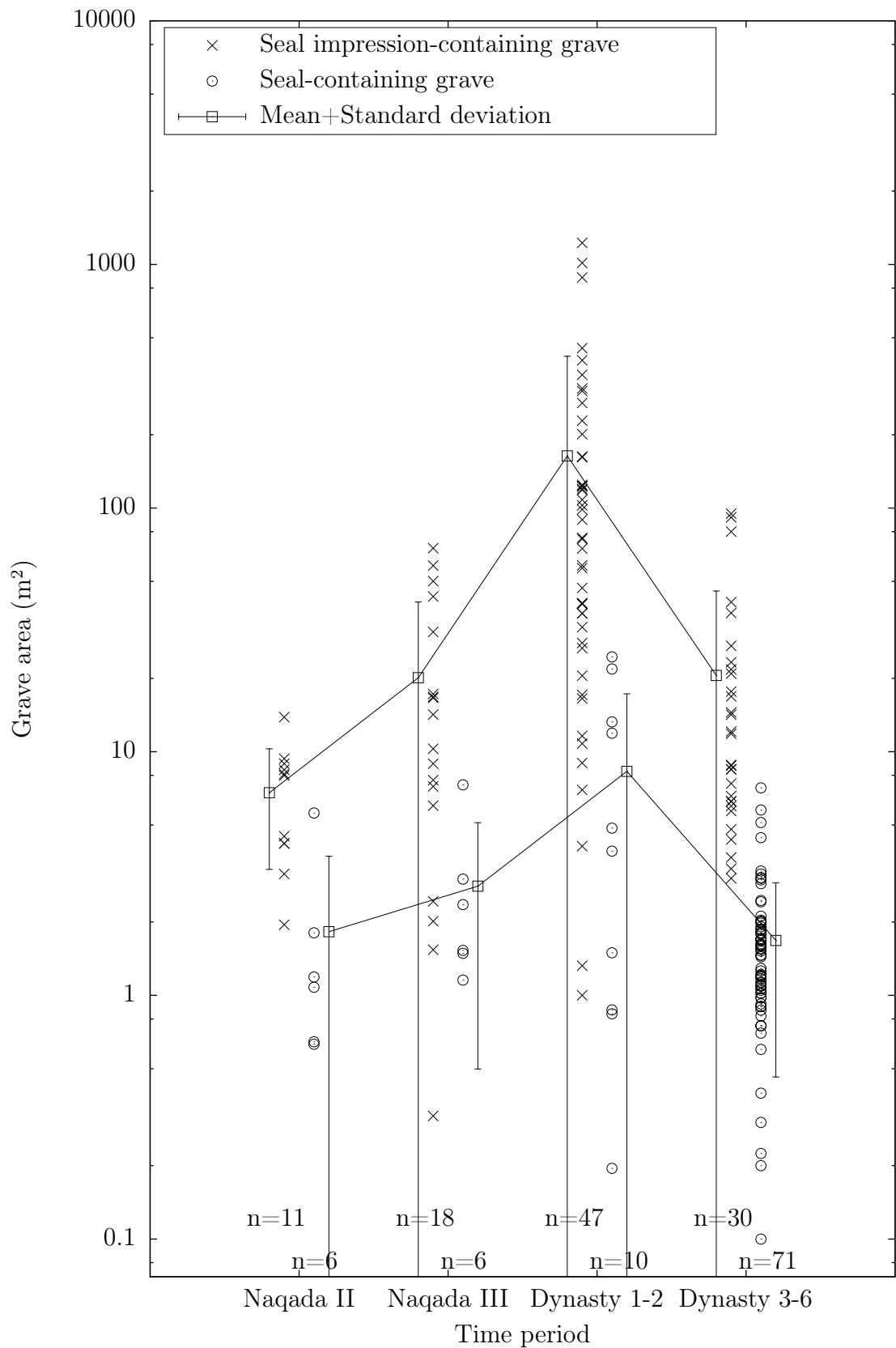


Figure A.82: Area of tomb substructures found to contain seal impressions, and area of tomb substructures found to contain seals, from Naqada II to Dynasty 6. Plotted on a logarithmic scale. Data does not include measurements from subsidiary burials.



Figure A.83: General map of southwestern Asia. Black rectangles indicate sites with evidence for cylinder seal-based administration in the 4th to 3rd millennium BCE that are examined in the present analysis. Except for Tell Brak, all sites enclosed in rectangles were also found to contain countersealed administrative artefacts. Modified from Matthews (2002, Figure 1). Hacinebi not included on this map. It is located near Jebel Aruda.

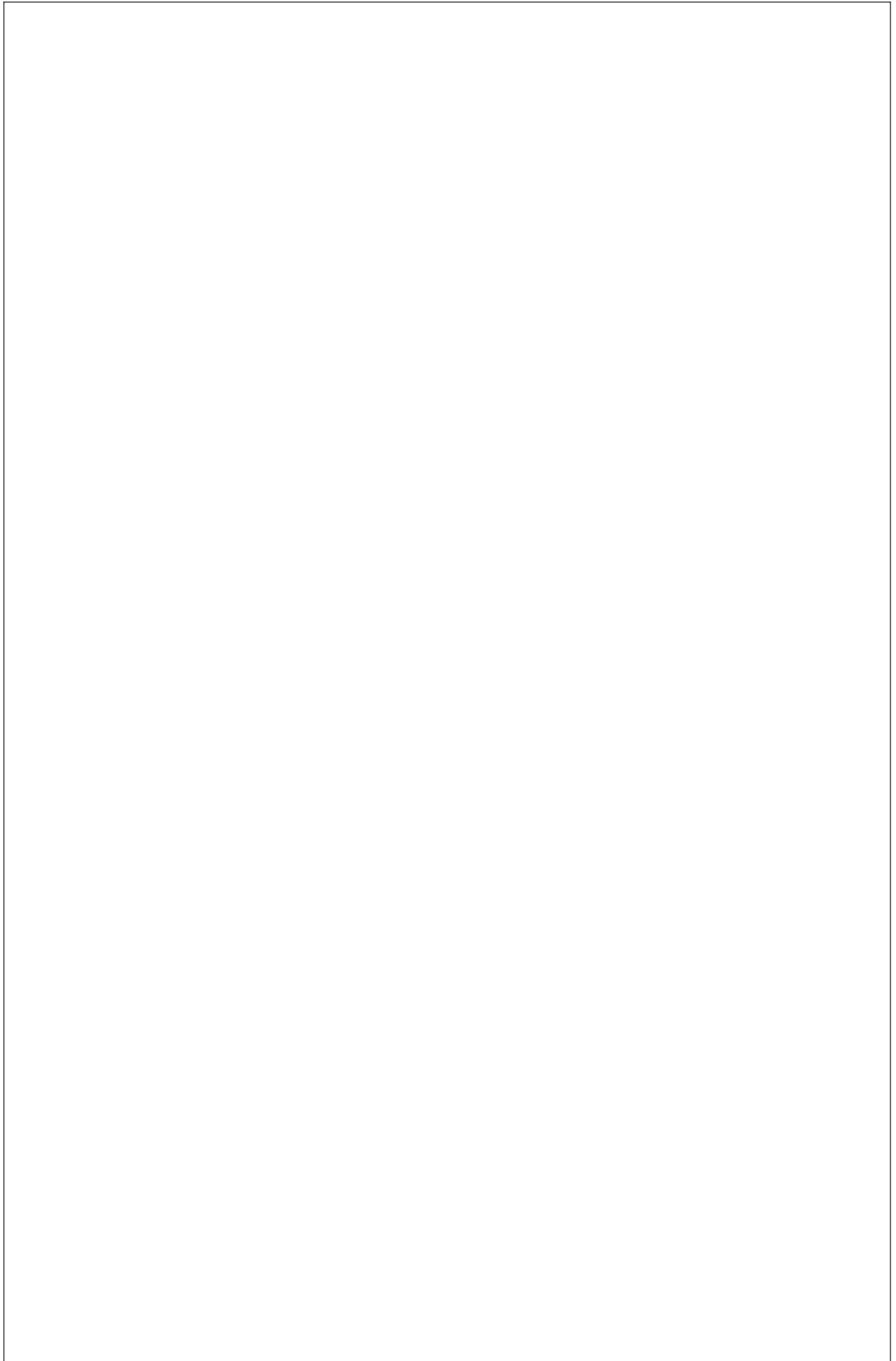


Figure A.84: City mound (tell) of Chogha Mish. Excavated areas found to contain seal impressions are circled in black. Modified from Alizadeh (2008, Figure 6).

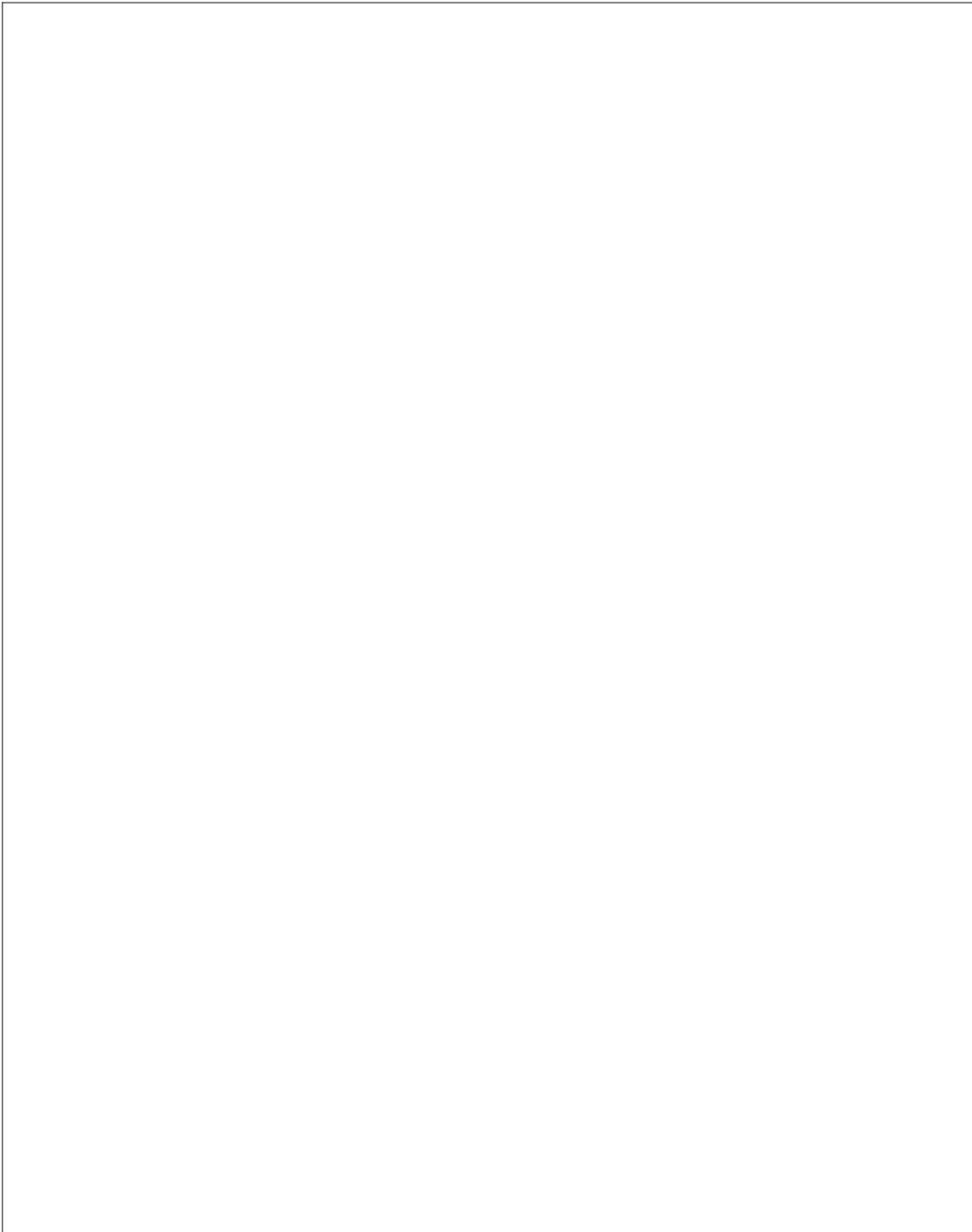


Figure A.85: Islands of Elephantine at high tide. Excavated areas found to contain early seal impressions are circled in black. Modified from Ziermann (2003, Abb. 50).



Figure A.86: East Area of Chogha Mish, building phase 3. Areas where seal impressions were found indicated with arrows. Modified from Delougaz and Kantor (1996b, Plate 264).

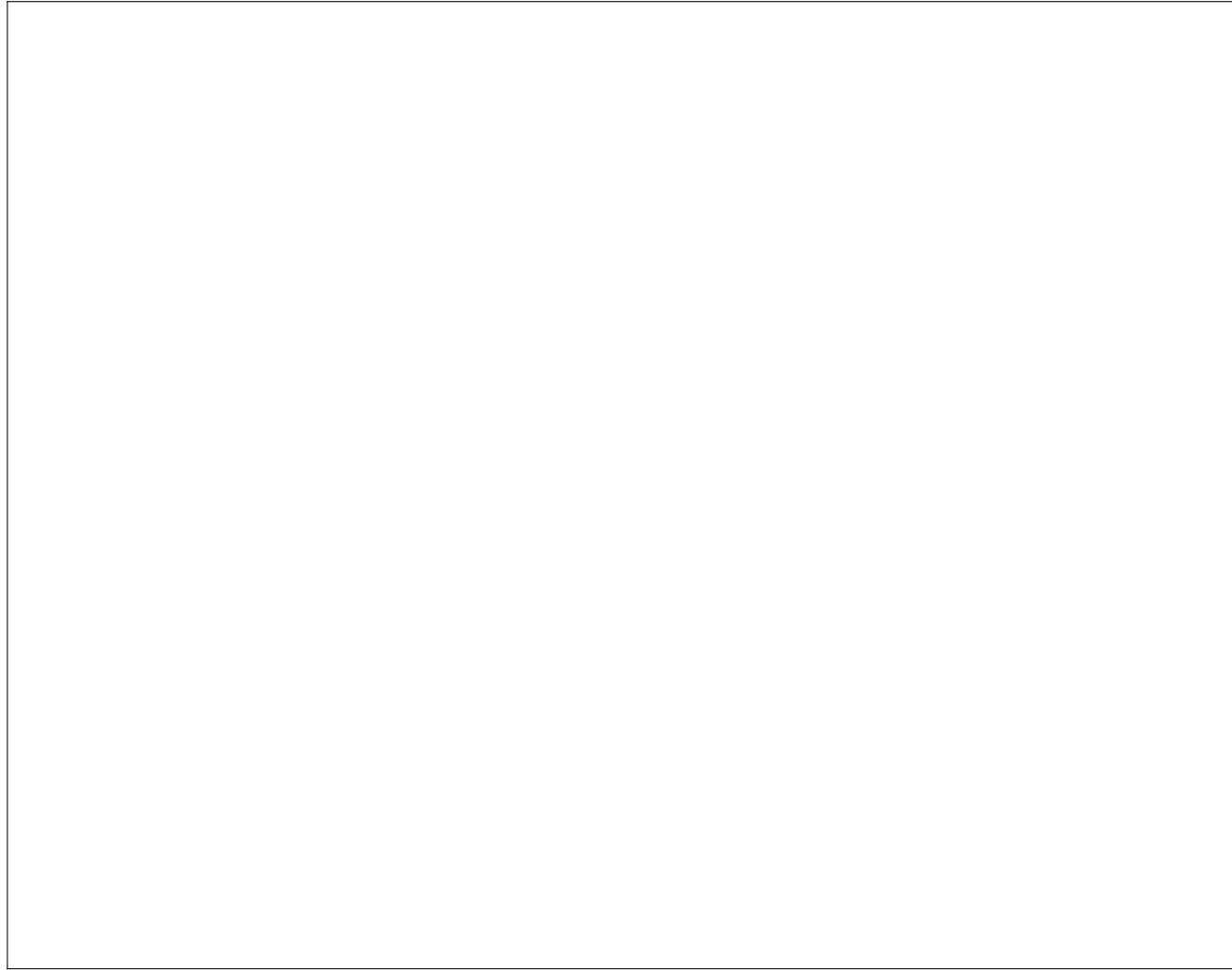


Figure A.87: East Area of Chogha Mish, building phase 3. Areas where seal impressions were found indicated with arrows. Modified from Alizadeh (2008, Figure 17).



Figure A.88: West Area of Chogha Mish. Areas where seal impressions were found indicated with arrows. Modified from Delougaz and Kantor (1996b, Plate 265).

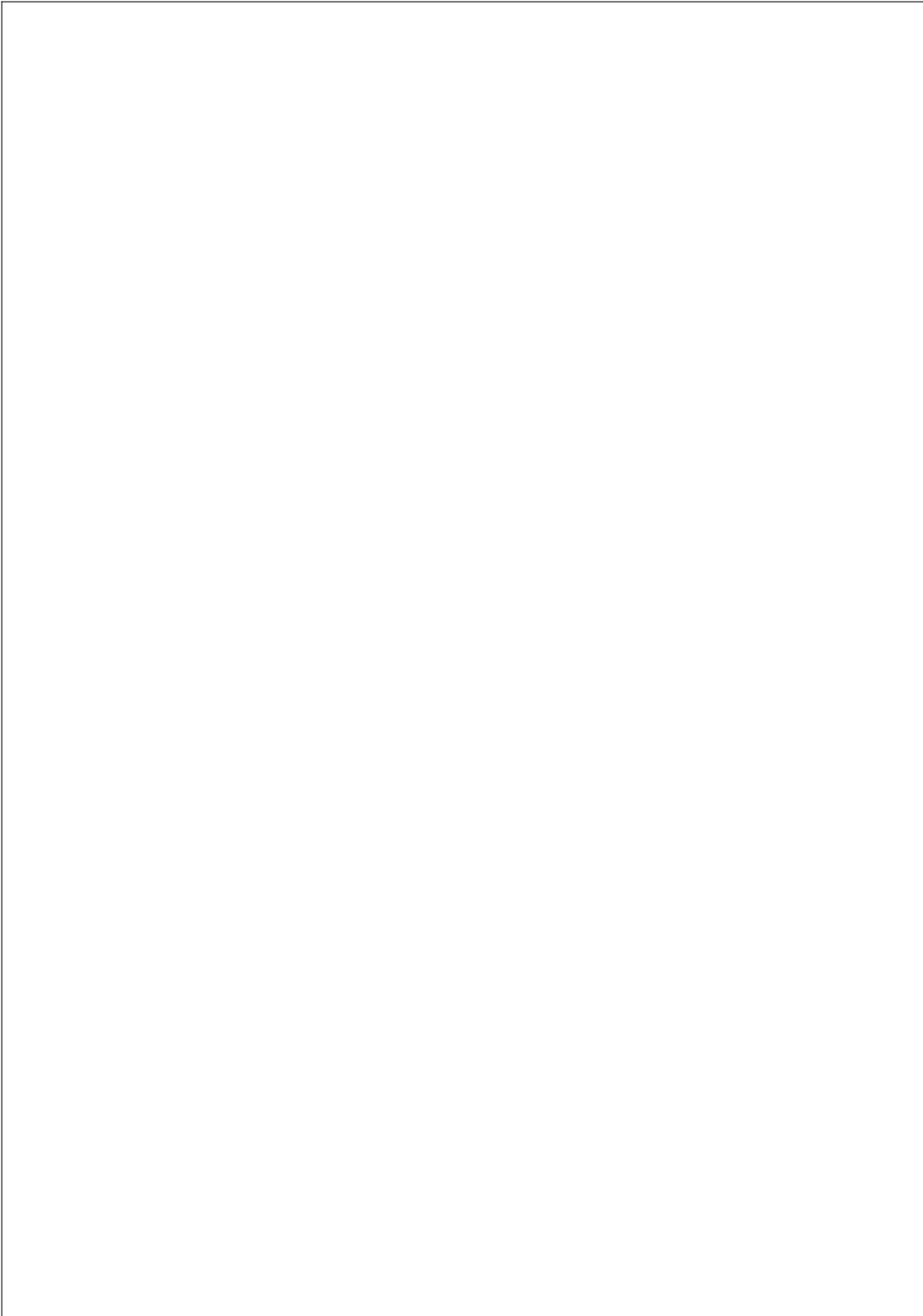


Figure A.89: Fortress area of Elephantine, dated to Dynasty 1. Area where seal impressions were found indicated with arrows. Modified from Kaiser *et al.* (1995, Abb. 2).

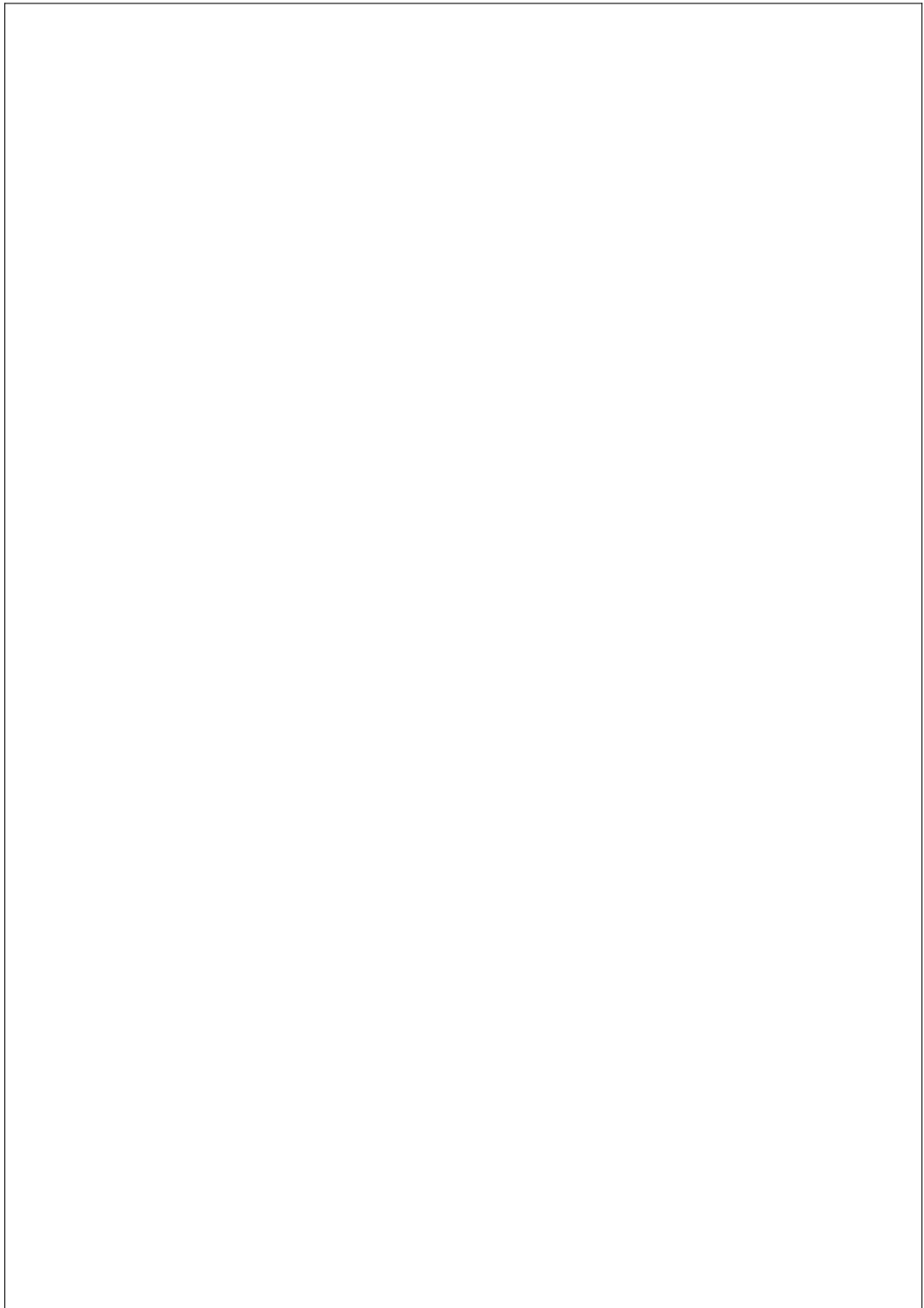


Figure A.90: Fortress area of Elephantine, dated to the second half of Dynasty 1–beginning of Dynasty 2. Area where seal impressions were found indicated with arrows. Modified from Kaiser *et al.* (1993, Abb. 2).



Figure A.91: City wall north of Satet temple of Elephantine, building phase III/IV, dated to early to mid Dynasty 2. Area where seal impression was found indicated with arrow. Modified from Ziermann (2003, Abb. 13).



Figure A.92: City wall north of Satet temple of Elephantine, building phase V(1), dated to the middle of Dynasty 2. Area where seal impression was found indicated with arrow. Modified from Ziermann (2003, Abb. 14).



Figure A.93: City wall north of Satet temple of Elephantine, building phase V(2), dated to the middle of Dynasty 2. Area where seal impression was found indicated with arrow. Modified from Ziermann (2003, Abb. 15).



Figure A.94: City wall north of Satet temple of Elephantine, building phase V(3/4), dated to the middle of Dynasty 2. Area where seal impression was found indicated with arrow. Modified from Ziermann (2003, Abb. 16).



Figure A.95: City wall north of Satet temple of Elephantine, building phase VI(1), dated to the middle of Dynasty 2. Area where seal impression was found indicated with arrow. Modified from Ziermann (2003, Abb. 17).

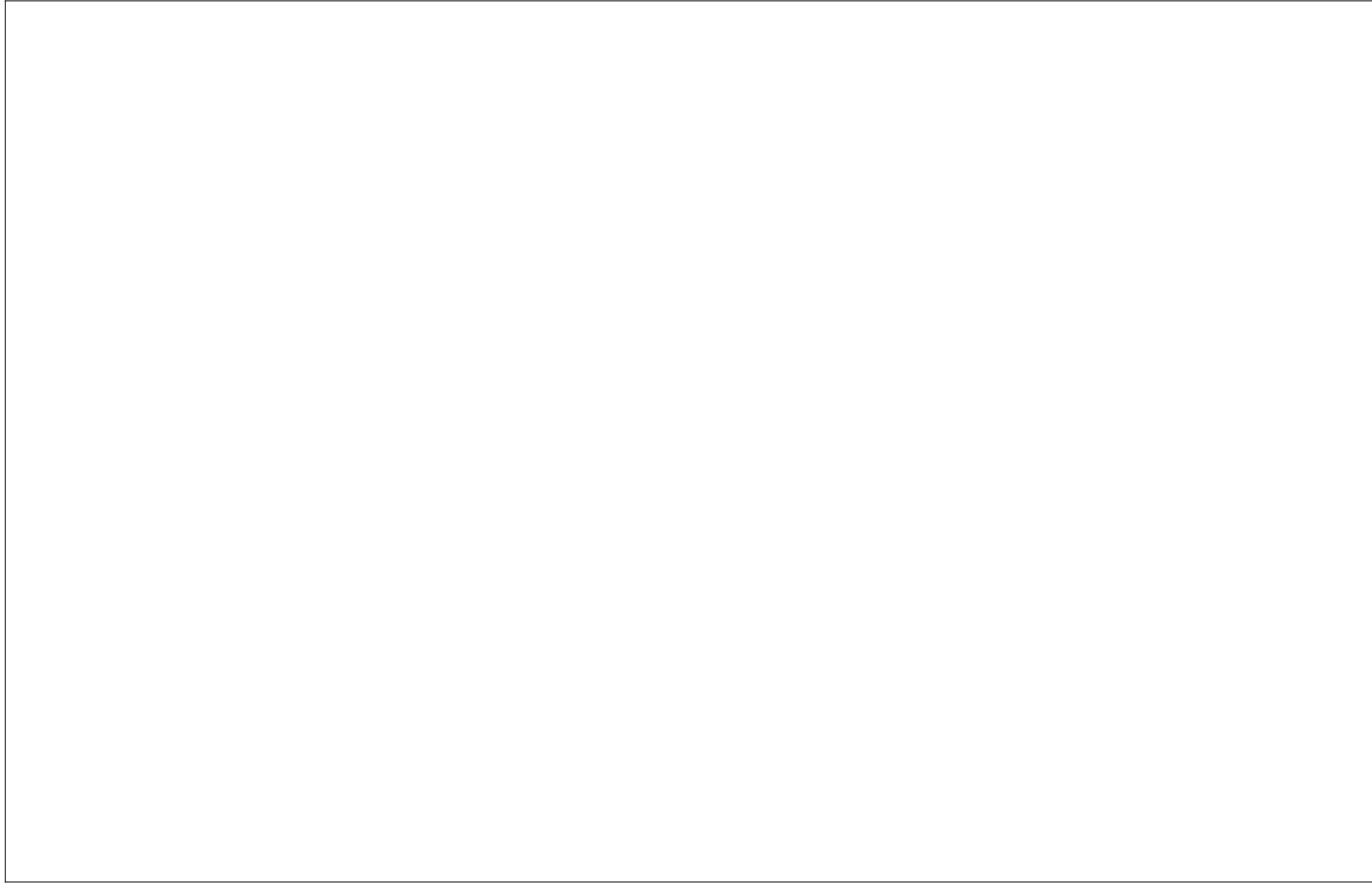


Figure A.96: City wall north of Satet temple of Elephantine, building phase VI(2), dated to the middle of Dynasty 2. Area where seal impression was found indicated with arrow. Modified from Ziermann (2003, Abb. 18).



Figure A.97: City wall north of Satet temple of Elephantine, building phase VI(3/4), dated to the middle of Dynasty 2. Area where seal impression was found indicated with arrow. Modified from Ziermann (2003, Abb. 19).

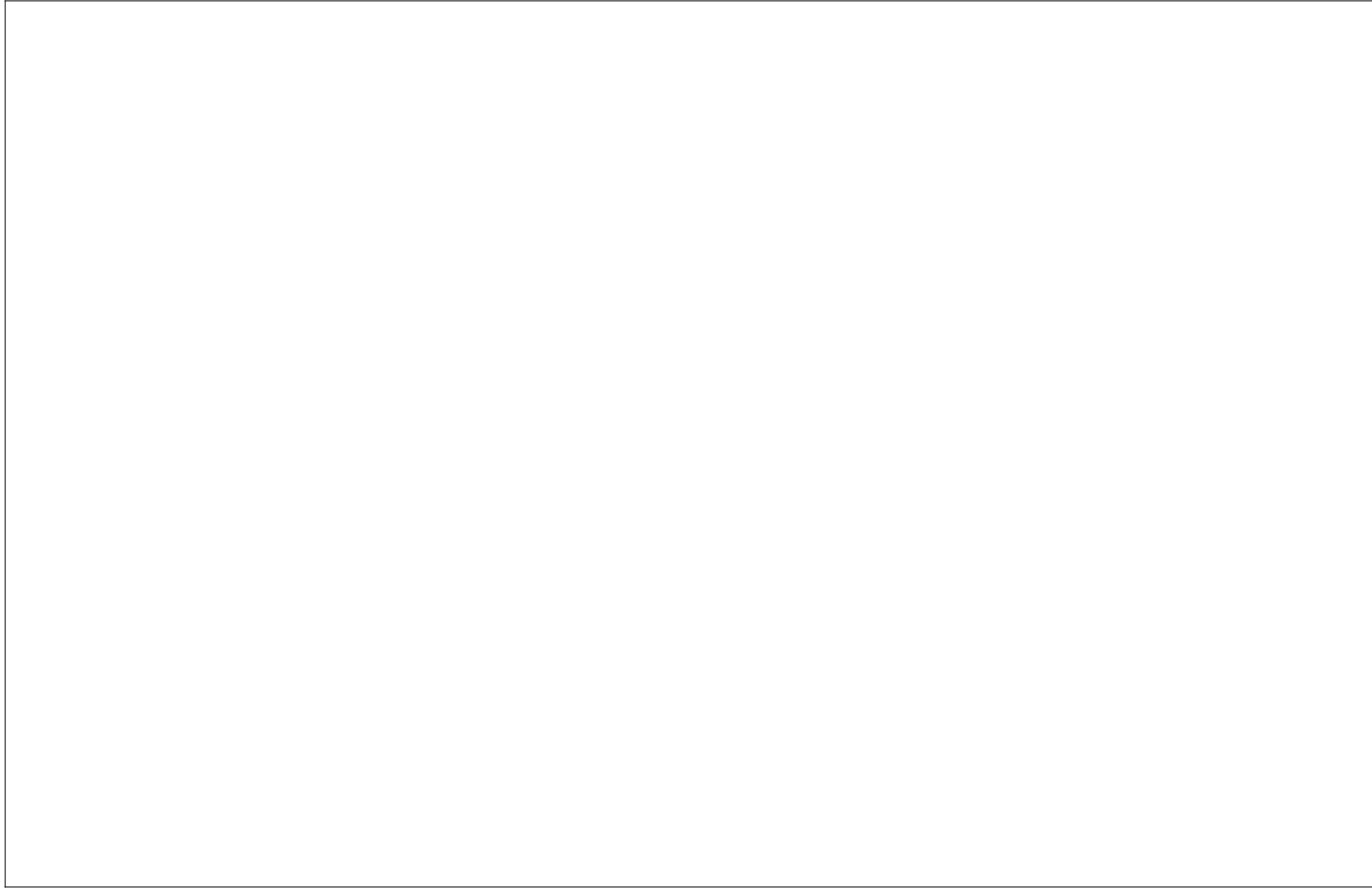


Figure A.98: City wall north of Satet temple of Elephantine, building phase VII(1,2), dated to mid to late Dynasty 2. Area where seal impression was found indicated with arrow. Modified from Ziermann (2003, Abb. 20).

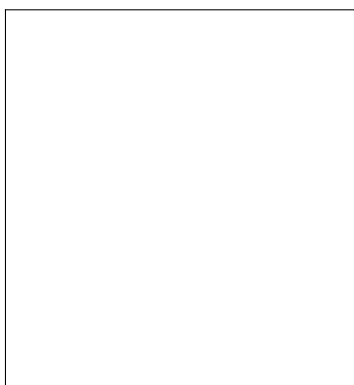


Figure A.99: Countersealed sealing from Elephantine, Pätznick catalogue no. 191. Modified from Pätznick (2005, 398).

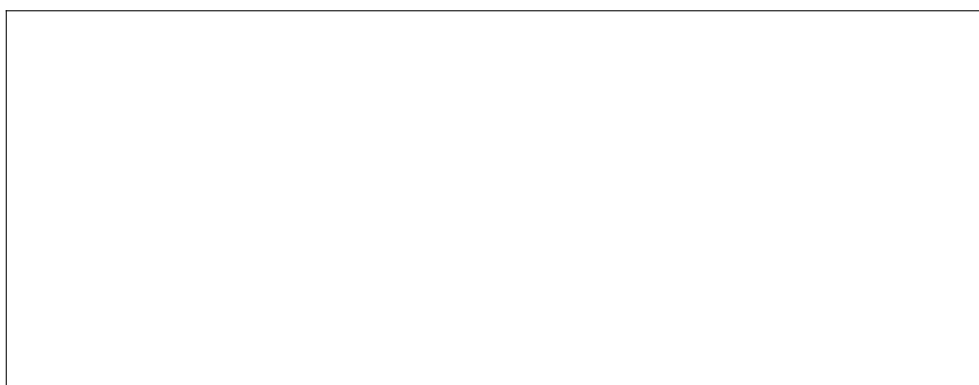


Figure A.100: Seal impression from Elephantine impressed with a seal inscribed with the hieroglyph sequences *rnw.tj* and *nfr m3' jz.t*, Pätznick catalogue no. 295. Modified from Pätznick (2005, 421).

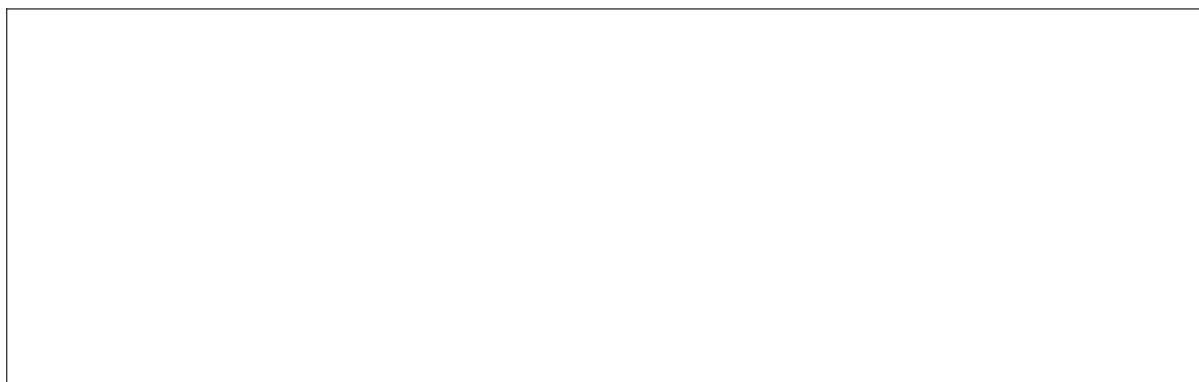


Figure A.101: Positive seal impression on a clay cylinder from Elephantine, likely used as a substitute 'seal'. Modified from Pätznick (2005, 577).

Table A.18: Sealings from Elephantine found to contain the hieroglyph sequences *rnw.tj/jrj nw.tj* or *nfr m3' jz.t*. Wherever possible, the sealing typology given by Pätznick (2005, 13–62) was also converted into the typology for early sealings created by Engel and Müller (2000). Rows highlighted in grey indicate that both hieroglyph sequences were found on the sealing.

Pätznick (2005) catalogue no.	Pätznick (2005) Sealing type	Engel and Müller (2000) Sealing type	Hieroglyph Sequence
003	Gv. Vb	G6	<i>rnw/jrj nw</i>
005	Wood cylinder seal		<i>rnw.tj/jrj nw.tj</i>
006	Gv. Vb	G6	<i>rnw.tj/jrj nw.tj</i>
007	Tv. 2		<i>rnw/jrj nw</i>
008	Tv. 1a		<i>rnw/jrj nw</i>
010	Tv. 1a		<i>rnw.tj/jrj nw.tj</i> (also countersealed with other seal)
011	Gv. Vb	G6	<i>rnw.tj/jrj nw.tj</i>
012	Wood cylinder seal		<i>rnw.t/jrj nw.t</i>
013	Gv. Ic+Gv. IIa	G1+G5	<i>rnw[...]/jrj nw[...]</i>
026	Tv. 1b		<i>rnw/jrj nw</i>
032	Tv. 1		<i>rnw/jrj nw</i>
067	Tb. 2a Box sealing		<i>rnw.t/jrj nw.t</i>
078	Gv. IIb	G5	<i>rnw/jrj nw</i>
089	Tb. 2b		<i>rnw.tj/jrj nw.tj</i>
093	Tb. 0		<i>rnw[...]/jrj nw[...]</i>
111	Tb. 2b		<i>rnw.tj/jrj nw.tj</i>

Table A.18: Sealings from Elephantine found to contain the hieroglyph sequences rnw.tj/jrj nw.tj or nfr m3' jz.t. - (continued)

Pätznick (2005) catalogue no.	Pätznick (2005) Sealing type	Engel and Müller (2000) Sealing type	Hieroglyph Sequence
112	Gv. Ic	G1	rnw.t/jrj nw.t
117	Gv. III	G5	rnw.tj/jrj nw.tj (also countersealed with other seal)
122	Tb. 2b		rnw.tj/jrj nw.tj
124	Tb. 2b		rnw.tj/jrj nw.tj
134	Tb. 2b		rnw.tj/jrj nw.tj
149	Tb. 2a Box sealing		rnw.tj/jrj nw.tj
150	Gv. Vb	G6	rnw/jrj nw
151	Tb. 2a Box sealing		rnw.tj/jrj nw.tj
152	Gv. IVa	G4	rnw.tj/jrj nw.tj
219	Tb. 1	S2	rnw/jrj nw
237	Tb. 0		rnw[...]/jrj nw[...]
268	Tb. 2b		rnw/jrj nw
270	Gv. Vb	G6	rnw/jrj nw
276	Gv. Ic	G1	rnw.tj/jrj nw.tj
292	Gv. Ia	G5	rnw.t/jrj nw.t
295	Gv. Ic	G1	rnw/jrj nw & nfr m3' jz.t ntchr.t
296	Tb. 2a Box sealing		rnw/jrj nw ?
312	Uv. 1	P1	rnw.tj/jrj nw.tj

Table A.18: Sealings from Elephantine found to contain the hieroglyph sequences rnw.tj/jrj nw.tj or nfr m3' jz.t. - (continued)

Pätznick (2005) catalogue no.	Pätznick (2005) Sealing type	Engel and Müller (2000) Sealing type	Hieroglyph Sequence
315	Gv. Ic	G1	rnw/jrj nw & nfr m3' jz.t
316	Gv. Ib	G1/G5	rnw.tj/jrj nw.tj
323	Gv. III	G5	rn(w/-tj) (also countersealed with other seal)
332	Gv. IVb	G4	rnw.t/jrj nw.t
336	Gv. Ib	G1/G5	rnw.t/jrj nw.t
343	Tb. 0		rnw[...]/jrj nw[...]
347	Tb. 0		rnw/jrj nw
348	Tb. 0		rnw.tj/jrj nw.tj
351	Tb. 0		rnw.tj/jrj nw.tj
355	Tb. 0		rnw.tj/jrj nw.tj
362	Gv. Ia	G5	rnw.t/jrj nw.t
363	Gv. Ia	G5	rnw.t/jrj nw.t
370	Tb. 2b		rnw[...]/jrj nw[...]
372	Tb. 0		rnw[...]/jrj nw[...]
375	Wood cylinder seal		rnw.tj/jrj nw.tj & nfr m3' jz.t
376	Tb. 1	S2	rnw.tj/jrj nw.tj & nfr m3' jz.t
377	Tb. 1	S2	rnw[...]/jrj nw[...]
379	Tb. 0		rnw.tj/jrj nw.tj & nfr m3' jz.t

Table A.18: Sealings from Elephantine found to contain the hieroglyph sequences rnw.tj/jrj nw.tj or nfr m3' jz.t. - (continued)

Pätznick (2005) catalogue no.	Pätznick (2005) Sealing type	Engel and Müller (2000) Sealing type	Hieroglyph Sequence
382	Tb. 2b		rnw[...]/jrj nw[...]
383	Gv. Vb	G6	rnw.t/jrj nw.t
393	Tv. 2		rnw/jrj nw
396	Wood cylinder seal		rnw.tj/jrj nw.tj & nfr m3' jz.t
399	Gv. Ic	G1	rnw.tj/jrj nw.tj
408	Gv. Ic	G1	rnw.tj/jrj nw.tj & nfr m3' jz.t
411	Gv. Vb	G6	rnw.tj/jrj nw.tj
414	Tb. 2b		rnw[...]/jrj nw[...]
417	Tb. 2a Box sealing		rnw/jrj nw
422	Gv. Ia	G5	rnw.tj/jrj nw.tj
423	Tb. 2b		rnw.tj/jrj nw.tj & nfr m3' jz.t
435	Tb. 1	S2	rnw/jrj nw & nfr m3' jz.t mjtr
437	Tb. 2b		rnw/jrj nw
439	Gv. Vb	G6	rnw/jrj nw
448	Tb. 1	S2	rnw/jrj nw
454	Gv. Vb	G6	rnw.tj/jrj nw.tj
462	Gv. III	G5	rnw/jrj nw
468	Gv. 0		rnw[...]/jrj nw[...]
501	Gv. IIa	G5	rnw.tj/jrj nw.tj & nfr m3' jz.t ?

Table A.18: Sealings from Elephantine found to contain the hieroglyph sequences rnw.tj/jrj nw.tj or nfr m3' jz.t. - (continued)

Pätznick (2005) catalogue no.	Pätznick (2005) Sealing type	Engel and Müller (2000) Sealing type	Hieroglyph Sequence
502	Gv. Vb	G6	rnw.tj/jrj nw.tj
506	Tb. 0		rnw.tj/jrj nw.tj
509	Tb. 2b		rnw.tj/jrj nw.tj & nfr m3' jz.t
516	Tv. 2		rnw[...]/jrj nw[...] & nfr m3' jz.t
517	Tb. 2b		rnw.tj/jrj nw.tj
521	Tv. 2		rnw[...]/jrj nw[...] & nfr m3' jz.t
529	Tb. 2a Box sealing		rnw[...]/jrj nw[...]
530	Tb. 2a Box sealing		rnw/jrj nw
532	Tb. 2b		rnw.tj/jrj nw.tj
534	Tb. 2b		rnw.tj/jrj nw.tj
536	Gv. IVb	G4	rnw/jrj nw
557	Unclear		rnw.tj/(jrj) nw.tj
560	Unclear		rnw/jrj nw
576	Clay cylinder with positive cylinder seal impression		rnw[...]/jrj nw[...] & s3dj nfr m3' jz.t
590	Tb. 2b		rnw/jrj nw
600	Tb. 1	S2	rnw.tj/jrj nw.tj & s3dj nfr m3' jz.t
625	Tb. 2b		rnw[...]/jrj nw[...]
626	Gv. Vb	G6	rnw.tj/jrj nw.tj

Table A.18: Sealings from Elephantine found to contain the hieroglyph sequences rnw.tj/jrj nw.tj or nfr m3' jz.t. - (continued)

Pätznick (2005) catalogue no.	Pätznick (2005) Sealing type	Engel and Müller (2000) Sealing type	Hieroglyph Sequence
639	Gv. Va	G6	rnw.tj/jrj nw.tj & nfr m3' jz.t
640	Gv. Vb	G6	rnw.tj/jrj nw.tj
641	Tb. 1	S2	rnw.tj/jrj nw.tj
646	Uv. 1	P1	rnw.tj/jrj nw.tj
654	Tv. 1a s3dj		rnw.tj/jrj nw.tj
655	Gv. 1a	G5	rnw/jrj nw & nfr m3' jz.t
663	Gv. 1c	G1	rnw/jrj nw
664	Tb. 0		rnw.tj/jrj nw.tj & nfr m3' jz.t
046	Tb. 2a Box sealing		nfr m3' jz.t
047	Tb. 2a Box sealing		nfr m3' jz.t
048	Tb. 2b		nfr m3' jz.t
073	Tb. 5a	S1	nfr m3' jz.t
088	Tb. 2b		nfr m3'(jz.t)
123	Tb. 2b		nfr m3' jz.t
281	Tb. 0		nfr m3' jz.t
283	Tb. 0		nfr m3' jz.t
284	Gv. V b		nfr m3' jz.t
308	Gv. Ic	G1	nfr m3' jz.t
320	Gv. IVb	G4	nfr m3' jz.t

Table A.18: Sealings from Elephantine found to contain the hieroglyph sequences $nw.tj/jrj$ $nw.tj$ or $nfr m3' jz.t$. - (continued)

Pätznick (2005) catalogue no.	Pätznick (2005) Sealing type	Engel and Müller (2000) Sealing type	Hieroglyph Sequence
333	Gv. Ia	G5	$nfr m3' jz.t s3dj$
335	Gv. Ib	G1/G5	$s3dj nfr m3' jz.t$
346	Tb. 0		$nfr m3' jz.t$
354	Gv. Vb		$nfr m3' jz.t$
369	Tb. 0		$nfr m3' jz.t$
388	Tv. 2		$nfr m3' jz.t$
390	Gv. Ia	G5	$nfr m3' jz.t$
392	Gv. Ic	G1	$nfr m3' jz.t$
397	Gv. Vb		$nfr m3' jz.t$
401	Gv. Vb		$nfr m3' jz.t s3dj$
409	Tb. 2b		$s3dj nfr m3' jz.t$
420	Tb. 0		$nfr m3' jz.t$
421	Gv. Ic	G1	$nfr m3' jz.t$
427	Tb. 2b		$nfr m3' jz.t$
440	Tb. 2b		$nfr m3' jz.t$
465	Tb. 2b		$nfr m3' jz.t$
471	Gv. IVb	G4	$nfr m3' jz.t$
486	Gv. Vb		$nfr m3' jz.t$
487	Gv. Vb		$nfr m3' jz.t$

Table A.18: Sealings from Elephantine found to contain the hieroglyph sequences *rnw.tj/jrj nw.tj* or *nfr m3' jz.t.* - (continued)

Pätznick (2005) catalogue no.	Pätznick (2005) Sealing type	Engel and Müller (2000) Sealing type	Hieroglyph Sequence
503	Gv. Va	G6	nfr m3' jz.t
508	Gv. Ic+Clay stopper	G1+Clay stopper	nfr m3' jz.t
510	Gv. IVa	G4	nfr m3' jz.t
511	Gv. Ic	G1	nfr m3' jz.t
523	Tb. 2a Box sealing		(nfr) m3' jz.t
526	Tb. 2b		nfr m3' jz.t
542	Tb. 0		nfr m3' jz.t
549	Gv. Vb		nfr m3' jz.t
556	Tb. 0		nfr m3' jz.t
558	Tb. 0		nfr m3' jz.t
561	Tb. 2a Box sealing		s3dj jz.t nfr m3'
585	Tb. 2a Box sealing		nfr m3' jz.t
589	Tb. 2b		nfr m3' jz.t
611	Gv. Ib+Gv. IIa	G1/G5+G5	nfr m3' jz.t
614	Gv. Vb		nfr m3' jz.t
633	Tv. 2		nfr m3' jz.t
643	Tb. 2b		nfr m3' jz.t
653	Tb. 1	S2	nfr m3' jz.t

Table A.18: Sealings from Elephantine found to contain the hieroglyph sequences rnw.tj/jrj nw.tj or nfr m3' jz.t . - (continued)

Pätznick (2005) catalogue no.	Pätznick (2005) Sealing type	Engel and Müller (2000) Sealing type	Hieroglyph Sequence
661	Tb. 1	S2	nfr m3' jz.t
			Total: 146

Table A.19: Sealings from other sites found to contain the hieroglyph sequences *rnw.tj/jrj nw.tj* or *nfr m3' jz.t*. Wherever possible, the sealing typology given in other publications, e.g. Kaplony (1963a) was also converted into the typology for early sealings created by Engel and Müller (2000) (Noted as E+M 2000).

Site	Reference catalogue no.	Sealing type	E+M 2000 Sealing type	Hieroglyph sequence	Source
Hierakonpolis	NA, Cambridge Museum of Archaeology and Anthropology	Jar sealing	G3	<i>nfr m3' jz.t</i>	Quibell and Green; (1902, Plate LXX, 18); Fairservis (1986, 24); Bussmann Pers. Comm. May 2, 2013
Elkab	E.7843, E.7851, E.7852	NA	NA	<i>rnw.tj</i>	Regulski (2009a, 41)
Kubaniya South, grave P225		Jar sealing		<i>nfr m3' jz.t</i>	Junker (1919, 135)
Abydos, grave of Khasekhemwy	Cairo 11105, 11117, 11118, 11128, 11130, 11136, 11141	Kaplony IVB	G4	<i>rnw.tj</i>	Kaplony (1963a, 160–161); Kaplony (1963b, No. 374); Petrie (1902, Pl. XXIV, no. 213)
	Toronto ROM 2346	Kaplony IVB	G4	<i>rnw.tj</i>	Kaplony (1963a, 160–161); Kaplony (1963b, No. 374); Petrie (1902, Pl. XXIV, no. 213)
Khasekhemwy enclosure, Abydos	Cairo 41354	Bag sealing		<i>nfr m3' jz.t</i>	Kaplony (1963a, 163-165)
	Ashmolean 1909.1113	Bag sealing		<i>nfr m3' jz.t</i>	Kaplony (1963a, 163-165)
	Ashmolean 1909.1118E	Bag sealing		<i>rnw.tj</i> &	Kaplony (1963a, 163-165)

Table A.19: Sealings from other sites found to contain the hieroglyph sequences rnw.tj/jrj nw.tj or nfr m3' jz.t. - (continued)

Site	Reference catalogue no.	Sealing type	E+M 2000 Sealing type	Hieroglyph sequence	Source
	1909.1118P, 1909.1123G, 1909.1123M, 1909.1123O			nfr m3' jz.t	
	Ashmolean 1909.1118A,B C,D,F,G,H,I,J,K,L,M,N,O			nfr m3' jz.t nfr m3' jz.t	Kaplony (1963a, 163-165)
	UC42974A,B,C		G4N	nfr m3' jz.t	Kaplony (1963a, 163-165)
	Ashmolean 1909.1123A,B C,D,E,F,I,J,K,L,N,P			rnw.tj rnw.tj	Kaplony (1963a, 163-165)
	UC42991A,B,C,D,E,F G,H,I,J,K,L,M,N,O			rnw.tj	Kaplony (1963a, 163-165)
					Total: 63

Table A.20: Comparison of seal impression motifs from different 4th to early 3rd millennium settlement sites dating from Naqada II to Dynasty 2 in Egypt. Only sealings with published drawings or photos are included in this table. Any sealings found to bear impressions with elements identifiable as hieroglyphs according to Regulski (2010a) were classified as ‘hieroglyphic’, unless they contained elements of both hieroglyphs and imagery. The Elephantine data is derived from the provenanced subset of sealings examined here.

	Pictorial	Hieroglyphic	Pictorial + Hieroglyphic	Royal names	Total	References
El-Adaima	1	4	2	0	7	Midant-Reynes <i>et al.</i> (1998)
Buto	1	16	0	1	18	Von Der Way and Schmidt (1988); Faltings and Köhler (1996); Faltings <i>et al.</i> (2000); Hartung <i>et al.</i> (2012)
Elephantine	0	116	3	1	120	Pätznick (2005)
Tell el-Farkha	7	6	0	0	13	Chłodnicki <i>et al.</i> (2002); Chłodnicki (2012); Kołodziejczyk (2012)
Hierakonpolis	65	170	9	9	253	Fairservis 1971–1972; Weeks 1971–1972; Fairservis 1986; Bussmann 2014a; Bussmann 2014b; Bussmann Pers. Comm. May 2, 2013
Tell el-Iswid	1	11	0	0	12	Regulski (2014)
Elkab	0	6	0	0	6	Regulski (2009a)
Mendes	0	4	0	1	5	Adams (2007); Redford (2010)
Naqada	0	2	0	0	2	DiMaria (2007)
'En Besor (Levant)	36	14	15	0	65	Schulman (1995a,b,c)
Halif Terrace/ Nahal Tillah (Levant)	1	2	0	0	3	Levy <i>et al.</i> (1997)
				Total:	504	

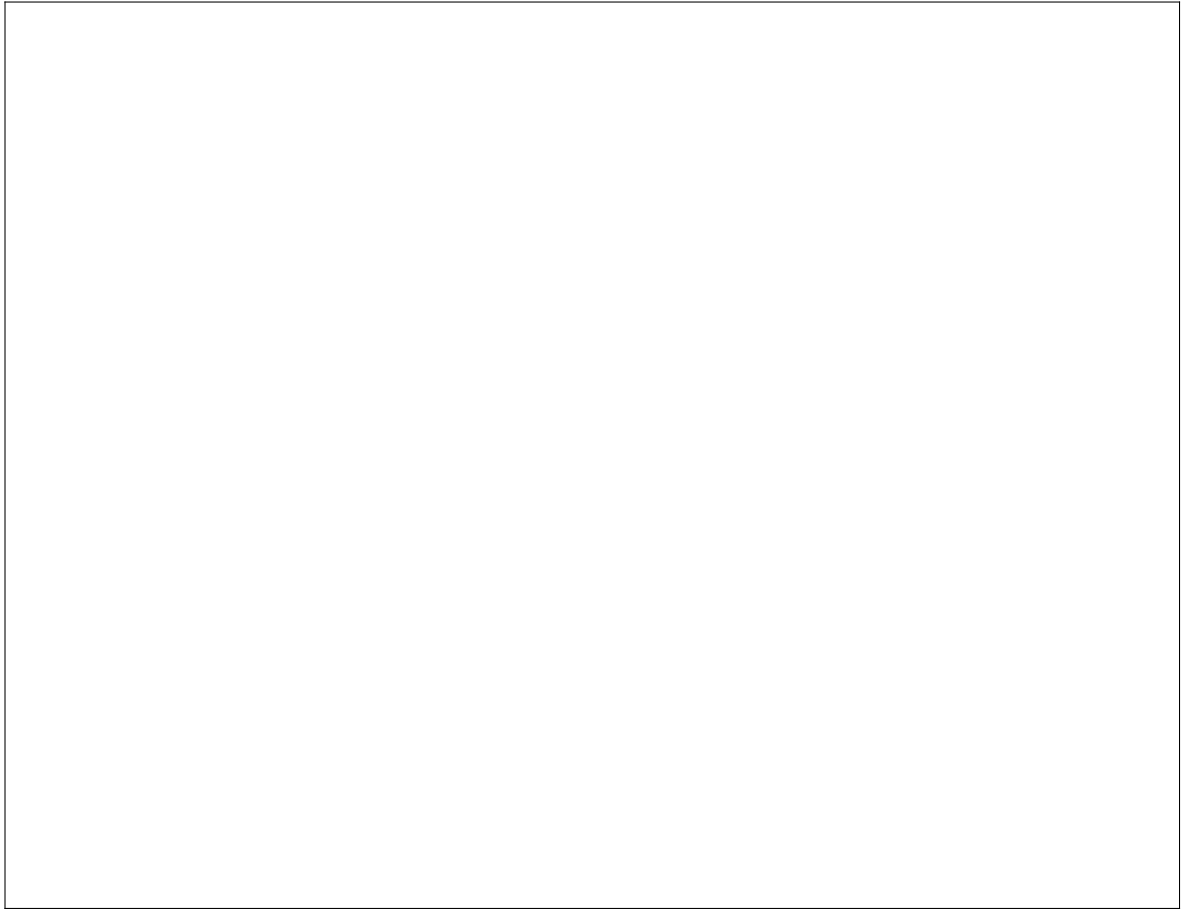


Figure A.102: Map of Tell Brak. Areas where seal impressions were found indicated with circles. Modified from Matthews and Matthews (2003, 2).



Figure A.103: Map of Tell Brak Area SS, Main Level. Area where seal impressions were found indicated with arrows. Modified from McDonald *et al.* (2002, 74). ‘Main’, ‘Ritual’, and ‘Trample’ labels refer to types of seal images found on impressions according to Matthews (1997). ‘Ritual’ seal images were found in the temple entrance deposit as well as other areas, ‘Main’ seal images were found in various locations in the Main Level of Area SS, and ‘Trample’ seal images were found only in the eastern ‘Trample’ layers of Room 18.

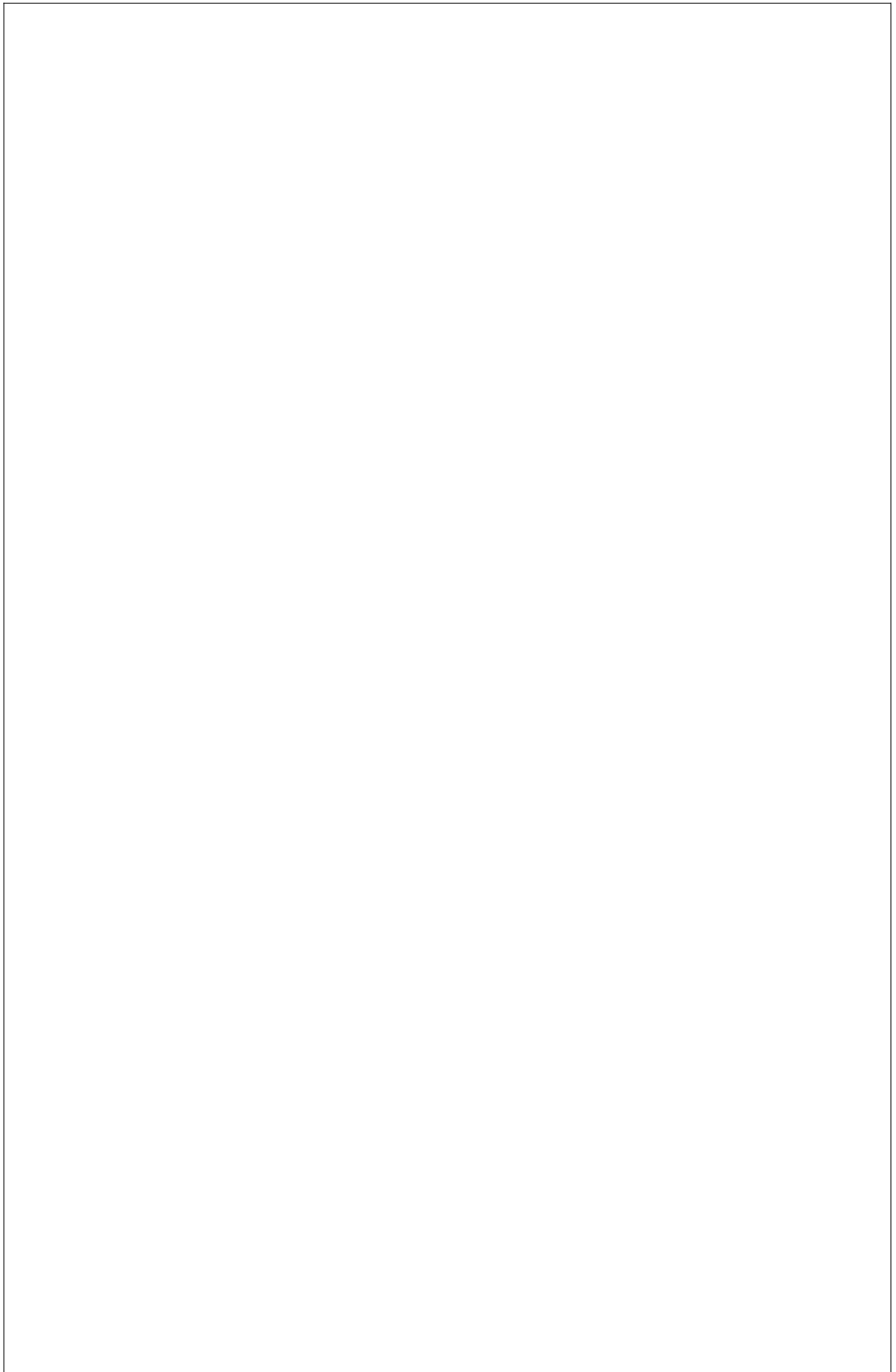


Figure A.104: Map of Tell Brak Area FS, layer 5. Area where seal impressions were found indicated with arrows. Modified from McDonald *et al.* (2002, 42).



Figure A.105: Triangular cross-section bulla from Tell Brak, impressed with seal image 242. Note numerical markings. Modified from Oates and Oates (1995, Plate 38).



Figure A.106: Rectangular cross-section bulla from Tell Brak, impressed with seal image 245. Note numerical markings and incised sign. Modified from Oates and Oates (1995, Plate 38).

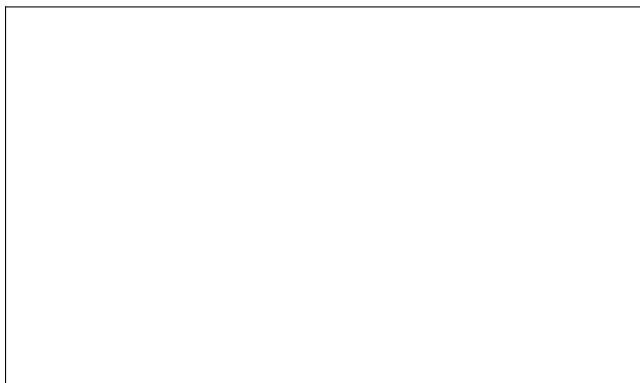


Figure A.107: Rectangular cross-section bullae squeezed together from Tell Brak, impressed with seal image 245. Modified from Oates and Oates (1995, Plate 38).

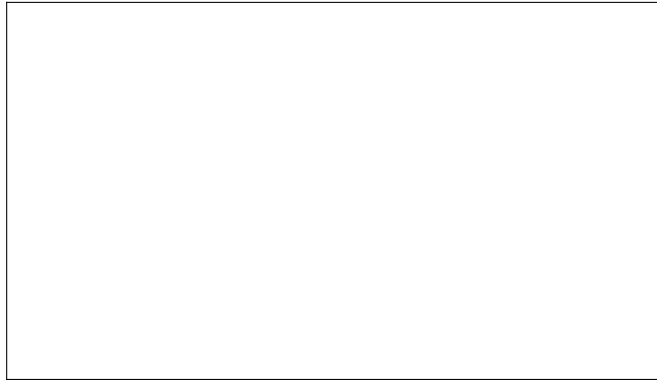


Figure A.108: Sealed bulla from the 4th millennium site of Chogha Mish. Modified from Delougaz and Kantor (1996b, Plate 33, H).



Figure A.109: Map of Balat, other oases of the Western Desert, and the Nile Valley of Egypt. Modified from Laisney and Pantalacci (2010, 27).

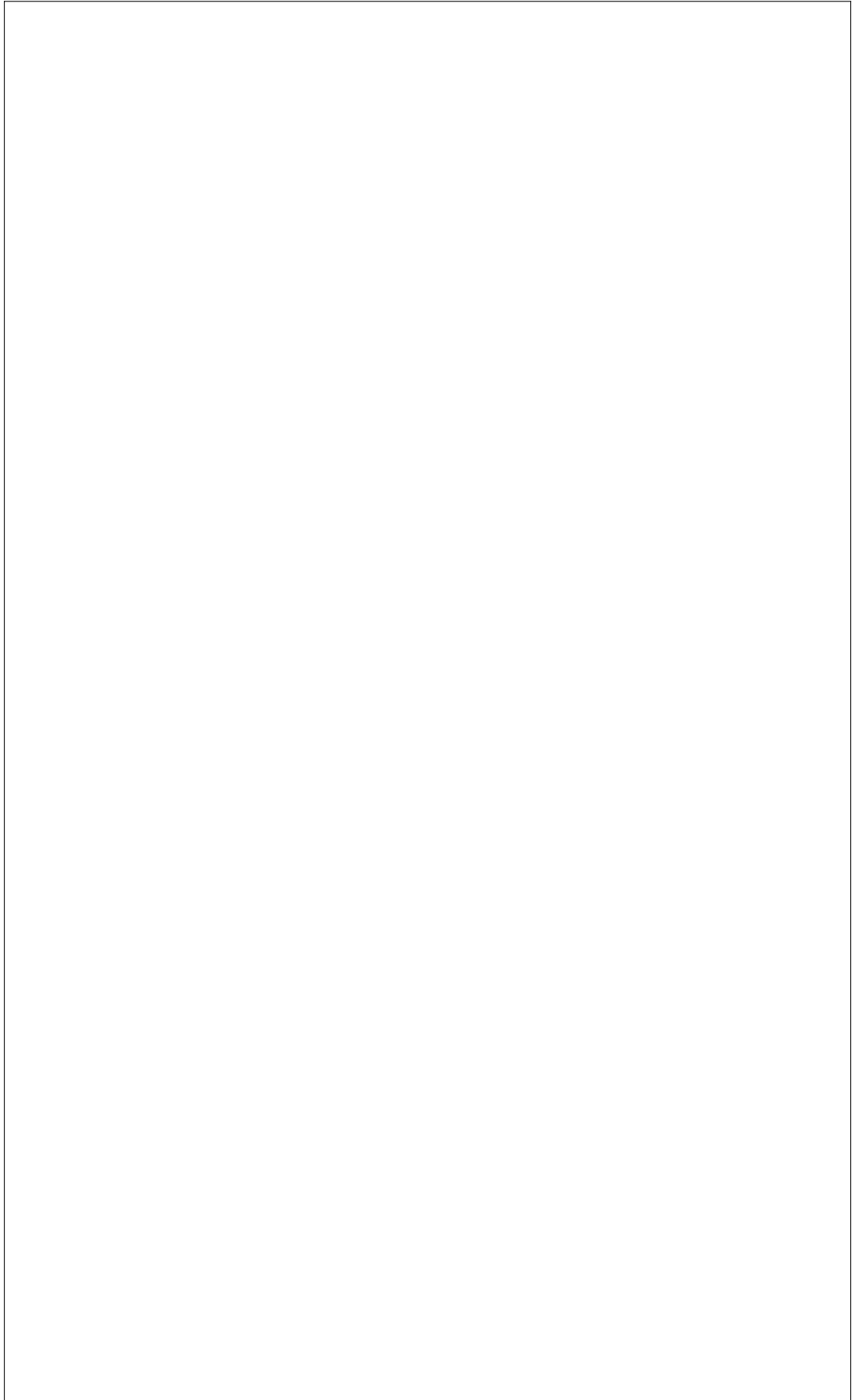


Figure A.110: Ka-shrine service complex at Balat, Old Kingdom layer 2. Area where seal impressions were found indicated with arrows. Modified from Soukiasian *et al.* (2002, 16).

Table A.21: Duplicate sealings from Balat, grouped according to duplicate seal images. Some sealings were not included in the diagram in Figure A.110 due to being found in post-burning contexts.



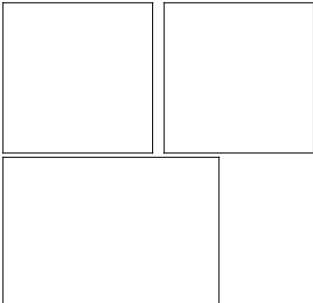
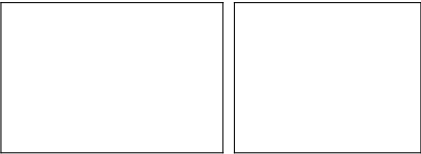



Seal image/sealing photo	Sealing #	Seal type employed	Sealing type	Area	Layer #	Source
	3248	Stamp	NA	Ka-sanctuaries	89	(Soukiassian <i>et al.</i> 2002, 406)
	3272	Stamp	NA	Ka-sanctuaries	89	(Soukiassian <i>et al.</i> 2002, 409)
	3260	Stamp	Jar	Ka-sanctuaries	89	(Soukiassian <i>et al.</i> 2002, 407)
	3267	Stamp	NA	Ka-sanctuaries	89	(Soukiassian <i>et al.</i> 2002, 408)
	3298	Stamp	NA	Ka-sanctuaries	107	(Soukiassian <i>et al.</i> 2002, 411)
	3770	Stamp (multiple times)	NA	Zone 1	519 (house, room 2)	(Soukiassian <i>et al.</i> 2002, 420)

Table A.21: Duplicate sealings from Balat, grouped according to duplicate seal images - (continued)

Seal image/sealing photo	Sealing #	Seal type employed	Sealing type	Area	Layer #	Source
 	3324	Cylinder	Shell-shaped	Zone 1	96 (12)	(Soukiassian <i>et al.</i> 2002, 413)
	3326	Cylinder	NA	Zone 1	96 (12)	(Soukiassian <i>et al.</i> 2002, 413)
	3337	Cylinder	Shell-shaped	Zone 1	109 (10)	(Soukiassian <i>et al.</i> 2002, 414)
	3338	Cylinder	Shell-shaped	Zone 1	109 (10)	(Soukiassian <i>et al.</i> 2002, 414)
 	3440 (not included in analysis)	Stamp	Door lock	Zone 1	262 (1)	(Soukiassian <i>et al.</i> 2002, 415)
	3471	Stamp	Door lock	Zone 1	6 (2)	(Soukiassian <i>et al.</i> 2002, 417)
	3472	Stamp	Door lock	Zone 1	6 (2)	(Soukiassian <i>et al.</i> 2002, 417)
	4413 (not included in analysis)	Stamp	NA	Dead-end corridor next to Zone 2	637	(Soukiassian <i>et al.</i> 2002, 438)

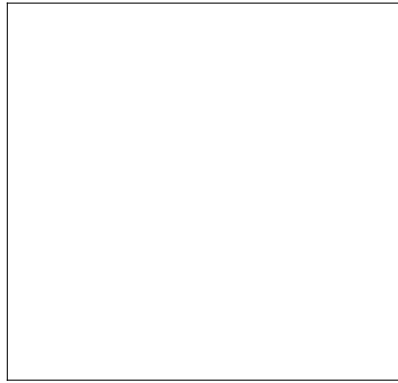


Figure A.111: Clay ball III-755 from Chogha Mish. Note that the equatorial seal appears to be more deeply impressed than the polar seal. Modified from Delougaz and Kantor (1996b, Plate 35A).

Table A.22: Countersealed sealings dated from Naqada III to Dynasty 3. Kaplony designates sealings with impressions that are crossed as ‘seal x seal’ and those impressed with parallel impressions as ‘seal // seal’, and those with countersealings of uncertain type as ‘seal and seal’ in his work. This notation is retained here. Unless otherwise noted, sealing type information is derived from Kaplony (1963a,c).

Site	Kaplony seal image types /other classification	Kaplony Sealing type	Engel Sealing type	# of sealings
Naqada III				
Abydos, Tomb U-j Hartung (2001)	K 808 a	NA	NA	1
	K 808 c	NA	NA	1
	K 824	NA	G6	1
Abydos, Narmer grave B17/18	26A x seal with per-wer sign	Type II	G2	1
	26A // 137	Type V	B1	3
	26A // 169	Type V	B1	1
Dynasty 1				
Abydos, Aha grave B10/15/19	27B x 138	Type II	G2	3
	Horus name seal of Aha x 168	Type II	G2	1
	Horus name seal of Aha x animal row seal	Type II	G2	18
	Horus name seal of Aha // animal row seal	Type V	B1	4
Aha III (valley) Enclosure northeast subsidiary grave	Horus name seal of Aha x animal row seal x rows of ḥ-sign seal	NA	G2	1

Table A.22: Countersealed sealings dated from Naqada III to Dynasty 3 - (continued)

Site	Kaplony seal image types /other classification	Kaplony Sealing type	Engel Sealing type	# of sealings
Bestock (2009)				
Naqada mastaba	27E x 57	Type II	G2	11
	27E x 66	Type II	G2	3
	27E x trace of an animal row seal	Type II	G2	1
	29E x 57	Type II	G2	1
	27E x 66	Type II	G2	1
	27E // 66	Type V	B1	1
	27E x 138	Type II	G2	5
	27E // 138	Type V	B1	3
Saqqara mastaba 3357	27D // 56	Type V	B1	1
	27D // 58	Type V	B1	1
	27D // 59	Type V	B1	1
	27D // 60	Type V	B1	1
	27C x 138	Type II	G2	6
Tura grave 137/76 el Sadeek and Murphy (1983)	Horus name seal of Aha // animal row seal of men riding Seth-animal	Type V	B1T	1
	Horus name seal of Aha // 56	Type V	B1T	2
	Horus name seal of Aha // animal row seal with fox-like animals	Type V	B1T	1

Table A.22: Countersealed sealings dated from Naqada III to Dynasty 3 - (continued)

Site	Kaplony seal image types /other classification	Kaplony Sealing type	Engel Sealing type	# of sealings
	Horus name seal of Aha // animal row seal with long-necked birds+quadruped	Type V	B1T	1
Abydos, Djer burial	29A x 43	Type II	G2	2
	29D x 43	Type II	G2	10
	30A x 43	Type II	G2	4
	Horus name seal trace x 43	Type II	G2	2
	29D // 43	Type V	B1	1
	30A // 43	Type V	B1	3
	208 // 43	Type V	B1	1
	29A // 21 or 22	Type V	B1	1
	29A // 22	Type V	B1	4
	29A(?) // 125	Type V	B1	1
	29D // 96	Type V	B1	3
	29D x 125	Type II	G2	1
	29D // 125	Type V	B1	1
	29D x 126	Type II	G2	1
	29E // 96	Type V	B1	1
	30A // 125	Type V	B1	1
	30A(?) // 22	Type V	B1	1

Table A.22: Countersealed sealings dated from Naqada III to Dynasty 3 - (continued)

Site	Kaplony seal image types /other classification	Kaplony Sealing type	Engel Sealing type	# of sealings
	Horus name seal trace // 101	Type V	B1	1
	30A // 47	Type V	B1	1
Abydos, Djet burial	32B and 189	NA	NA	1
	32B and 99B	NA	NA	1
	32B x seal of shm-ka-sdj of Hr- (unreadable)	Type II	G2	1
	32B x 98	Type II	G2	2
	32C x 46B	Type II	G2	2
	32B x 45A	Type II	G2	1
	32 x seal of htm-shmwj	Type II	G2	1
	32B x 44	Type II	G2	4
	32B x 101	Type II	G2	1
Giza mastaba V	Horus name seal of Djet x 'Beamten- siegel'	Type II	G2T	8
Saqqara mastaba 3504	32D x 189	Type II	G2	2
	86 x 99A	Type II	G2	3
	87 x 99A	Type II	G2	1
	32D x 45B	Type II	G2	1
	32A x 46A	Type II	G2	1
	32C x 46A	Type II	G2	1

Table A.22: Countersealed sealings dated from Naqada III to Dynasty 3 - (continued)

Site	Kaplony seal image types /other classification	Kaplony Sealing type	Engel Sealing type	# of sealings
	50A x 136	Type I	G1	1
	50B x 136	Type I	G1	1
Saqqara mastaba 3507	86 x 100	Type II(?)	G2(?)	1
Abydos, Merneith burial	198 x 118	Type II	G2	2
	200 x 116	Type II	G2	2
	'Amtssiegel' of Den x 118	Type II	G2	1
	198 x 119	Type II	G2	1
	198 x 119 x 129	Type II	G2	1
	238/239 and 240	NA	NA	1
	239 and 240	NA	NA	1
Abydos, Den burial	91B x 91B x 242	Type II	G2	1
	90A x 731	Type II	G2	1
	90B x 89B	Type II	G2	1
	306A x 218	Type II	G2	27
	202 x 215	Type II	G2	12
	202D x 215 x 202D around base	Type I	G1	1
	202D and 216	Jar sealing	NA	1
	202D // 216	Type V	B1	1
	225 x 215	Type II	G2	8
	227 // 215	Type V	B1	1

Table A.22: Countersealed sealings dated from Naqada III to Dynasty 3 - (continued)

Site	Kaplony seal image types /other classification	Kaplony Sealing type	Engel Sealing type	# of sealings
	202 x 233	Type II	G2	4
	202D x 233	Type I(?)	G1(?)	1
	203B x 233	Type II	G2	5
	203B x 233 x 233 around the base	Type I	G1	4
	203B // 233	Type V	B1	3
	225A x 233	Type II	G2	2
	232 x 233	Type II	G2	7
	222 // 233	Type V	B1	1
	222 and 233	NA	NA	1
	247 x 305	Type II	G2	2
	247 x 215	Type II	G2	5
	223 // 233	Type V	B1	1
	202C(?) x 234	Type II	G2	1
	276A x 276B	Type I	G1	2
	276A x 276B	Type V	B1	1
	202D x 219	Type II	G2	3
	203B x 219	Type II	G2	1
	203B(?) x 231	Type II	G2	1
	‘Amtssiegel’ x ‘Beamtensiegel’ x ‘Amtssiegel’ around base	Type I	G1	1

Table A.22: Countersealed sealings dated from Naqada III to Dynasty 3 - (continued)

Site	Kaplony seal image types /other classification	Kaplony Sealing type	Engel Sealing type	# of sealings
	202D x 202D	Type II	G2	9
	224 x 305A	Type II	G2	1
	202D x 232 x 305A	Type II	G2	1
	202D x 232	Frag.	NA	1
	202D x 219 x 233(?)	Type II	G2	1
	223 x 218	NA	NA	1
Saqqara mastaba 3506	29C x 97	Type II	G2	2
	306B x 218	Type II	G2	29
	202 x 215	Type II	G2	3
	225 x 215	Type II	G2	2
	202E x 305A	Type II	G2	9
	202 x 233	Type II	G2	1
	232 x 233	Type II	G2	17
	222 x 233	Type II	G2	3
	247 x 215	Type II	G2	1
	202A x 220B	Type II	G2	1
	202A x 234	Type II	G2	1
	202C x 220B	Type II	G2	6
	202C x 220B x 276A	Type II	G2	4
	202C x 220B	Type I/IIIA	G1/G3	1

Table A.22: Countersealed sealings dated from Naqada III to Dynasty 3 - (continued)

Site	Kaplony seal image types /other classification	Kaplony Sealing type	Engel Sealing type	# of sealings
	202C x 221A	Type II	G2	2
	202C x 234 x 276A	Type II	G2	1
	202E x 221B x 276A	Type II	G2	1
	202E x 298	Type II	G2	1
	203A // 235	Type V	B1	1
	203B x 220B	Type II	G2	1
	203B x 221B	Type II	G2	1
	204 x 221A x 276A	Type II	G2	1
	202C x 276A	Type II	G2	2
	276A x 276B	Type I	G1	2
	276A x 276B	Type II	G2	3
	276A x 276B	Type IIIA	G3	1
	276A x 276B	Type V	B1	2
	202D x 230	Type II	G2	2
	202E x 219	Type II	G2	2
	203B x 219	Type II	G2	1
	Emery 1958, 3506,20 and 47	Type IV	G4N	1
Saqqara mastaba 3035	207 x 215	Type II	G2	2
Saqqara subsidiary	91B // 242	Type IIIA	G3	1

Table A.22: Countersealed sealings dated from Naqada III to Dynasty 3 - (continued)

Site	Kaplony seal image types /other classification	Kaplony Sealing type	Engel Sealing type	# of sealings
graves of Den	91B x 242	Type II	G2	1
Abu Rawash grave M16	202C x 220B	Type II	G2	2
Saqqara mastaba 3036	Den x Ankh-ka seal	Jar sealings	NA	2
Abu Rawash grave M25	202-204 x 202-204 x 276 x 298	Jar sealing, conical	G2	1
	202 x 234	Jar sealing, conical	G2	1
Abydos, Anedjib burial	278 x 300A	Type II	G2	9
	94 x 274	Type II	G2	1
	95 x 275	Type II	G2	1
	205 // 274	Type V	B1	3
	94 x 300B x 213 around base	Type II	G2	2
Saqqara mastaba 3111	Horus name seal Den x seal of 'Sabu'	Type I/II	G1/G2	71
Helwan 1371 H 2	similar to 205 // seal with inscription Andj-mr+hrj	Type V (fragmentary)	B1	1
	Horus name seal x 'Amtssiegel' (?) x 'Beamtensiegel'	Type II	G2	1
Abydos, Qa'a burial	209 x hrp-hrj-ib seal	Type I	G1	2
	737 x 279 around base	Type I	G1	1
	257A // 279	Type V	B1	1
	257A // 279	Type V	B1	1

Table A.22: Countersealed sealings dated from Naqada III to Dynasty 3 - (continued)

Site	Kaplony seal image types /other classification	Kaplony Sealing type	Engel Sealing type	# of sealings
Dynasty 2				
Saqqara, Hotepsekhemwy burial	263 x 263 x 307 around base	Type I/II	G1/G2	3
	281 x 281 x 307 around base	Type I/II	G1/G2	1
	262 x 262 x 307 around base	Type II	G2	3
Saqqara, Ninetjer burial Regulski and Kahl (2010)	Ni/Sa/2 x Ni/Sa/2 x seal with deity holding was sceptre	Jar sealing	G2	1
Saqqara mastaba 2171	748 x another seal	Type II	G2	1
Giza, Dynasty 2 burial with 2 portcullises and a chamber still intact (Petrie 1907)	745 // another seal	Type V	B1	1
Helwan 505 H4	Ninetjer x seal of official	Jar sealings	NA	2
Abydos, Peribsen burial	283 x 285 x 286 around base	Type II	G2	22
	283 x 285 x 286 around base	Type I	G1	2
	283 x 284 x 286 around base	Type II	G2	10
	283 // 287	Type V	B1	3
	283 x 283 x 286 around base	Type II	G2	8
	283 once across the middle x 286 around base	Type I	G1	2
	283 or 285 // 286	Type V	B1	1

Table A.22: Countersealed sealings dated from Naqada III to Dynasty 3 - (continued)

Site	Kaplony seal image types /other classification	Kaplony Sealing type	Engel Sealing type	# of sealings
	284 once across the middle x 286 around base	Type I	G1	1
	285 over the tip x 286 around base	Type II	G2	3
	283 x another seal x 286 around base	Type I	G1	1
	284 x another seal x 286 likely around base	Type I	G1	1
	285 x another seal x 286 around base	Type I	G1	2
	seal x 286 around base	Type I	G1	2
	283 x 286 around base	Type II	G2	3
	285 x 286 around base	Type II	G2	2
	332 and 763	Type VI	G6/B2	1
Abydos, Khasekhemwy burial	291 x 291 x 303 around base	Type I	G1	2
	291 x 291 x 303 around base	Type II	G2	3
	291 x 291 x 303 around base	Type I/II	G1/G2	2
	214(?) x 325(?)	Type IVB	G4/G5	1
	314 // 374	Type IVB	G4/G5	7
Abydos, mortuary enclosure of Peribsen	289 x 290	Grey clay bag sealing	B2N	1
Abydos, mortuary enclosure of Khasekhemwy	346 x 269	Grey clay bag sealing	B2N	1
	346 x 801	Grey clay bag sealing	B2N	1

Table A.22: Countersealed sealings dated from Naqada III to Dynasty 3 - (continued)

Site	Kaplony seal image types /other classification	Kaplony Sealing type	Engel Sealing type	# of sealings
	270 x 'Amtssiegel'	Grey clay bag sealing	B2N	1
	346 x 347A	Grey clay bag sealing	B2N	5
	345A x Newberry 1909, Plate XXIV,XIII	Grey clay bag sealing	B2N	1
Dynasty 3				
Beit Khallaf mastaba 1	304 x 369	Type II	G2	1
	352 x 379	Type II	G2	2
Beit Khallaf mastaba 2	Garstang and Sethe 1903, XIX,22 x Garstang and Sethe 1903, XIX,23	Type IV	G4/G5	1
				Total: 587

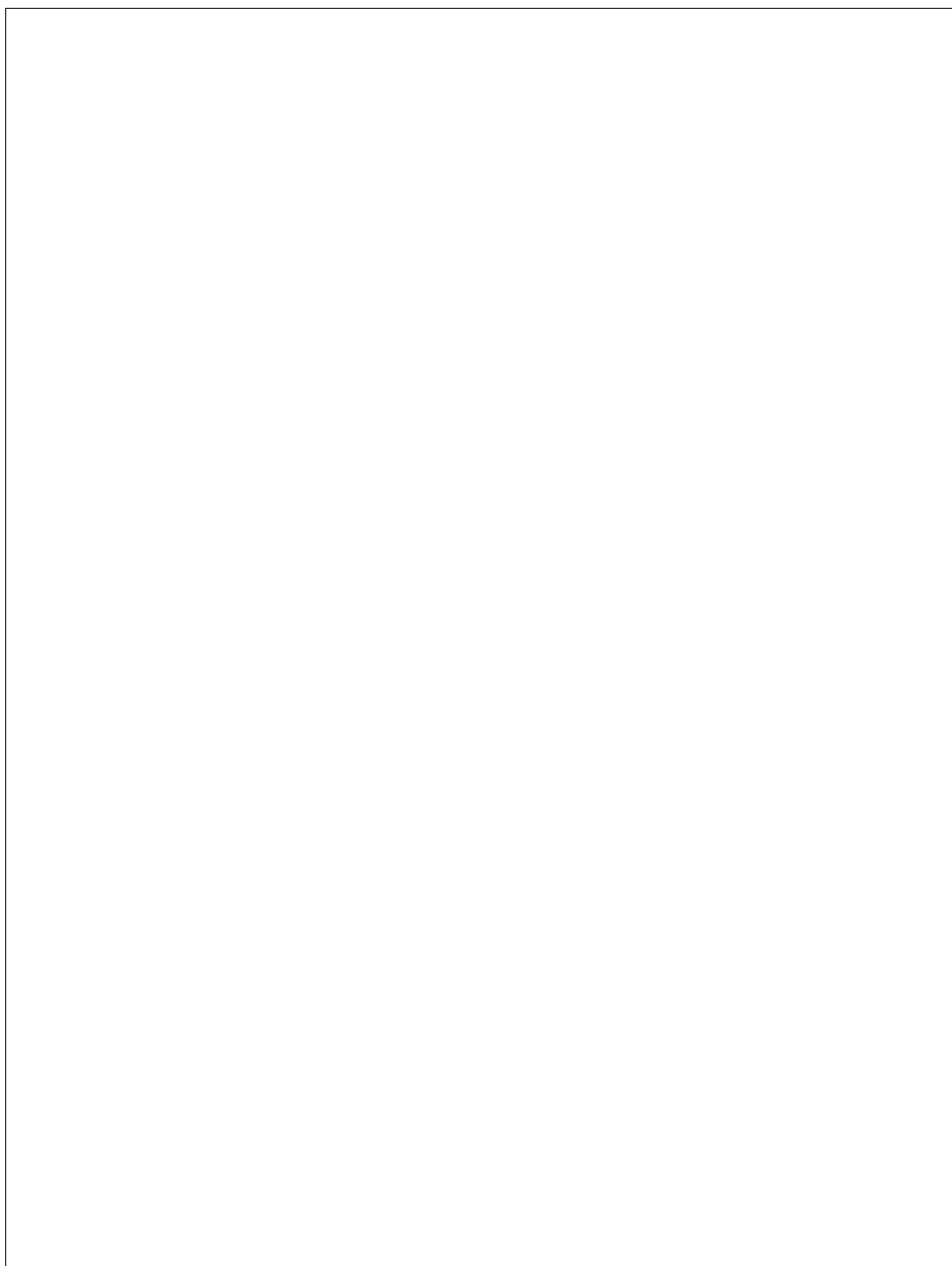


Figure A.112: Jar with type G1 jar sealing still attached on the left, and vessel with type G2 jar sealing still attached on the right. Type definition from Engel and Müller (2000). Royal tomb of Ninetjer, Saqqara. Modified from Lacher-Raschdorff (2014, Tafel 27e).

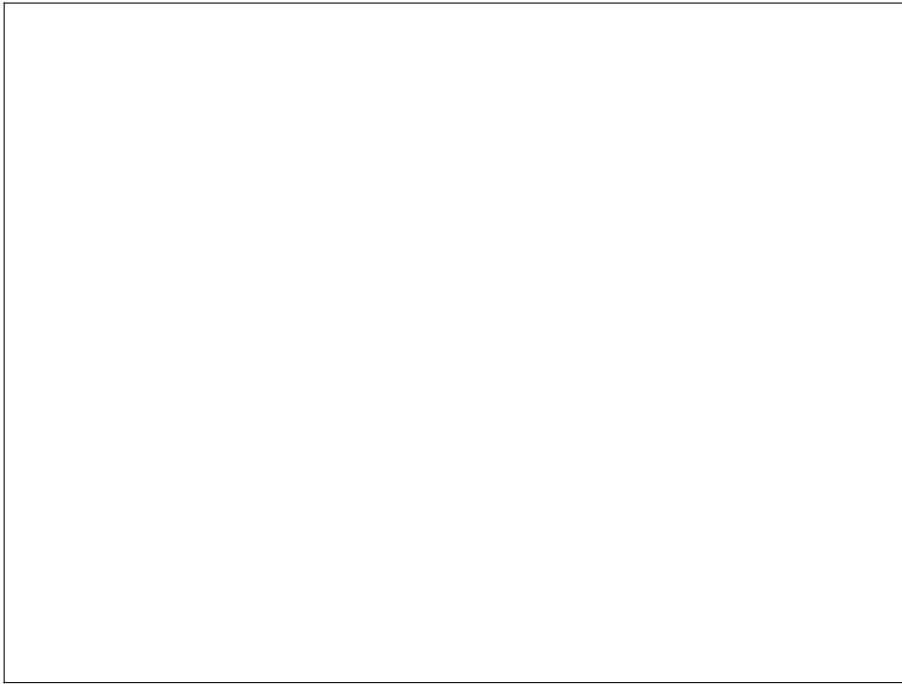


Figure A.113: Type G2 countersealed jar sealing from royal tomb of Den at Abydos, Egypt. Type definition from Engel and Müller (2000). Greyscale version of colour original from Petrie Museum (2015, UC36710, Photo 1). Creative Commons licensed: <http://creativecommons.org/licenses/by-nc-sa/3.0/legalcode>.

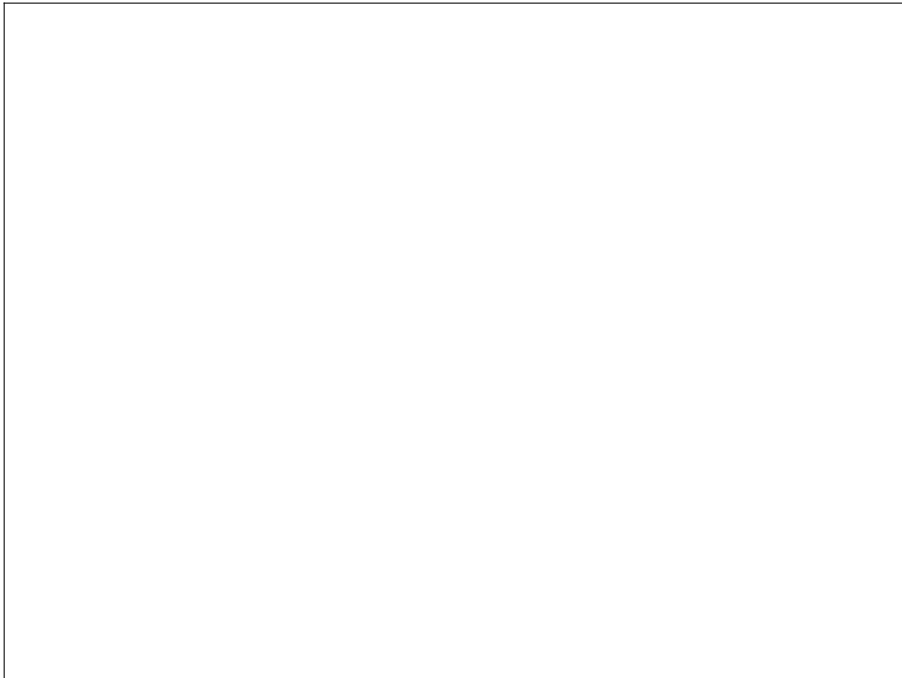


Figure A.114: Type B1 countersealed bag sealing from royal tomb of Aha at Abydos, Egypt. Type definition from Engel and Müller (2000). Greyscale version of colour original from Petrie Museum (2015, UC35706). Creative Commons licensed: <http://creativecommons.org/licenses/by-nc-sa/3.0/legalcode>.

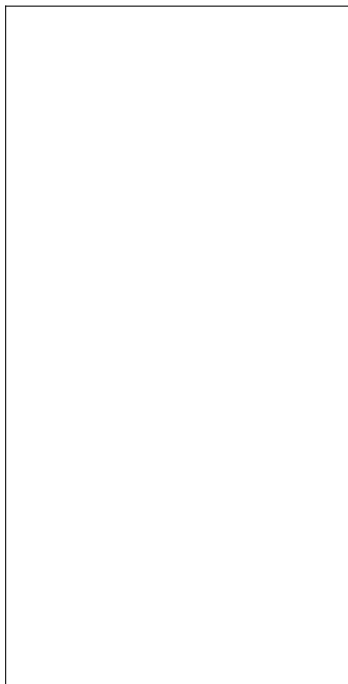


Figure A.115: Flat triangular bulla likely countersealed with two different seals, Tell el-Iswid, Egypt. Modified from Regulski (2014, 235, Fig. 5).

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