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# Building Ideas out of Wood. What Ancient Egyptian Funerary ‘Models’ Tell Us about Thought and Communication

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*This paper unpacks the cognitive processes potentially involved in comprehending funerary ‘models’ from ancient Egypt. These objects comprise small scenes, usually made of wood, which have been found in burial chambers of pharaonic-era tombs. After considering the fittingness of the term ‘model’, the paper illustrates how a cognitive approach might better help us understand the purported functionality of these objects than has hitherto been the case. This approach, grounded in distributed cognition, draws on semiotics, figurative thought and communication theory and considers the priorities of both the theoretical sender and the theoretical receiver. The perspective of the sender comprises what could actually be built, given the confines of material, size, space and budget. The perspective of the receiver is tied to the factors that guarantee intelligibility, such as cultural primaries, medial awareness and aesthetic priming. It is argued that many of the cognitive processes driving comprehension may be based on transfer processes transcending culture and aesthetics, such as metonymy and metaphor, which occur both in the linguistic and the visual modality. In this way, we can ground discussions of model production and use in more fine-grained theoretical and methodological frameworks and achieve new insights into the communicative power of these objects.*

## Introduction

Egyptology has long preoccupied itself with what it calls funerary ‘models’, which were found in Egyptian tombs throughout Egyptian pharaonic history.<sup>1</sup> However, the discipline has predominantly focused on two main topics: what the objects portray and what function they served. On the one hand, the objects allegedly represent ‘scenes from everyday life’,<sup>2</sup> and on the other, given their findspot in burial chambers, they probably contribute to the deceased’s provisioning.<sup>3</sup>

This paper takes as its specific point of departure the wooden ‘models’ of the Egyptian First Intermediate Period and early Middle Kingdom (roughly equivalent to the Near Eastern Middle

Bronze Age, c. 2160–1870 BCE). These small objects comprise miniature scenes of specific kinds of labour or of particular structures (like gardens or boats).<sup>4</sup> They depict architectural elements usually at their most minimal (i.e., physical frames or bases), are designed on a scale small enough for inclusion in a tomb assemblage and are usually—though not always—accompanied by human or animal figures.<sup>5</sup> So-called ‘miniature’ objects are not foreign to specialists of material culture across cultural boundaries (Davy & Dixon 2019; Foxhall 2015); however, as this study will suggest, it remains unclear whether the objects under study are best described by the term ‘miniature’ or ‘model’. In deciding this, we must consider whether the term should reflect functionality beyond simply the representational aspect.

Concerning the objects' functionality, I work with several conceptual frameworks—from distributed cognition to semiotics and figurative thought—to elucidate the communicative impact of these objects more precisely. In doing so, I attempt to dissect the kinds of conditions that might guarantee the intelligibility of ancient Egyptian funerary model.

## Definitions

Despite the title of this paper, there are grounds to question the appropriateness of the term 'model'. This is firstly the case because 'model' in Egyptology currently refers to three categories of object: funerary 'models' depicting scenes and structures (the object of our discussion); 'model' or 'miniature' objects found across mundane, ritual and funerary contexts (Di Pietro 2019; Odler & Dulíková 2015; Stevenson 2017); and artists' studies in two and three dimensions (Liepsner 1982, 168–9). Moreover, the term 'model' in modern parlance evokes a to-scale physical representation of a structure for the study of an architectural design or for the communication of specific design ideas. In contrast, the objects that form the focus of this study lack an explicit scale,<sup>6</sup> they have a specific thematic range focused more on activities than spaces and, as funerary objects, their function is apparently to provide for the deceased.

This dissimilarity from prototypical architectural models prompts Arnold (2005, 6) to propose using the term 'architectural miniatures'.<sup>7</sup> However, this term thematizes the architectural aspect of the object, even though, as Geertz (1973, 93) argued in relation to religious symbols, it is almost always the interaction of the figures in their physical context that makes the object functional. Such a problem could prompt us to use a term like 'tableau', to take the scene-like aspect of the objects into consideration; however, this term fails to represent the cultural, material, or functional characteristics of the object.

Another approach draws on recent work within material culture studies (Knappett 2011, 6–7), in which the term 'miniatures' is used. In this discourse, 'miniatures' are distinguished from 'models' on the grounds that 'models are not selective but keep all detail. The latter on the other hand, i.e., miniatures, do involve a process of abstraction, such that some details are deliberately excluded' (Knappett 2012, 100; also Bailey 2005, 29). By this token, miniaturization defines objects that undergo processes of 'mimesis, scaling and simplification' (Davy & Dixon 2019, 5), often in ways that are rarely accurate

in relation to a full-sized original.<sup>8</sup> The relationship of the miniature to its original has been lucidly framed by Foxhall (2015, 1) as 'a kind of "intertextuality" of materiality, where miniatures epitomize, echo and reverberate meanings captured in and associated with other objects, while creating new meanings of their own, which potentially enrich and alter both the miniature itself and its prototype'. This difference in meaning is also highlighted by the fact that miniature versions of objects whose scale is dependent on the human body (like houses, boats, etc.) are (often) 'deliberately dysfunctional' (Foxhall 2015, 2)—at least in relation to the context of use of the original.<sup>9</sup> Nevertheless, resonances of the original functionality might be carried by the object, as 'the pragmatic qualities of the artefact are removed while the epistemic features are brought to the fore' (Knappett 2011, 180).

Given the insight offered by archaeological theory and materiality studies, it might seem that the term 'miniature' is optimal for the material presented here. Yet, to my mind, there remains something missing. After all, though 'miniature' focalizes the material and cultural contexts of the object (Davy & Dixon 2019, 3), the term does not sufficiently reflect its *functionality*. Given this, reconsidering the term 'model' from a less archaeological or architectural and more philosophical standpoint might add new dimensions.

A phenomenological perspective on 'models' is instructive: a model is a model of something, whose features are reduced, and which has a pragmatic purpose with respect to the original (Stachowiak 1973, 131–3). Recent functional analyses of models draw on these ideas and conclude that a model is 'a well-formed, adequate, and dependable instrument that represents origins and that functions in utilisation scenarios' (Thalheim 2018). The functional aspect here is most helpful, as these models are not only *of* something; they are also *for* something, from which standpoint one could posit that these Egyptian objects are, like others in the archaeological record, both 'models' and 'miniatures' (Davy & Dixon 2019, 13). For this reason, this paper shall continue to refer to the objects in question as 'models', though implied in this is an understanding that they also conform to the category of 'miniatures'.

Concerning cognitive perspectives, some scholars have suggested that figurines provoke cognitive effort, 'making the viewer draw inferences' (Bailey 2005, 32), and that the cognitive and emotive responses they elicit can open the world of the viewer to 'other realities' (Bailey 2005, 33–44). However, the connection between representation and functionality could be clearer, especially for

objects whose functionality can be hypothesized. Thus, we consider what framework would allow this connection to be made more explicit.

### The theoretical framework

#### *Object studies and cognition*

To relate the physical object more to its function, we consider the communicative power of the physical object. To this end, we draw on the potential of cognitive and communicative models to elucidate *how* an object can communicate. Approaching an object study from a cognitive perspective requires a localization within distributed cognition, by which cognition is ‘spread out over the brain, the non-neural body and ... an environment consisting of objects, tools, other artefacts, texts, individuals, groups and/or social/institutional structures’ (Anderson *et al.* 2019, 2; also Malafouris 2013, 2–3). Within this framework, the specific approach is ‘extended cognition’, whereby ‘the material vehicles [like tools, CD] that realise the thinking and thoughts concerned are spatially distributed over brain, body and world’ (see Anderson *et al.* 2019, 4; also Malafouris 2013, 4–5). Such ideas are key to ‘cognitive archaeology’, which interrogates not ‘*what* people thought, but rather *how* they carried out their thinking in interaction with others and the material world’ (Iliopoulos & Malafouris 2014, 1522; also Renfrew 2001, 128–9).

This position can be taken further, away from just the human *use* of objects as part of the cognitive process towards human *interaction* with objects: in cases of object agency, ‘a human agent delegates agency to an artefact—as with a speed-bump, or a landmine’ (Knappett 2011, 172, also Gell 1998). Actor Network Theory (ANT) goes so far as to theorize the human–object relationship as being ‘symmetrical’, whereby agency is affected on both sides by diverse material properties (Knappett 2011, 172).

However, an approach tying people (and their minds) to objects, though illuminating, is not granular enough to decode, once we have established the nexus between thought process and object-making, *how this object is specifically structured to work in the world*.<sup>10</sup> Thus, the proposed framework draws on reality-structuring models like semiotics<sup>11</sup> and communicative models. Compared to other cognitive models, like phenomenology, which focuses on the similarity of human spatial perception (Van Dyke 2014, 5909), this approach explicitly takes *objects and (inter-subjective) meaning making* as the main idea. To this end, the priorities of senders and receivers are taken into consideration, though I hasten to

add that such roles are theoretical and predominantly serve to model a communicative act in the visual medium.

A model’s intelligibility, from the perspective of the sender, is entailed by taking stock of what was able to be built and depicted in three dimensions, given the confines of material, size, space or budget, as well, of course, as the taste of the future owner. It is proposed that the constraint of *practicability* is the necessary correlate to the *functionality* of the scene depicted and helps to constitute a specific type of essentialism key to ancient Egyptian artistic production. This essentialism is based around a series of aesthetic choices in the model-making process, such as thematic simplification, structural simplification and modification, authentication and structural isolation.

From the perspective of the receiver, we can also isolate several factors that guarantee intelligibility, which are tied to semiotic principles that Angenot (2015, 102–4) applied to two-dimensional Egyptian visual material. What we will notice is that many of the cognitive processes behind the semiotic principles can be based on transfer processes that transcend culture and aesthetics, such as metonymy and metaphor, which occur both in linguistic and visual modalities, as well as in the built environment and in landscapes.<sup>12</sup>

#### *Semiotics*

Semiotics, the study of ‘the mechanism of meaning production for all signifying systems’ (Angenot 2015, 98), has long been a valuable conceptual tool in the field of cognitive archaeology.<sup>13</sup> The comprehensibility of a sign across time and space is not a given, but Peirce’s sign typology gives us insight into what might be transparent to the modern analytical gaze and what remains opaque. For instance, a ‘symbol’ stands in an arbitrary relationship to its object and is the least intelligible, an ‘index’ relates to its object in a contiguous way and an ‘icon’ stands in a relationship of similarity to its object (Peirce 1931–1958, CP 1.369). Whereas Pilz (2011, 9), who likewise applies the semiotic perspective to miniature objects, identifies miniatures as ‘iconic signs’, I think the situation is more complex. Though the models in question show a great deal of iconicity (i.e., a small garden for a garden), many of the more interesting features come from the objects’ indexical features (i.e., a gesture for an action) (see section *Metaphor and metonymy*, below). Because of both iconic and indexical features, the models have the potential to be unambiguous to any viewer. How this may be the case has been suggested by Angenot (2015, 102–4) who presents a series of general semiotic

principles for ‘univalence’,<sup>14</sup> or lack of ambiguity, when it comes to interpreting a sign:

- 1) typicality (based on taxonomy/classification, which is culturally determined)
- 2) readability (i.e., recognizability of an image)
- 3) schematization (referring, e.g., to movement, variation and colour schemes) and density (i.e., degree of detail in an image)
- 4) functionality (i.e., allowing for perspectives not necessarily possible in real life but contributing to comprehensibility)
- 5) durability of specific culturally important motifs.

We shall be reflecting on the applicability of these conditions to the communicative potential of Egyptian ‘models’ in the section **The reception of models** (below), where the needs of the receiver or viewer are modelled.

#### *Communication theory*

To understand the communicative potential of ‘models’ more deeply, especially from the perspective of the sender/producer, one must consider how communicative acts are enacted. From the perspective of object studies, Knappett (2011, 9) uses Social Network Analysis (SNA) to model the role of material culture in human interaction. However, such an approach does not suit the purposes of this study, in which not social interactions, but rather the meaning-making that comes out of these interactions, is being modelled. The approach proposed is thus based on communication theory, in which the objects/signs are considered in their intersubjective context. According to Jakobson (1960), six factors are necessary for successful communication to occur:

- 1) context (and co-text of the whole message)
- 2) addresser (sender)
- 3) addressee (receiver)
- 4) contact between sender and receiver
- 5) common code
- 6) message.

The interaction of such factors helps us start to unpack the communicative potential of models, though models lack the focus and scope of conventional communication. From this perspective, the context could be the archaeological find-spot, the artefacts found in the same matrix, or thematically related models. As for the addresser/sender and the addressee/receiver, it is most reasonable, given the paucity of explicit evidence, to regard their interaction as a ‘pseudo-communication’ of the sort otherwise seen in ritual activity, whereby the message takes priority over the identification of any

individual agent (Schneider 2000). This idea could plausibly be tied to Actor Network Theory, in which the model ‘interacts’ (via its qualities of meaning-making, elaborated above) with human agents/viewers. Otherwise, we could see the primary sender as the craftsman and the receiver as the tomb owner, although this person presumably purchased the object with the view that a secondary communicative act would take place, between themselves (now the secondary sender) and other theoretical viewers (living and dead, human and supernatural agents). We could also count the modern viewer as a receiver, though one cannot presume that the same conceptual processes would transcend cultures and millennia. The contact in this case concerns the visible physical features of the model itself, whereas the common code reflects the semiotic and cognitive principles that make the physical features both recognizable and meaningful. Lastly, the message pertains to the meaning and function conveyed in the visual features of the object.

#### *Metaphor and metonymy*

To ensure that the meaning or ‘message’ behind this object type is understood, a last cognitively driven dimension is expedient. After all, the message of the image is conveyed via comprehensible semiotic cues (the common code) that comprise literal expressions and meaning transfers like metaphor and metonymy, which are common across linguistic and visual modalities.

Metaphor is a transfer process which establishes a similarity relation between two conceptual structures, called ‘domains’ in studies of cognition (Kövecses 2002, 4). By this means, in the phrase ‘love-sick’, an abstract entity like LOVE (the target domain in Conceptual Metaphor Theory),<sup>15</sup> is conceptualized in terms of a more concrete entity, like SICKNESS (the source domain), based on a relation of similarity (in behaviour or feeling) between the two entities (Goatly 2011, 16). Though metaphors often transcend culture and aesthetics (such as IMPORTANT IS BIG), some are limited to single cultures (Di Biase-Dyson 2017; Kövecses 2005).

Metonymy establishes a relationship of contiguity between two connected elements of a single domain, like CAUSE FOR EFFECT (Radden & Kövecses 1999, 19). Metonymy (in which grouping I include synecdoche, or PART FOR WHOLE relations) is often less culturally bound, and cognitively speaking, more basic than metaphorical transfer. Perhaps for this reason, metonymy is often—as here—more apparent in the visual domain than metaphor. The PART-FOR-WHOLE relationship that a miniature object

can hold to its full-sized referent has already been discussed by archaeologists (Bailey 2005, 33; Pilz 2011), but as we shall see, our model corpus demonstrates conceptual links of more diversity and complexity than this. Firstly, a range of metonymic, i.e., contiguous, relationships can be noted in the signification of the models, showing us the kinds of ‘indexical’ qualities discussed in section *Semiotics* (above). Also, the metonymic components sometimes form chains with a loose narrative basis, whereby GESTURE FOR ACTION (a PART FOR WHOLE metonymy) is followed causally by ACTION FOR ACTION SEQUENCE (a PART FOR WHOLE metonymy) and ACTION SEQUENCE FOR EFFECT OF ACTION SEQUENCE (a CAUSE FOR EFFECT metonymy). We shall explore the role of such mappings and sequences in the production of these models in the following sections.

### The production of models (the perspective of the sender)

To consider how models were produced for consumption, we need to understand the motivations and constraints (i.e., vestiges of ‘extended cognition’) of the producer/sender. For now, we will concentrate on the primary sender(s), the craftspeople. Given that the archaeological find-spots of models suggest that the craftsmen’s motivation was to create objects for use in a funerary context, in all likelihood for the purpose of providing for the deceased, models ‘should be taken as distillations of what was perceived as *essential* both in the activities themselves and, in the case of models with architectural settings, those architectural features that contributed to *conveying the essence of a scene*’ (Adams 2007, 14, italics mine). This category conforms to Knappet’s ‘epistemic features’ (2011, 180), discussed above.

We can reconstruct the sorts of aesthetic choices made to convey a model’s essence (i.e., functionality) in different ways. We can consult the models, but we can also take a comparative perspective, between two-dimensional painting and relief on the one hand (Barker 2018) and archaeological remains on the other hand (Adams 2007; Arnold 2005; Kemp 1986). This comparison does not imply that three-dimensional models are conceptually derived from, or duplicates of, two-dimensional images.<sup>16</sup> After all, the differences between these media are significant, though motifs are often shared (Barker 2018, 7). It also does not assume that there is a 1:1 relationship between models and architectural structures, which is a contentious issue. Not only is the aesthetic issue of whether models replicated real buildings at stake (von Pilgrim 1996, 204–5): Adams (2007, 11) also

posits that, at the conceptual level, the same kinds of cultural ideals that influenced the forms taken by the (granary) models may have also affected architectural trends.

Next to our conceptualization of motivations should come a reflection on the constraints on the (primary) producer/sender, whereby practicability should be considered in relation to the functionality of the scene depicted.<sup>17</sup> The intersection between the two axes is visible in choices like the degree of detail and variability in the depiction of the human body. For example, for reasons of expediency, human figures in models were customarily carved out of a single piece of wood, with the exception of the arms, which assumed different gestures corresponding to their roles (Tooley 1995, 64).<sup>18</sup> Another example of medium-driven variation is that granary silos in stone and clay are customarily modelled as round with domed tops,<sup>19</sup> whereas those built from wood are usually shaped as oblongs with flat tops and peaked corners (Tooley 1989, 122–6; 1995, 36–41; also Fig. 1).<sup>20</sup>

Aesthetic essentialism fundamentally entails picking out the most salient (and thus most intelligible) elements of a) the structure, like the enclosing walls of a granary (Adams 2007, 6–7), and/or b) the activities carried out in them (see Figure 1).<sup>21</sup> Whereas two-dimensional representation enables a more extensive portrayal of labour and manufacture, in a model only essential scenes are selected.<sup>22</sup> Be that as it may, salience is important in all media: even two-dimensional representations of agriculture usually focus on the beginning and end points of the process (PART FOR WHOLE metonymy),<sup>23</sup> namely, ploughing and sowing then harvesting, followed by processing and storage (Kanawati 2001, 88), while in models the early and comparatively rare ploughing scenes (see BM EA 51090: Breasted 1948, 6–8, pl. 3b) are superseded by the models that represent the absolutely final stage, the process of storage in the granary (Barker 2018, 8–9; 2020, 74). This feature can be tracked as far back as Early Dynastic (c. 3100–2680 BCE) model granaries (Müller 2018), whereby the isolation of the structure corresponds to PART FOR WHOLE and CONTAINER FOR CONTENTS metonymies. In the case of butchery, models frequently show the beginning (the bloodletting) and end (the butchered cuts hanging out to dry) in a single scene (Gilbert 1988, 88–9) (see Figure 2).<sup>24</sup>

According to the talent and inclination of the producer/sender, there were several methods to achieve aesthetic essentialism: thematic simplification, structural simplification and modification, authentication and structural isolation.



**Figure 1.** *The granary model of Meketre (MMA 20.3.11).* <https://www.metmuseum.org/art/collection/search/545281>

#### *Thematic simplification*

Thematic simplification, i.e., the selective elimination of detail, is a noted feature of ‘miniatures’ in general (Davy & Dixon 2019, 9–10), since they undergo processes of ‘abstraction and compression’ (Bailey 2005, 32). This process is indicated in the Egyptian ‘model’ corpus, for instance, by the reduction of the court of a granary, as in the model of the official Meketre from his tomb in Thebes (Luxor) (Fig. 1), to represent granary-based (labour and administrative) activities. It is represented thus even though archaeological evidence in Abydos, Elephantine and Nubia indicates that such areas were frequently multifunctional, for ‘grinding

grain, cooking, keeping and butchering animals, and water storage’ (Kemp 1986, 120–36) (Adams 2007, 6, 9; Arnold 2005, 60, 62; von Pilgrim 1996, 85–100).

However, the opposite can also be true: for the purpose of compactness or economy, several potentially unrelated scenes can be shown on the same model, such as the granary, bakery and weaving shed model of Djehuty from Lisht (Eskenazi Museum of Art 58.34: Tooley 1989, 53, 109). This issue tests the limits of verisimilitude: the frequent adjacency of baking and brewing scenes may indicate their actual physical adjacency, but the grouping may also be convenient (Ikram 1995, 86).



**Figure 2.** *The slaughterhouse model of Meketre (MMA 20.3.10).* <https://www.metmuseum.org/art/collection/search/544257>

The model bull from Asyut tomb 14 of Wepwawet-em-hat may also exemplify thematic simplification (Chassinat & Palanque 1911: 164). Since the bull is uncharacteristically presented alone, rather than in a scene, it has been considered whether—if it is intended to be a stand-alone piece—it represents a cattle-counting scene or a butchery scene via a PART FOR WHOLE transfer. This, incidentally, is ‘the only major type of food production otherwise missing from Wepwawet-em-hat’s tomb’ (Roehrig 1988b, 101).<sup>25</sup>

Another example is provided by Djehutynekht’s crudely-finished offering bearers (e.g., MFA 21.418).<sup>26</sup> These figures have nothing in their right hands (where a duck is customary), their baskets are filled with unidentifiable contents and they are portrayed standing, not in a striding posture (Freed & Doxey 2009, 154–6, fig. 114). However, since the women are standing and supporting baskets on their heads with their left hands, the salient features by which to identify them are present.

#### *Structural simplification and modification*

The process of structural simplification might involve a PART FOR WHOLE metonymic transfer, whereby one small, roofed room stands for a large, roofed area, as seen by a comparison of the granary of Meketre (Fig. 1) with the granary inside the fortress in Mirgissa, in which the columns indicate a roofed area, fronted by an open hall with a dais (Kemp 1986, 125–9).<sup>27</sup>

Simplification was also involved in the portrayal of the walls of granaries. Although in the archaeological record there is a documented practice of building double walls around granaries and filling the space between them with sand (as a desiccant or to protect against rodents, or both),<sup>28</sup> this practice is not attested in models, which presumably has to do with the isolation of each individual structure, a feature I shall discuss in the section *Structural isolation*, below.

Simplification might also be entailed in the fact that many (earlier) models—and butchery models in particular—were built on a plinth, without walls, as seen in the model of Khety from Beni Hassan (Fitzwilliam Museum E.71c.1903: Bourriau 1988, 106). Ikram (1995, 86) suggests that these features were ‘meant to suggest that this was an open-air activity’, though she concedes that the lack of architectural setting ‘might be due to model making conventions and/or convenience and economy’.

The columned area and garden of Meketre’s identical residence models (MMA 20.3.13 and JE 46721)<sup>29</sup> also show simplification by representing the house behind the colonnade only via doors and windows on the back wall of each model. These

portals to the exterior stand for the interior of the house (Winlock 1955, pl. 10–11), establishing a PART FOR WHOLE metonymy in the relationship of door to structure (von Pilgrim 1996, 204; also Kemp 1989, 152–3). Interestingly, this metonymic reduction may also have been present within the Egyptian language, as suggested by taxation records and wills, like ostrakon DeM 00112 = IFAO 00334 (Kitchen 1980, 546–7), in which the worth of structures is described with reference to their number of doors, or *sb3* (von Pilgrim 1996, 204, n. 565, referring to Helck 1963, 338, 344).

Architectural structures could also be modified for the purpose of intelligibility. In this case, the lack of roofs on some model silos presents scholars with a contentious example. Silos without any roof may have been built this way to emphasize the contents (Garstang 1907, 87), though Winlock (1955, 25 & 36, n. 8), in relation to Meketre’s granary model (Fig. 1), challenges the idea, by supplying modern examples for the construction of open-roofed granaries. As Adams (2007, 5) points out, ‘[i]t is difficult to see, however, how grain or other produce could have been kept safe from rodents, insects, occasional rainfall, and windborne dust and debris without a cover of some kind’. Archaeological evidence seems to indicate that most granaries were roofed, as seen in the Nubian fortress granaries (Kemp 1986, 121, 124–30), or at least had a removable cover, as seen on a silo in Elephantine (von Pilgrim 1996, 45, Abb. 9, Taf. 3c). We can thus stand behind the early supposition of Garstang that the roofless construction of models was an aesthetic choice.

Meketre’s slaughterhouse model (Fig. 2), the only model with a full roof, is really the only structure that challenges the simplification argument, which has heretofore justified the modification of walled and roofed structures for the sake of visibility (Arnold 2005, 2). The fact that the roof in question is removable may be a point to consider, however, and imply that the sender wanted the receiver to see inside the model if they desired.

Some structures are shown with a partial covering. Arnold (2005, 46) argues that ‘[s]ince it seems to be irrelevant which part of the enclosure is covered, the incomplete covering may reasonably be understood as indicating a fully roofed building’. However, the degree of irrelevance of the roof’s placement should perhaps be subjected to further scrutiny. A few partial covers are actually canopies, under which, for instance, the scribes could sit, as in the granary model of Sepi III from Deir el-Bersha (JE 32831: Tooley 1995, 41). These partial roofs could also be covers for storage areas, as seen in the



storehouse, baking and brewing model of Karenen/Karenni and Nefersemdenet/Nefermedjdenyt from Saqqara (Cairo Museum temporary register 4/3/23/1: Quibell 1908, pl. XIX.1). The functionality of the canopy, as a means of providing shade, could thus imply a degree of verisimilitude in the structure, which thus corresponds to the next factor, that of authentication.

#### *Authentication*

Authentication, or verisimilitude, could be attained not only via depicting key parts of real structures but also via the use of cost-effective mixed media (Adams 2007, 5; Barker 2018, 10–11; Tooley 1995, 40, 65). For instance, model figures were often dressed in scraps of real fabric and granaries were sometimes filled with real grain, as seen in a number of examples from Beni Hassan (Garstang 1907, 73, fig. 60 (tomb 116), 87, fig. 76 (tomb 186), 125, fig. 121 (tomb 575)) and also in Meketre’s granary (Fig. 1; Winlock 1955, 87, pls. 20, 62), although on discovery only the husks remained (Winlock 1955, 26).

To this example we could also add the use of ‘real’ (i.e., functional) miniature tools in some carpentry models, pegs and most probably string in weaving models (JE 46723: Breasted 1948, 54, pl. 48b) and ponds in the garden models of Meketre (MMA 20.3.13 and JE 46721), which would have been filled with water, as suggested by state of the ponds’ copper lining (Winlock 1955, 83–4). Arnold takes a hermeneutic approach (Angenot 2015, 108), reading into these objects even further layers of meaning: that the garden ponds are shaped like offering basins and that the carpentry tools could be linked to rituals for the revivification of the mummy like the ‘opening of the mouth’ (Arnold 2005, 47). In this way, she argues that ‘the potency of a ritual object (a purification tank or a toolbox) is intensified by the addition of narrative elements taken from the real world’.

#### *Structural isolation*

Structural isolation implies the extraction of a model from its spatial context of other (supporting or adjacent) buildings, such as in the real-world case of the Abydos granary and its surrounding structures (Adams 2007, 7). The use of walls to demarcate or delimit this isolated architectural element in a model was undertaken first—and until the Twelfth Dynasty (c. 1990–1800 BCE) exclusively—in the context of granaries (Arnold 2005, 26, 33). This was perhaps because granaries were too structurally complex to realize in any other way or because the architecture of granaries is so recognizable (and thus salient).

The containment of a model seems to be contingent on budget and artistry, and perhaps fashion and taste. Djehutyakht’s models from Deir el-Bersha, for instance, rarely feature exterior structures, in contrast with Meketre’s. Only Djehutyakht’s eight granaries are enclosed in a box-shaped enclosure, without a roof (Roehrig 1988c, 113, fig. 59; Freed & Doxey 2009, 162, fig. 121). However, an isolating aesthetic is not only achieved by walls. Arnold (2005, 43–55) identifies seven different types of architectural settings for groups of figures doing various activities that ensure this structural delimitation: a flat board,<sup>30</sup> a board with a back-board on one or two sides,<sup>31</sup> a board surrounded by a low wall,<sup>32</sup> a board with higher enclosure walls and a roof board that covers part of the structure,<sup>33</sup> a granary with a new interpretation of the roof (namely, no longer for pouring in grain but for sitting on),<sup>34</sup> intricately vaulted ceiling frameworks, seen mostly in models of spinning and weaving,<sup>35</sup> and columned rooms, often with partial roofing or full roofing.<sup>36</sup>

Sometimes the isolation of a scene inside a walled structure complicates our interpretation of its verisimilitude, as can be seen from the dispute surrounding the above-mentioned slaughterhouse model of Meketre (Fig. 2), which is uniquely represented inside a complex structure. Whereas Ikram (1995, 87–8) regards the model as a representation of an actual structure on Meketre’s estate, the use of interior structures with columns as slaughterhouses is unattested in two-dimensional representations (Arnold 2005, 25). Arnold (2005, 56) thus concludes that it is ill-advised to take the model as a ‘straightforward depiction of an actual ancient Egyptian slaughterhouse’ and implies thereby that the structure is an ideation of a situation which may have little or no relation to real architectural structures. As Arnold (2005, 48) argues, ‘the basic idea of using high positioned windows to created [*sic*] an airy and shaded environment inside buildings existed in Egypt as early as the Middle Kingdom’. Given this, the interesting part is that the airiness and shadiness of the environment is what the structure may be being used to convey in relation to butchery, in other words, that optimal conditions ensured that Meketre’s meat was of the best quality. Thus, it seems clear via these tendencies that producers/senders were not depicting but rather interpreting the ‘real world’ to fulfil a specific agenda (i.e., of provisioning), given that these objects were destined for use in a funerary context.

## The reception of models

When considering how the person observing a model (the receiver) makes sense of the context and interprets the object, we return to the semiotic principles of Angenot (2015, 102–4) to establish what they contribute to the proposed communicative framework. This process, like the discussion of the principles of production and transmission in the previous section, can be made fruitful by tying these principles to specific transfer processes (like metonymy and metaphor) at the conceptual level, which are visible in the design and transmission of meaning-units in the models. These categories are not discrete: they tend to merge, as Angenot herself points out (2015, 103), but the categories are nonetheless useful structuring elements.

### *Typicality*

A receiver might see typicality, which is tied to taxonomy, in the use of beef to stand for the provision of animal protein, since the plucking of birds and the catching of fish are comparably underrepresented in the model corpus. Both appear, however, in the opulent model sets of Meketre (Fig. 2 and JE 46715),<sup>37</sup> and the numerous skiffs, even the unmanned ones, may also stand metonymically (INSTRUMENT FOR ACTION and PART FOR WHOLE, perhaps PLACE FOR ACTIVITY PERFORMED AT THAT PLACE) for the well-documented activities of fishing and fowling. Perhaps depictions of these actions were reduced in this way for the purpose of practicability, as discussed in the previous section. We may also see typicality in the gender roles depicted, whereby women weave and carry offerings and men undertake most other activities.

### *Readability*

Readability, or recognizability of an image, is contingent on the fact that there is a degree of medial awareness, or aesthetic priming, taking place. This priming is based on real-world structures or situations, or motifs in other media, such as two-dimensional scenes, and is thus iconic in scope. This factor is supported by the limited repertoire of activities represented in models (Tooley 1995, 16–18).

The lack of cover on the silos in a granary (MMA 20.3.11, Fig. 1) could increase its readability, since, as discussed in the section *Authentication* above, this feature is widely considered not to have reflected real-life conditions (Adams 2007, 5; Badawy 1966, 31; Roehrig 1988c, 113). What is also unusual is the shape of the silos themselves (section on **The production of models**), in which ‘painters

and relief artists most often chose the older, dome shaped type of structure, because this was more recognizable in the profile view’, whereas ‘the model makers preferred the rectangular grain receptacles because they were much easier to make in wood’ (Arnold 2005, 60). Nevertheless, the readability of granary structures, thanks to the outer perimeter with its characteristic peaked edges, is indisputable.

The columned porticoes of houses may also have been unambiguous to the Egyptian eye. As Arnold (2005, 58, referring to von Pilgrim 1996, 207–8) stipulates, ‘columns and porticoes evoked administration, oversight and the presence of authority’. Many other potential cases of readability overlap with the principles of typicality and schematization and will be handled in those sections.

### *Schematization and density*

Schematization stands on a cline in relation to density to refer to the degree of detail and variation used in the representation of such features as movement, colour, perhaps shape and number. All these factors can affect the intelligibility of a model’s design.

Colour: Robins (2008, 75) claims, in relation to model figures, that ‘[e]verything about the statues is designed to emphasise the activity shown; the servant is simply a generic figure and has no individual identity’. Though the issue of the figures lacking an ‘individual identity’ requires further scrutiny (Nyord *in press*), the representations of the figures are schematized, similar to most Egyptian two-dimensional wall paintings.<sup>38</sup> Thus, the human figures in models are almost invariably depicted with short black hair and short white kilts (for men) and long black hair and white robes (for women). Scribes are represented with shaved heads to set them apart, both chromatically and aesthetically, from the black-haired workmen in Meketre’s granary (Fig. 1). This style is not canonical, though: in Meketre’s bakery/brewery model (MMA 20.3.12), all the workmen have shaved heads. Skin colour is often symbolically tied to gender, similarly to two-dimensional depictions (Angenot 2015, 104), as we can see from the weaver’s shop model of Djehuty at Lisht (Eskenazi Museum of Art 58.34), where both (red-skinned) males and (yellow-skinned) females are portrayed working. Again, though, colour is not canonical where the need for contrast is not present: a model of a girl carrying offerings from the tomb of Hepikem at Meir depicts her with dark red skin (Myers Museum, Eton College 1: Bourriau 1988, 103–4, pl. III.2). Other non-meaningful

colour variation can be observed on the variegated coats of a herd of cattle in the cattle-count model of Meketre (JE 46724),<sup>39</sup> which lends density to the image while maintaining readability.

**Movement:** Another key factor of schematization, which relates to the principles of typicality and readability, concerns the specific, coded (i.e. indexical) gestures of human (and animal) figures, which is probably closely tied to the functionality of the object and scene. The high degree of schematicity applies particularly in relation to movement because, as described above in relation to practicality *versus* functionality, the amount of variation was curtailed by the fact that the only jointed and thus moveable parts of model humans were the arms.

A PART FOR WHOLE relationship can be established between a single gesture and the execution of a whole activity (Angenot 2015, 203), as can be seen in the slaughterhouse model of Meketre (Fig. 2). In this scene, the process of butchering is coded by the single gesture of butchers starting to slit the throats of the two cows (the knife is held at the slightly notched and bleeding throat), while attendants hold bowls to catch the blood. This transfer connects with a point in the section **The production of models** about the beginning of a process being profiled visually. It is also very likely that concomitant metonymic transfers are occurring, such as: ACTOR FOR ACTION, since the receiver focuses not on an individual, but rather on what they are doing, and CAUSE FOR EFFECT, since the contact of knife and neck implies that the cow is going to die.

More gestures showing PART FOR WHOLE relationships are the rowing gesture—whereby the men strain backwards with arms forward and are thus captured mid-gesture, when about to pull the oars back and thus drive the boat forward—as seen in several boat models from Beni Hassan (e.g. National Museum of Ireland 1920, 270),<sup>40</sup> and the singing gesture, where the singer has his hand in front of his mouth, as seen in a boat model of Meketre (MMA 20.3.1).<sup>41</sup> In the model depicting musical entertainment for the tomb owner Karenen/Karenni from Saqqara (JE 39130: Quibell 1908, pl. XVI), the musicians clapping are shown with their hands lightly parted, about to make contact (or having just made it).

**Shape:** The metonymic (i.e. indexical) relationship of CONTAINER FOR CONTENTS is most likely activated in relation to bread moulds and beer vats and jars in models, just like it is in relation to model vessels, which are described by Allen (2006, 20) thus: ‘Since

the interior volume of these model vessels is negligible, it is their outward form that is symbolically important and their contents are implied by their shape’. Perhaps, on a broader scale, as Arnold (2005, 26) posits, the granary stood for the grain it held (CONTAINER FOR CONTENTS), which explains the popularity of this motif and model type.

In addition to schematicity, models also seem to provide evidence for densification of certain details, such as the portrayal of different offerings in the baskets of the offering bearers of Meketre (JE 46725, MMA 20.3.7 and MMA 20.3.8: Winlock 1955, pls. 30–32) and the so-called Bersha Procession of Djehutynakht (MFA 21.326: Freed & Doxey 2009, 152–4, fig. 113),<sup>42</sup> or different cuts of meat in Meketre’s slaughterhouse model (Fig. 2). Variety may be considered as a marker of prestige. On the other hand, variety notwithstanding, the offerings and cuts are depicted in a schematized way (fillets as isosceles triangles, for instance) and in no way detract from the readability of the image.

**Number:** The classic sign in this case, closely tied to the Egyptian language, is the number three for plurality (Angenot 2015, 105). Perhaps this factor motivates how we comprehend the eight granary models from Djehutynakht’s tomb (10A) in Deir el-Bersha, which all portray three people in the stances of the three typical activities: one man carrying a full sack of grain, one bending over, scooping grain, and a scribe recording the amount (Roehrig 1988c, 113, fig. 59). Whether the number three is inherently significant here or not, the reduction of each activity to a single person displays a high degree of schematization and salience. Since this schematization frequently occurs in relation to three individuals, I am tempted to see this as more than a coincidence. For instance, in a collection from Neuchâtel, the models deriving from a single anonymous tomb in Saqqara display this reductive tendency in 5 out of 11 cases: offering bearers (two sets), female brewers, males preparing food (poultry) and beer, and a pottery scene (Eschenbrenner-Diemer 2010, 63–4, 66–7, 69).

#### *Functionality*

Functionality is the principle that allows for perspectives to be portrayed that are not necessarily possible in real life but nevertheless contribute to an image’s comprehensibility. The world of models supplies breaks in the relative proportionality of the components of a single model, of which the best examples are the toolboxes, which are oversized (and thus in relation to the human figures look more like coffins)

because they are filled with real miniature tools.<sup>43</sup> Since both boxes are closed, unless the receiver knows what they are looking at, the principle of readability does not apply here. However, those of Meketre are openable, mirroring the roof of his butchery model.

#### *Durability of specific culturally important motifs*

Motifs are usually durable because they relate in some way to conceptual primaries, or what Adams (2007, 11) calls 'cultural ideals', which may not only affect object-making, but also affect how such objects are or were viewed. In this category, greater degrees of abstraction and cross-domain mapping—metaphors, in other words—are visible. For instance, in the scale of some models, the metaphors *IMPORTANT IS BIG*, *IMPORTANT IS UP* and their correlates may play a role, though there are exceptions to the rule. Meketre is depicted in his cattle-count model as only slightly larger than the other figures.<sup>44</sup> He and all people of higher status are seated or standing on a plinth, and the tomb-owner is the only figure seated on a chair. As 'sitting was superior to standing' (Robins 2008, 73), Meketre is indubitably represented as the individual with the highest status.

One might ask why scribes, especially in granaries, were often depicted in the uppermost part of the model. It may be indicative of the *IMPORTANT IS UP* metaphor, but since the uppermost area is also where visibility was high, it may just have been an element of realism. The latter is likely, on the grounds that the opposite can also occur. Meketre's granary model (Fig. 1) has the scribes in the lowest, but most salient position: whereas the workmen must climb the stairs to dump the grain into the silo from above, the scribes are seated in the front hall along the central entryway to the silo. From this vantage point, they are privy to the entry of every sack on the back of a workman. By contrast, *UNIMPORTANT IS DOWN* may be seen not only in the portrayal of the workers driving the cattle in Meketre's cattle-count model (JE 46724),<sup>45</sup> but also by the cow in Meketre's manger (MMA 20.3.9),<sup>46</sup> which, in the process of being hand-fed, is seated on (or has sunk onto) the floor. A similar case appears in a model of Djehutyakht (Freed & Doxey 2009, 160–61, fig. 119).

Another issue of scale, perhaps related to the metaphor *IMPORTANT IS BIG*, is the fact that human figures (and sometimes animals) are often too large for the structure in which they stand.<sup>47</sup> The extent to which humans were routinely larger than their animals is unresolved. Winlock (1955, 21–2) assumed that the cattle in Meketre's count scene were to

scale and therefore 'food cattle' rather than larger beasts of burden. Gilbert (1988, 71–2) follows this logic and presumes that the cattle in question were young. However, this would mean that under any other circumstances the cattle would not be to scale, which calls into question the plausibility of this idea. In any case, the opposite scale also occurs: in a milking model (Roemer- und Pelizaeus-Museum Hildesheim, Inv. Nr. 1690: Tooley 1995, 50), the cow dwarfs the human. It thus seems that considerations regarding human and animal scale in relation to real prototypes must be regarded with caution. More relevant seems to be the primacy of conceptual metaphors, like *IMPORTANT IS BIG*, which consider the relative saliency of elements in the scene. Moreover, we must bear in mind that it is not the individuals, but the activity for which they metonymically stand (*ACTOR FOR ACTION*), which has visual—and thus conceptual—primacy.

#### **Conclusions**

To conclude, this study supports the argument that models 'contribute to our understanding of the ancient Egyptians' use of architecture as a means of expression' (Arnold 2005, 8). However, it takes the idea far further, by considering the cumulative semiotic weight of architectural forms, figures, objects and gestures in relation to materials, dimensions and manual labour, while availing itself of the tools of conceptual modelling. This approach takes Egyptian funerary models not only as indications of the human cognitive process (i.e., as products of 'extended cognition'), but also as objects interacting via their meaning-making potential with human agents (Actor Network Theory). In other words, not only are the models shaped by human ideas, but they shape those ideas in turn. This relationship has been given methodological rigour by remodelling the relationship as a communicative act between sender and receiver, in which priorities of the sender can be explored using theories of communication and figuration and the reception of the object can be given decisive contours with references to semiotic principles. In other words, this refocused visual semiotics offers a far more explicit way of modelling interaction by considering the properties key to aesthetic essentialism and visual intelligibility.

The implications of this study transcend the methodological. We can see that the kinds of figurative mappings revealed by models of this type extend beyond simply 'representing' the thing-in-itself towards 'signifying' a whole range of other meanings, relating to lived experience, ritual priorities

and social hierarchies. In this way, models/minia- tures provide us with a gateway not only to new real- ities but also to new ways of interacting.

## Notes

1. Models are found in Egyptian tombs (also temples) from the Predynastic and Early Dynastic Periods (c. 3900–2680 BCE) (usually boats, granaries and offering objects in clay and ivory: Di Pietro 2019), the Old Kingdom (c. 2680–2180 BCE) (usually stone statuettes of individuals carrying out a specific activity: Roehrig 1988a), the First Intermediate Period and early Middle Kingdom (c. 2160–1870 BCE) (an expanded repertoire in wood: Tooley 1995, 17), and the late Middle Kingdom and beyond (from c. 1870 BCE) (when numbers and repertoire declined, perhaps due to changes in religious thought: Eschenbrenner-Diemer 2017, 179–81). The most complete assemblages from the ‘golden age’ of models (the early Middle Kingdom) are the 25 models of the official Meketre from his tomb in Thebes (TT 280: Winlock 1955) and over 100 of the official Djehutynakht from his tomb in Deir el-Bersha (10A: Freed & Doxey 2009; Roehrig 1988c).
2. Winlock (1955, 14) and Barker (2018, 7).
3. Roth (1988, 54) proposes the function to be ‘to ensure by magic that the provisions and activities depicted would continue in the other world’; see also Tooley (1995, 8) and Adams (2007, 14). The location of these objects in the burial chambers of tombs around the coffin seems to suggest that provision for the deceased was the primary function of these artefacts. This is reinforced by the proposal of Barker (2020, 79–80) that the use of these models increased in a time of disruption, when the decorated chapel could not be relied on to ensure the supply of resources.
4. See, for example, the model bakery and brewery of Meketre (<https://www.metmuseum.org/art/collection/search/544258>). It is beyond the scope of this paper to illustrate all cited cases, but references and (where possible) stable URLs to images are provided.
5. This definition excludes ‘model’ or ‘miniature’ vessels, which may have been similar in their function to other funerary models, but which are different on formal grounds (though I acknowledge that small portable granaries are a borderline case).
6. Winlock (1955, 76–7) gives useful indications about the scale and proportions used in the Meketre mod- els. Human figures range from one-seventh to one- tenth of life-size and ‘in proportion to the buildings the men are nearly twice too large’. These calcula- tions seem to assume that the scale of each building was roughly the same, apart from the residence models (MMA 20.3.13 and JE 46721), which are smaller. That Meketre’s slaughterhouse model (MMA 20.3.10: Fig. 2) is to scale was proposed by Gilbert (1988, 78) but is doubted by Ikram (1995, 87).
7. For a similar distinction between model and miniature (portable) granaries from the Early Dynastic Period, see Müller (2018, 414).
8. A variability in scaling could also be due to the meas- ure of scale not being that of the original but rather the human scale, as has been argued in relation to prehis- toric figurines (Bailey 2005, 28–9).
9. However, this is emphatically countered by Pilz (2011, 9–10) in relation to ancient Greek miniature lamps and vessels.
10. This criticism echoes the thoughts of Collins and Yearley (1992, 322) about Actor Network Theory, namely, that the theory asserts the power of non- human agents without proposing a means of measuring it. There are, however, more granular approaches in archaeological theory. Biehl’s (2006) analysis of ‘fragmentation’ of prehistoric figurines might also allow the scholar to access ‘how they may have functioned as communication conduits’. However, since our corpus was for the most part found whole, this approach does not apply here.
11. This paper follows broadly the triadic model of semi- osis proposed by Peirce (1931–1958, CP 1.292 and CP 1.339), whereby a sign is a conventional, arbitrary word or representation (e.g., a model of a workshop), an object is what the sign refers to (i.e., a real work- shop) and an interpretant refers to the sign’s meaning for observers (ancient or modern). Another scholar who has taken a Peircean semiotic approach to min- iatures/models is Pilz (2011).
12. From an archaeological perspective, see Tilley (1999).
13. Deacon (1997); Preucel (2020).
14. Angenot (2015, 102) uses the term ‘univalence’ on the grounds that the relation between signifier and signi- fied is usually 1:1. This, however, may not always be the case.
15. As originally proposed by Lakoff and Johnson (1980). Conceptual domains are represented in SMALL CAPS, as is standard in cognitive linguistics.
16. Barker (2018, 7) presents other scholars as arguing that models are ‘duplicates’ of wall scenes, which the cited authors, however, do not do. Spencer (1982, 67) and Tooley (1995, 8) see them as an ‘alternative’ or ‘supplement’ to wall decoration and Robins (2008, 74) merely says that the activ- ities depicted in models can also be seen on tomb walls.
17. An excellent example between the relationship between functionality and practicability can be seen in relation to ‘miniature’ and/or ‘model’ vessels, which do not form part of this corpus (see n. 5). Allen (2006, 20–22) distinguishes ‘model’ vessels from ‘miniature’ vessels, on the basis that ‘models’ are vessels that are solid and thus have no functional ability, but which ‘stand for the real thing’, whereas

- 'miniatures' are vessels which are small in size but are nevertheless functional containers. However, by tying the definition of these vessels to their functionality, practicability is not sufficiently accounted for. A consideration of the latter makes clear that the pottery miniatures are not solid because: a) they are manufactured in a similar manner to full-size vessels and thus b) it would take more work to make them solid, not less. On the other hand, it takes less work to leave stone vessels solid, so the uniting factor is one of less manufacturing time per object. If seen in this way, the difference between so-called 'models' and 'miniatures' in relation to vessels is negligible. It is perhaps revealing that these terms are used synonymously by other scholars (Lacovara 1988, 77).
18. <https://www.metmuseum.org/art/collection/search/685330>
  19. See the example from Norwich Castle Museum, in Wenzel (2019, 52–3); Bourriau (1988, 104–5). The incorporation of figures in painted, not modelled form and the presence of inscriptions makes this model unique to date.
  20. <https://www.metmuseum.org/art/collection/search/545281>. However, an exception (a wooden silo model with domed tops) is attested on a now-defunct model from the tomb of Iqer in Gebelein, recorded on Glass Plate C0631 in the Museo Egizio di Torino (Montonati 2018, 9–10).
  21. A similar process is undergone in the Egyptian hieroglyphic script, when 'animate' signs are mutilated for apotropaic reasons (Thuault 2020, 108). The link between high salience and metonymy and synecdoche is also prevalent in the script (overview in Thuault 2020).
  22. The extent to which patrons or particular workshops were responsible for the constraint on the total number of scenes is another factor to consider here, but it lies outside the scope of this paper.
  23. The focus on 'beginning' and 'end' in the case of agricultural representations most likely has to do with the fact that these are the stages in which humans must do the most work. It should not surprise us that saliency is closely tied to anthropocentrism.
  24. <https://www.metmuseum.org/art/collection/search/544257>
  25. Surprisingly, the same can be said of the c. 100 models from the tomb of Djehutynekht in Deir el-Bersha (Roehrig 1988c, 113).
  26. <https://collections.mfa.org/objects/143711>
  27. In general, Kemp (1986: 122–3) shows that not only some large houses at Kahun but also granary buildings in fortresses from the Second Cataract region in Nubia 'are examples of a type of large granary developed during the Middle Kingdom, of which the Meketra model is a slightly abbreviated representation'.
  28. This practice can be seen in Abydos Settlement Site Building 4 (Adams 2007: 5) and in a house structure on Elephantine (von Pilgrim 1996: 91, Abb. 26). However, in the latter case, going by von Pilgrim's explanation (1996: 90), the silo in question is from an earlier building phase than the wall and the fill, so the practice may not be as well attested as Adams (2007) claims.
  29. <https://www.metmuseum.org/art/collection/search/544256> and <http://www.globalegyptianmuseum.org/record.aspx?id=15635>
  30. See the bakery and butchery model from Beni Hassan in the National Museums Liverpool (55.82.7). <http://www.globalegyptianmuseum.org/detail.aspx?id=3888>
  31. A model of Karenen/Karenni and Nefersemdenet/Nefermedjdenyt from Saqqara combines carpenters (in the enclosed angle) and potters (in the open) (JE 39131: Quibell 1908, pl. XVII.3).
  32. This may sometimes indicate a real boundary, as seen by a butchery model in the Roemer- und Pelizaeus-Museum Hildesheim (Inv. Nr. 1694: Breasted 1948, pl. 35), whose low wall is, according to Arnold (2005, 44–5) (though in photos not visibly), painted like a reed fence. However, in a butchery and brewing model from Meir (MMA 11.150.12) the wall merely marks the edge of the model. <https://www.metmuseum.org/art/collection/search/555953>
  33. See the carpentry/metalworking/pottery model of Gemni/Gemniemhat from Saqqara (Ny Carlsberg Glyptotek, Copenhagen AEIN 1633: Tooley 1995, 44).
  34. See the granary/brewery model of Henuy from Gebelein, now in the Ägyptisches Museum und Papyrussammlung, Staatliche Museen, Berlin (Inv. Nr. 13758: Breasted 1948, pl. 12b).
  35. See the weaving model of Gemni/Gemniemhat from Saqqara (Ny Carlsberg Glyptotek, Copenhagen AEIN 1634: Arnold 2005, pl. IX.17).
  36. Full roofing can be seen in Meketre's slaughterhouse model (Fig. 2), perhaps also in the model of Gemni/Gemniemhat from Saqqara (Ny Carlsberg Glyptotek, Copenhagen AEIN 1632: Arnold 2005, pl. X.20).
  37. <http://www.globalegyptianmuseum.org/record.aspx?id=15282>
  38. For the anonymity—or not—of model figurines, see also Barker (2020).
  39. <http://www.globalegyptianmuseum.org/record.aspx?id=15294>
  40. <http://www.globalegyptianmuseum.org/detail.aspx?id=2643>
  41. <https://www.metmuseum.org/art/collection/search/544214>
  42. <https://collections.mfa.org/objects/143592>
  43. See the carpenters' workshops of Meketre (JE 46722: Breasted 1948, pl. 46a) and Inpuemhat in Saqqara (JE 45319: Arnold 2005, 46, pl. VIII.15).

44. The kinds of differences in scale seen in wall decorations and statuary are missing. That this visual *Bedeutungsmaßstab* (Assmann 1987, 30–31) was even an indication of power in wall paintings is contended by Kanawati (2001, 86): since the wife of the tomb owner can be portrayed both of equal size to and smaller than her husband, the smaller portrayals (e.g., on a papyrus skiff) are probably indicative of scenes in which this individual ‘was not or should not be there’.
45. <http://www.globalegyptianmuseum.org/record.aspx?id=15294>
46. <https://www.metmuseum.org/art/collection/search/544254>
47. The most exaggerated of these comes from a Fifth Dynasty limestone model of Djasha from his mastaba in Giza (Ägyptisches Museum der Universität Leipzig, Inv. Nr. 2566), in which a human figure with his measuring drum towers over five small silos (Tooley 1995, 37).

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