



**CONTENTS, STATUS, AND SYMBOLISM: THE STUDY OF RESIDUES FROM IMPORTED JARS
AT OLD KINGDOM GIZA**

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ABSTRACT

Throughout the 4th to 6th Dynasties of the Old Kingdom (c. 2613–2181 BCE), liquid commodities were imported in ceramic combed jars made in workshops in the Byblos region, enabling proximal geographic identification of the original contents. Results of scientific, archaeometric, and archaeological research on a large corpus of jars found in elite tombs at Giza, now in the Museum of Fine Arts, Boston, reveal a complex story of the use and reuse of the jars and that very little remains of the original and even secondary contents. Rather, from the moment of production, the jars had a complex itinerary. At different times, jars were invested with diverse meanings that included their original use as a transport and product container, a symbol of royal power, an elite status symbol, and, more recently, a 20th-century museum artifact. It is argued that a number of jars were used more than once before final deposition in elite tombs, where they were provided as gifts to high officials and royal family members. The jars acquired the significance of prestige markers in the status framework of Egyptian elites, signifying proximity to royal grace and favor. As a result of ancient use and modern interventions, the original contents of the jars are difficult to discern, with wider implications for how to characterize the liquid commodities trade with the region.

KEYWORDS

Egypt; Lebanon; Old Kingdom; resins; trade; Giza; ceramics; residues; radiocarbon dating

INTRODUCTION

Identification of liquid commodities traded between Egypt and the Levant during the Old Kingdom (c. 2686–2181 BCE) has largely eluded discovery for decades. Debate has involved the study of textual evidence on the one hand and, on the other, speculation based on very limited archaeological data and scientific analysis. Recent multi-proxy analyses of remaining residues in the large corpus of imported combed jars from Giza held in the Museum of Fine Arts in Boston (MFA) reveal that few jars contain traces of contents visible to the naked eye. Indeed, on examination, a number of jars revealed evidence of having been used more than once and prepared especially for burial as items in their own right. Archaeological observations suggest that the jars had a more complex itinerary than simply as containers for liquid commodities, and once received in Egypt, moved through the palace economy to final interment with different perceived identities along the way. Moreover, modern handling of the jars has contributed further complexity through interventions such as cleaning.

This paper examines the reception and archaeology of the jars themselves: their condition on deposition, the presence or absence of contents, evidence of stoppers, and various ancient and modern interventions. A case study using macroscopic, microscopic, and archaeometric methods on contents associated with jar MFA 47.1662 demonstrates the nature of the problems encountered in identifying the contents and analyzing legacy archaeological data. Using an object itinerary approach, these data also help reveal the complex journey of the jars, their significance, and meaning at different points along the way.

IMPORTED COMBED JARS IN EGYPT AND THE ‘CONTENTS PROBLEM’

During the 4th to 6th Dynasties, the two-handled combed jar was the primary Levantine imported transport container for shipping liquid commodities to Egypt.¹ Results of thin-section petrography on jars from Giza reveal that vessels were produced in the Central Levant, between Beirut and Tripoli; recent geochemical results identified the Byblos region itself as the place of manufacture during the 4th Dynasty, a pattern which likely continued for much of the Old Kingdom (FIG. 1).² The dominance of this type and the uniform nature of the vessels over a long period indicates a standardized

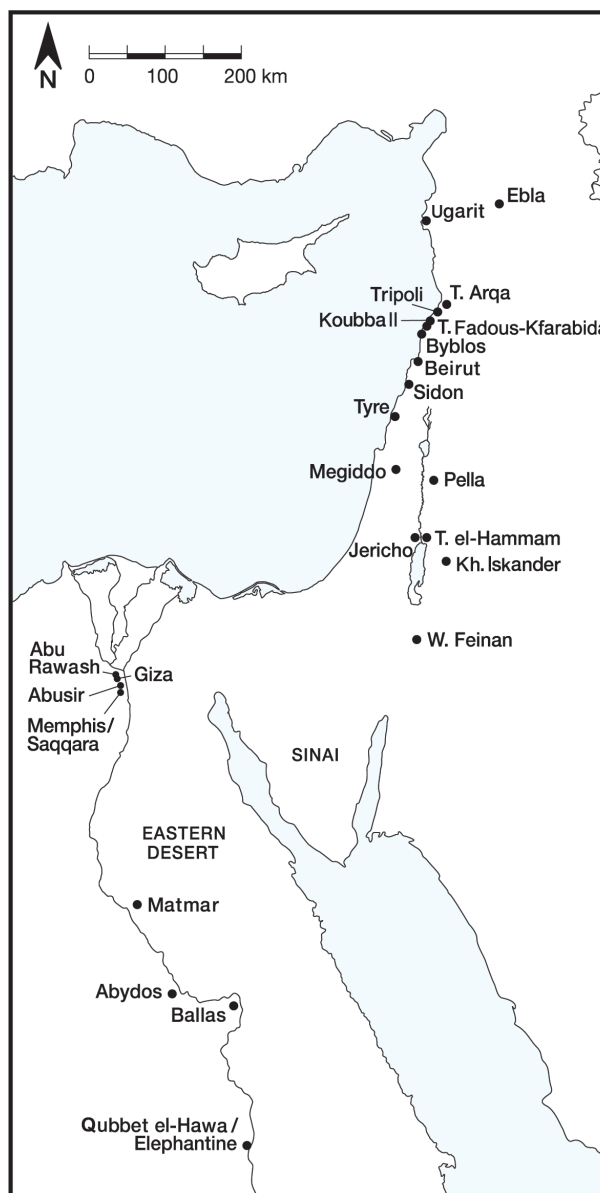


FIGURE 1: Map of Egypt and the Levant, showing sites mentioned in the text.

production regime in northern Lebanon that served the requirements of Egyptian state maritime trade in a highly efficient manner.³ This arrangement was so successful that it lasted for over 350 years.⁴

While many jars have been studied from the perspective of ceramic production and technology, little attention has been paid to their contents and the archaeology of the jars themselves. To date, the contents of only three jars have been scientifically examined with conclusions published, and even this



FIGURE 2: (a) Upper body and body sherd of jar MFA 13.5671, showing calcium carbonate residue. Giza Tomb G 4440, early–mid Fourth Dynasty (Photographs K. Sowada, used courtesy © Museum of Fine Arts, Boston); (b) Interior view of jar MFA 13.2829a showing drip marks on the wall (Photograph 2022 © Museum of Fine Arts, Boston).

was done many decades ago. Little detail is known of the scientific method used, and only two of the three examined jars yielded informative results.⁵ A current program of multi-proxy analysis is seeking to unravel the ‘contents problem,’ but even this has proved more complex than initially anticipated.⁶

This complexity prompted a detailed assessment of the archaeology and object itinerary of the jars themselves. The MFA holds an important corpus of 29 imported jars from G.A. Reisner’s excavations at Giza, conducted from 1902 to 1942 on behalf of the Harvard University–MFA Egyptian Expedition. Five are one-handled jugs, and the remaining 24 are combed jars. All the vessels come from tombs belonging to the kings’ extended family and senior officials and date from the early 4th to the late 6th Dynasty.⁷ This is the largest group of such vessels outside Egypt. Thanks to George Reisner’s recording, a great deal is known about the archaeological setting and modern recording of this material, not only through primary publication data but also through his original field notes and photographs, now publicly available.⁸ This enables construction of a general life history of imported jars and thus contributes to understanding how they were used at different times, the associated significance attributed to them at different points, and possible reasons for the overall paucity of contents.

(A) THE IMPACT OF 20TH-CENTURY EXCAVATION AND MUSEUM METHODS

The collated examination of the MFA jars and the original field records enables several key observations. First, few jars have obvious visible residues on the interior walls, rims, or dribbling down the exterior and interior surfaces. Over a two-year period commencing in November 2017, the jars were examined multiple times by the writers, and samples of any remaining residues were taken, repeatedly observing how little was visible to the naked eye. Access to interior surfaces for examination and taking samples also varied and was controlled by museum procedures: eight jars were still in fragments, so all surfaces were accessible; six jars were completely restored from sherds, so the interiors were difficult to inspect; and a further thirteen were intact but likewise hard to examine internally, especially where the neck was narrow. Very few vessels had either loose or adhering residues on the interior walls that could be sampled, even around the base where an accumulation would be expected (FIG. 2a; Table 3 at the end of this chapter). Recent photographs taken by the Museum from inside several large intact jars using a suspended camera revealed ‘drip’ marks on the walls and limited adhering residues (FIG. 2b).

The lack or loss of residues can be partially explained by post-excavation and museum conservation practices. Examination of original Giza field photographs suggests that external surfaces were



FIGURE 3: Jars from Tomb G 2381A, late Sixth Dynasty. (a) Current photo of jar MFA 13.2930 showing loss of original accretions. Height 48.3cm (b) Original field photograph. Note surface accretions on MFA 13.2930 (left). The remains of the stopper, visible in Fig. 6, is missing. MFA 13.2929 is on the right. Photo dated 01/25/1913 (Photographs 2021 © Museum of Fine Arts, Boston).

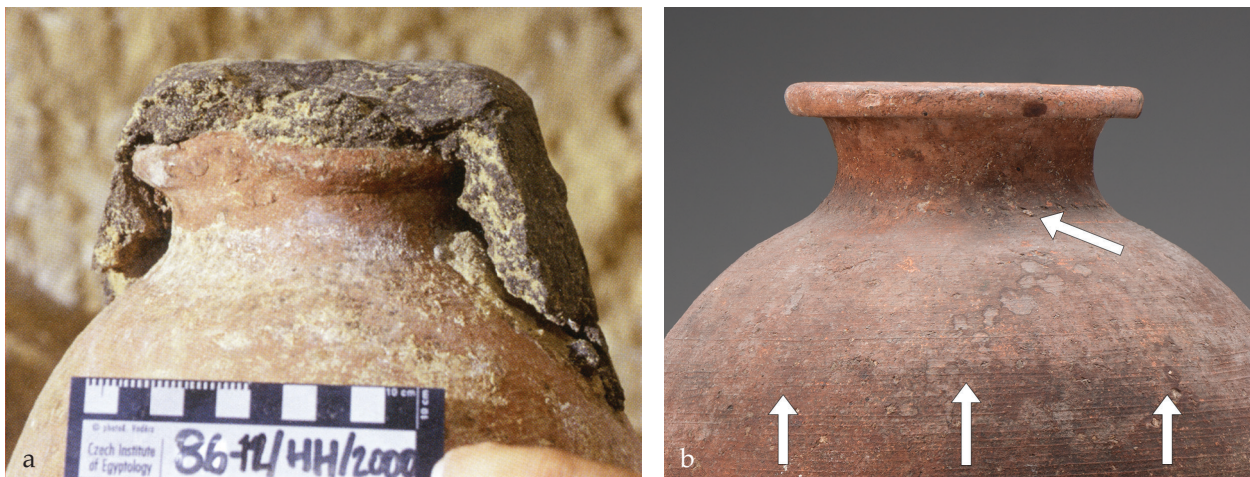


FIGURE 4: (a) Stopper from jar 86-12/HH/2000, showing traces of a plaster stopper under local unfired Nile silt (right). From the tomb complex of Qar Junior, Abusir, Sixth Dynasty (photo courtesy M. Bárta); (b) Jar MFA 13.2929, showing traces of white plaster (diagonal arrow) and the 'shadow' of a plaster stopper across the shoulder. Comparison with the field photograph in Figs 3b and 6 indicates post-excavation removal of accretions (Photograph 2021 © Museum of Fine Arts, Boston).

often 'cleaned up' for photography (FIG. 3). Further cleaning evidently occurred at the Museum over the ensuing years, especially when intact jars were prepared for display or sherds for restoration. Even ancient 'kill holes' were 'restored' by plastering over the 'damage' in modern times: jug MFA 20.1904 had three kill holes near the base, all plastered over during restoration.⁹ Indeed, this latter category—

jars restored from sherds—was likely the most extensively desalinated and cleaned, inside and out, in accordance with standard museum practices. Nowadays, there is an emerging realization of data loss through excavation practice and post-excavation handling of ceramics. The result is that field strategies are shifting to ensure the retention of micro-datasets for future analysis.

FIGURE 5: (a) Jar MFA 13.2928a-b; (b) Underside of stopper MFA 13.2928b showing several layers of material. (Photographs 2022 © Museum of Fine Arts, Boston).



(B) THE REMAINS OF NILE MUD STOPPERS OR SEALINGS AND THE ARCHAEOLOGICAL SETTING

Many jars were used anciently more than once, shown by the extant remains of multiple plaster and Nile mud stoppers on some jars. Whereas Nile mud indicates vessels resealed in Egypt, when and by whom plaster stoppers were used requires a cautious assessment. Possibly the traces of a white shadow on the upper shoulder of many jars are remains of the first or second stopper. The nature of the original sealing in Lebanon is also not known: it may have been clay, textile and string, or maybe plaster; elemental analyses on plaster samples are required to resolve this.

From the late Old Kingdom, a combed jar from Giza and one from Matmar were found with Nile mud stoppers, whereas no less than seven late 6th Dynasty jars from Abusir are likewise sealed, some with contents still inside.¹⁰ One Abusir jar had a Nile mud stopper placed *over* remnants of an earlier cream-colored plaster stopper, a piece of which is visible on the shoulder. Under this are traces of another white coating on the rim and neck (FIG. 4a).¹¹ The Nile mud stoppers from Abusir and Giza are impressed with an inscribed seal. The Matmar jar was found with a broken rim sealed with a clay sherd lid held in place with a leather strap and secured by a Nile mud stopper with no reported seal impression.¹² MFA 13.2930 likewise appears to have been originally sealed with a piece of leather, part of which was still *in situ* on discovery (FIG. 6 inset left). The presence of mud stoppers made from Egyptian

Nile clay not only points to a late Old Kingdom date, since such stoppers are confined to that period but also demonstrates that some jars were resealed locally at least once prior to interment.

Examination of original field photographs and object registration notes show that when discovered, many vessels lacked a stopper altogether (Table 3).¹³ The Giza fieldnotes only mention a stopper, or the substantial remains of such, if it was present when the vessel was originally recorded. One must, of course, account for the method of field recording that was a product of its time and different people. Many of the field entries are brief and lacking detail, thus the modern reader is captive to what was thought worthy of documenting at the time. That said, where extensive remnants of a stopper remained *in situ* or was stabilized in the field, it was evidently conserved and recorded.¹⁴ Most of the Giza jars now in Boston are uncapped, but examination of the surface reveals that all vessels were anciently sealed with white plaster at some point, as noted above (e.g., FIGS. 3b, 4–8).¹⁵

In this respect, the collection of jars from late 6th Dynasty Giza tomb G 2381 A is instructive. An original photograph of the burial chamber shows four jars behind the coffin, three with stoppers and one leaning over with a broken stopper.¹⁶ A fifth jar, MFA 13.2929, likely fell over and is not shown. FIG. 6 shows MFA 13.2930 (left) with a mostly missing stopper, yet the field photograph shows none (FIG. 3a, right), indicating that it had fallen off during excavation or was cleaned off for photography. The

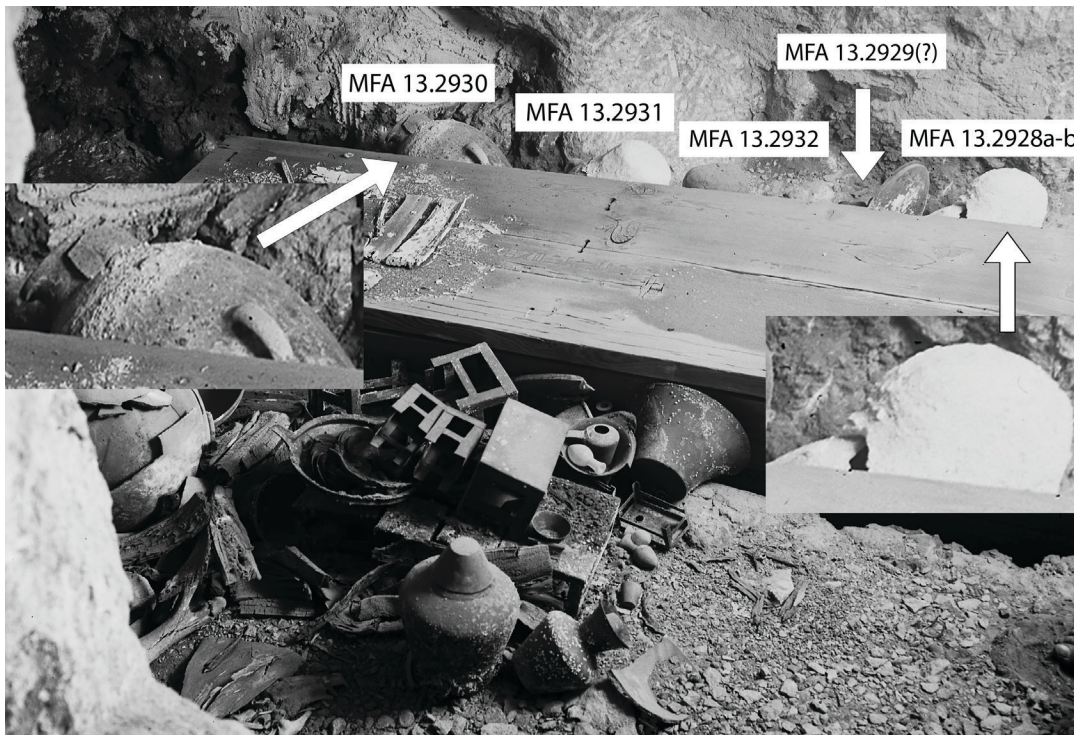


FIGURE 6: Intact burial chamber of Giza Tomb G 2381 A, belonging to Impy, reign of Pepy II, Sixth Dynasty. Note four combed jars alongside the coffin, MFA 13.2929 is not visible. Remains of the earlier plaster stopper of MFA 13.2930 are on the shoulder; along the neck are remains of a mud stopper or piece of leather (?). Photo dated 12/31/1912. (Photograph 2021 © Museum of Fine Arts, Boston).



FIGURE 7: (a) Jar MFA 20.1903 from Giza Tomb G 1031 A *in situ*: the neck and rim are seen with no visible stopper. Photo dated March 1904; (b) Jar MFA 47.1662 from Giza Tomb G 2350 L, shown *in situ* inside the coffin but likely moved from its original position during ancient robbing. The jar was missing a handle and the rim was broken (note sherds near the mouth), the stopper was also fully absent. Photo dated 05/02/1940 (Photographs 2021 © Museum of Fine Arts, Boston).

broken neck of MFA 13.2928a–b reveals multiple sealings which may or may not be local. Close inspection of the original photo showing the jar *in situ* reveals that the neck and stopper had already broken off (see the black void on the left-hand side) and may indeed have been re-positioned for the picture or moved in ancient times (FIG. 6 detail). As many as three possible layers of different materials on the stopper can be discerned: a primary layer of clay which does not appear to be Nile silt or mud, and two subsequent layers of plaster. Each layer likely represents separate acts of closure (FIG. 5b).¹⁷

Yet, from field notes and photographs, it seems likely that stoppers were *absent* from many other jars on discovery. Some jars from earlier tombs were found *not sealed*. For example, 4th Dynasty jar MFA 20.1903 from plundered Tomb G 1031 A was missing its stopper completely and appeared ‘cleaned up’ (FIG. 7a).¹⁸ Jar MFA 47.1662 from plundered Fifth Dynasty Giza Tomb G 2350 L shows the stopper almost completely absent (FIG. 7b).¹⁹ The rim likewise appears ‘cleaned up’ anciently, as loose fragments lying nearby bear only small patches of surface plaster and few if any residues are visible on the rim, even though the field notes record residues in the jar (further discussed below). The point here is that the lack of stoppers in the field photos and notes, combined with a general lack of actual substantive contents, even in small quantities for most jars, indicate that many vessels appear to have been unsealed, maybe partially filled, possibly emptied, and indeed anciently ‘cleaned up’ prior to deposition. Some vessels were also ritually ‘killed,’ some close to the base where any contents would have seeped out.

CASE STUDY: THE PROBLEMATIC ‘CONTENTS’ OF COMBED JAR MFA 47.1662

The conundrum of ‘empty’ jars and the general lack of visible residues cannot be easily explained. In the case of the Giza jars, contents could have been robbed out anciently, used in a funerary ritual, have been of a kind that did not leave extensive visible remains or deteriorated/evaporated, *or* the jars were extensively cleaned prior to burial and/or extensively cleaned post-excavation. Funerary rites or tomb robbing could offer an explanation: robbers could have climbed out with a container for stolen liquids, such as a goatskin slung over the body or simply taken the jar from the tomb.²⁰ For some interred jars, contents may have been already crystalline, facilitating removal in a sack or bag.



FIG. 8: Jar MFA 47.1662. Height 31.0cm. Mid-5th Dynasty (Photograph 2021 © Museum of Fine Arts, Boston).

To help assess this issue, jar MFA 47.1662 (FIG. 8) with associated loose contents MFA OP.1.47.1662 was investigated to evaluate the nature and relationship of the material to the jar in light of possible multiple ancient and modern interventions. The jar was found in the burial chamber of Giza Tomb G 2350 L (= G 5290), dated to the Fifth Dynasty. Visual inspection of the clay fabric on a crack through the rim revealed that it was made of P200, the main fabric for Old Kingdom imports originating in the Byblos area.²¹ Slight traces of yellowish plaster were visible on the neck and rim, but the overall surface had been thoroughly cleaned. The field photo shows the jar lying on its side in the stone sarcophagus, near a pile of robbed bones and objects (FIG. 7b). The rim had minor pieces missing, and there was a small amount of residual material adhering to the neck, but for the most part, the neck and rim looked relatively clean. Field notes record that the jar ‘contains dried oil, shiny black color, cf Lucas analysis of 32-12-18’ [i.e., MFA 47.1661],²² but did

not state if this was loose or adhering to the vessel walls, and it was not analyzed at the time. Two samples from the interior wall of the jar were taken in 2021, and analysis is in progress.

LOOSE CONTENTS MFA OP.1.47.1662

The MFA holds a small plastic bag of loose contents labeled as having been removed from this jar. The date of transfer from the jar is not certain and is nowhere stated in the MFA records. No loose contents were mentioned in the field notes and Reisner recorded no other contents, yet residues *were* adhering to the walls, as evidenced by the observations of Lucas (see above) and the samples taken in 2021. That said, the relationship of at least some of the bag contents to jar MFA 47.1662 is possible but cannot be verified with certainty. Indeed, as we will see below, there is clear evidence of material not related to the original contents in the bag, which includes modern remains, but perhaps not all of the same age (FIG. 9).

The nature of this situation will be familiar to anyone who works with museum objects obtained from an old archaeological excavation. The MFA accession date of the jar is signaled by the prefix ‘47,’ indicating that the Museum accessioned this and other objects in that year. A number of objects were secured in the Harvard Camp storeroom at Giza up until 1947, when they were transferred to the United States. Former Chair of the Department of Ancient Art at the MFA, Dr. Rita Freed, recounted a conversation long ago with Dr. Dows Dunham, who was a member of the team that closed the Camp. According to Dr. Freed (pers. comm. 1 July 2021), Dunham reflected that ‘there was a lot to do in a very short time.’ Thus, working under time pressure, quick decisions about material were likely needed, and without several key people who were present during the original fieldwork.²³

The contents of the bag, approximately 100 ml, was partially sorted by Dr. Wilma Wetterstrom in the Scientific Research Laboratory of the MFA Boston over four visits between April and August 2019. Much of the contents was sediment and dust (FIG. 9a). The remainder was a curious collection of botanical, faunal, and unidentified material, and most of it almost certainly was not in the jar when excavated by Reisner (Table 1).²⁴ The most abundant items were small pieces of dark matte and ‘resinous’-looking material. Some pieces adhered to ceramic flakes, which could have spalled off the walls of



FIG. 9: Contents of bag MFA OP.1.47.1662. (a) Loose contents.; (b) Ceramic fragment with resinous adhesions; (c) Grape pips and pip fragments; (d) Olive stone; (e) Barley rachis; (f) Botanical material; (g) Detail of (f), showing flax fragment; (h) Animal bone; (i) Rodent droppings; (j) Insect carapace and fragments; (k) Spider beetle; (l) Spider beetles embedded in resinous material (Photographs W. Wetterstrom, used courtesy Museum of Fine Arts, Boston). Grid squares = 1 mm.

the jar (FIG. 9b). Five representative samples were taken from the bag for analysis (see above), and two additional samples were submitted for AMS dating (see below).

The most abundant identifiable botanical material was grape (*Vitis vinifera* L.) pips and pip fragments (FIG. 9c). The specimens consist of the tough testa (seed coat) with no traces of the endosperm or embryo, indicating degrading as could be expected in old specimens. A sample submitted for AMS dating proved to be a few hundred years old (180 ± 20 years) (Appendix 1). The bag contents also included one small olive stone (*Olea europaea* L.), bearing a hole gnawed by rodents, undoubtedly seeking the seed inside (FIG. 9d). It would not have been in the jar at the time of discovery. If it had, it is unlikely that Reisner would have missed it, given that olive stones are easily recognized and large enough to spot by the naked eye. In addition, the

Identification	Latin name	Count, description	Comments
PLANT MATERIAL			
Olive	<i>Olea europaea</i> L.	1 stone	Hole with rodent gnaw marks
Grape	<i>Vitis vinefera</i> L.	Numerous seed (pip) fragments At least 7 pips counted based on “necks” of the seed	Pips consist only of the seed coat, with desiccated soft tissue of the fruit adhering to some
Barley	<i>Hordeum vulgare</i> L.	1 rachis internode	In very good condition. Color slightly darker than fresh material. Hairs intact. Shiny appearance.
Cereal chaff and straw		Some fragments	Degraded. Unidentifiable
Legume	<i>Fabaceae</i> family	Some seed coat fragments	One fragment has hilum characteristic of legumes
Legume	<i>Fabaceae</i> family?	Stem/pod/ leaf fragments	Probably legume
Fibers, string		Small mass	Fibers are very fine, possibly flax
String		1 piece of fine string	Possibly flax
Wood		1 small fragment	Degraded
FAUNAL MATERIAL			
Bone		1	Hollow, possibly from a bird
Insect parts		Numerous legs, carapaces, jaws	Possible grain pests, such as the grain weevil.
Spider beetles	<i>Gibbium?</i>	Numerous loose specimens with thorax, abdomen, and some legs intact	Many spider beetles embedded in a piece of ‘resin’
OTHER			
Unidentifiable		Minute fragments	

TABLE 1: Summary of observations from MFA OP.1.47.1662, bag of loose contents. Notes: 1. Fragments cannot be quantified, except very subjectively as some, numerous, etc. Weight would be the only objective measure for quantity, but not useful here given the uncertainty of the source and date of the material. 2. For dimensions see photos. Most specimens are seen on grid paper with 1 mm grid squares.

earliest examples of olive-stone finds in Egypt date to Middle Kingdom deposits at Memphis, so this would have been noticed at the time.²⁵

The other identifiable botanical specimen is a segment of barley (*Hordeum vulgare* L.) rachis (FIG. 9e), the central axis of the cereal head. Its shiny surface, intact fine hairs, and color, only slightly darker than a fresh rachis, suggest that the specimen is not ancient. Other botanical material included bits of chaff, probably derived from cereals; unidentifiable fragments of plant tissue, most of which were degraded (FIG. 9f); and a deteriorating fragment of wood. Bits of seed testa probably belong to the legume family, as indicated by one

fragment that displays a hilum (scar left from where a stalk connected the seed to the pod) (FIG. 9g) characteristic of legumes. A small mass of fine fibers and a thread in the bag may be derived from plants, such as flax (FIG. 9f).

The faunal material included a small hollow bone, possibly from a bird (FIG. 9h). Rodent droppings, roughly 4 to 6 millimeters long, were abundant and modern as per AMS dating (215 cal AD \pm 25) (FIG. 9i; Table 2). Insect carapaces, legs, and jaws were numerous (FIG. 9j). These may derive from grain storage pests. The most abundant insect was the spider beetle (FIG. 9k), recognizable because many examples were preserved with the thorax, abdomen,

ANSTO Code	Sample Type	MFA Museum No.	$\delta(^{13}\text{C})$ (‰)	Percent of Modern Carbon (pMC, 1 σ error)	Conventional Radiocarbon Age (years BP, 1 σ error)	Calibrated Age Ranges (cal BCE/cal CE, 95.4% CI)	Median Calibrated Age (cal BCE/CE)
OZY543	Plant matter including possible resinous pieces	OP.1.47.1662	-23.2±0.1	61.50±0.20	3,905±30	2469–2296 cal BCE (95.4%)	2392 BCE
OZY544	Plant matter including possible resinous pieces	OP.1.47.1662	-22.8±0.1	63.66±0.18	3,630±25	2127–2093 cal BCE (8.1%) 2041–1920 cal BCE (85.3%) 1915–1900 cal BCE (2.1%)	1992 BCE
OZY550	Rodent droppings	OP.1.47.1662	-23.7±0.2	97.37±0.25	215±25	1644–1684 cal CE (35.1%) 1735–1804 cal CE (53.4%) 1929–..... cal CE (7.0%)	1763 CE
OZY551	Grape seed	OP.1.47.1662	-25.8±0.1	97.80±0.22	180±20	1661–1693 cal CE (19.5%) 1726–1810 cal CE (56.6%) 1919–..... cal CE (19.3%)	1765 CE

TABLE 2: C14 dates from selected contents of bag MFA OP.1.47.1662.

and some legs intact. The beetle infests foodstuffs and has been found in mummies and archaeological settlement sites in Egypt.²⁶

One spider beetle was attached to a rodent dropping, apparently feeding on it at the time of death. Other rodent droppings bore holes that may have been dug by beetles, which might be a species known to tunnel in human feces and eat foodstuffs.²⁷ This species has not been recovered from archaeological sites,²⁸ but is the one found in Egypt today, suggesting that the spider beetles in the bag are modern, as does the beetles' association with the AMS-dated rodent droppings. Curiously, a great mass of spider beetles were embedded in a piece of the resinous material (FIG. 9m), suggesting that they were in a container with the resin when the material was soft enough to entrap the beetles, such as during the blistering hot days of Egyptian summers.

To ascertain the relationship of the material to the jar, samples of different materials were selected from the bag for radiocarbon dating (Appendix 1). The results revealed a 'mixed bag' of dates, with only Sample OZY543 returning the date 2469–2296 cal BCE (95.4%), which is coeval with a date in the 5th Dynasty. The other three samples were later, including two dating from the early modern era. The mixed dating of the samples from bag OP.1.47.1662 indicates that a significant amount, with the likely

exception of resin fragments with ceramic attached (FIG. 9b), does not belong to the jar and was collected in modern times.

DISCUSSION

As revealed by the case study of MFA 47.1662 and MFA OP.1.47.1662, considering the 'life cycle' of the jars is required when assessing possible ancient contents. MFA 47.1662 demonstrates, on the one hand, the difficulties of working with legacy data, and museum material and the nature of preserved residues on the other.

A general reconstruction of the object itinerary of combed jars in Egypt—from point-of-manufacture to the 21st century—helps segment ancient and modern interventions. These interventions are linked to the jars' changing purpose and semiotic journey. Various approaches are needed to examine the nature of cultural entanglement, the shifting use, circulation, meaning and symbolism, remains of the contents (if any), and the validity and complexity of the scientific results obtained from remaining residues, visible and microscopic. An object itinerary is thus proposed here for the early Old Kingdom, recognizing that in the later Old Kingdom, shifts in royal power mean that elite officials may have enjoyed more direct control and access to commodities from foreign expeditions resulting in different interventions. Moreover, the

Old Kingdom spans over 350 years; thus, an object itinerary for combed jars cannot be considered homogeneous for the duration of this era.

- (a) Starting with the clay raw materials, jars were made by local potters in workshops in the Byblos region as a specialized production for maritime transport to Egypt. This must have occurred through negotiation between Egyptian and Byblite elites and concomitant direction to, and experimentation by, local pottery workshops. Elsewhere in Lebanon, combed jars appear to have been made for local use and not traded between sites in the Central Levant; thus, the involvement of other centers remains to be established.²⁹ Once in the hands of this specialized production, the combed jar acquired a different purpose in that it was exclusively reserved for the Egyptian state. From its point of manufacture, it was a commoditized article of international trade and economic value, set apart from a local utilitarian function and with technically different properties. That the Egyptians did not request a distinctive shape and used an existing local type may stem from familiarity with two-handled jars from previous eras; it may also reflect a certain economy and efficiency in size and workshop production.³⁰ Between the Byblite producers and the Egyptian ‘purchasers,’ different perceptions of the jars were apparently underpinned by ‘deeply divergent perceptions of the value of the objects being exchanged,’ as will be seen below.³¹
- (b) Jars were filled and locally stoppered, then shipped by boat from Byblos with other commodities under the auspices of Egyptian agents acting on behalf of the king.³² Supply and shipping was facilitated by local Byblite suppliers and elites.³³ Once on the ship, a cultural reconstruction began at the hands of Egyptian agents, sailors, and possibly Byblite representatives.³⁴ Vessels assumed the identity of cargo, with the main priority being minimal breakage and safe delivery.
- (c) On docking at the Giza harbor, the cargo was probably received and disembarked with great pomp and ceremony. To Egyptian eyes, the strange pottery shape denoted non-Egyptian ‘otherness,’ hallmarking the exotic contents. Importantly, the fleet’s arrival signaled not only the success of the king’s expedition in material terms but also evidence of his divine triumph and domination over the forces of chaos, represented by the sea and unknown threats of ‘the foreign.’³⁵ Thus, the jars, while maintaining the aura of *exotica* owing to their shape and contents, became entangled in the ideology of kingship and reached the most visible and important stage of their cultural transformation.
- (d) At some point, the jar stoppers were removed and the primary contents decanted. Possibly, this was also accompanied by a ceremony. Empty jars may have been washed inside and out and remains of stoppers cleaned off, then stored for future use, possibly in the Treasury at Giza.
- (e) Having been ‘commissioned’ through their journey into royal hands, jars may have been reused more than once for ritual and ceremonial purposes or re-purposed for the palace economy. Each of these points involved the possibility of cleaning and reusing with different contents and resealing. This proposition helps explain the presence of combed jars in the Heit el-Ghurab worker’s settlement at Giza.³⁶ The use of such jars at HeG also suggests that its inhabitants were people of status in the pecking order of pyramid workers and officials, owing to access and use of foreign jars linked to activities of the divine king.³⁷ The rich provisioning of victuals for particular settlement areas also points to this status.
- (f) Occasionally, jars passed beyond the palace economy, evidenced by several jars in non-royal contexts.³⁸ One example is the jar from intact Grave 3209 of an unnamed person at Matmar (BM EA 63698), found with a small number of modest grave goods and dated to the late 5th–early 6th Dynasty.³⁹ The jar ‘escaped’ the palace economy into the common realm of the ‘unwritten dead.’⁴⁰ The jar is an outlier in terms of its final ownership, as most are found in elite tombs. The Matmar vessel is disconnected from its royal origins and must have been considered a great prize by the tomb owner and the family, having been repaired for burial. Possibly, it was gifted by a local elite as a reward for service or was at some point the product of robbing.
- (g) Finally, most extant jars passed into the hands of male high officials or their families for interment in tombs. Jars would have been visible to everyone in the funeral procession and may have played a role in the burial ritual.

Extensive robbing of many tombs means that the original location and position of the jars can only be conjectured; yet it appears that most were placed in the burial chamber (e.g., FIG. 6, 7, Table 3). This is the likely stage at which some jars were ‘killed.’ Jars, along with other burial goods, passed into the realm of the dead.

- (h) Ancient robbing disturbed many vessels: any contents may have been removed, vessels were shifted around the tomb, some may have been removed altogether; others were broken during robbing and left in fragments around the tomb and its environs. Through this activity, jars and any contents had a new value, that of a commodity capable of being exchanged for other goods.
- (i) Further robbing may have taken place during the 19th and 20th centuries AD. Jars were excavated by various missions in the 20th century and were fully or partially cleaned up in the field and photographed. Many were sent to overseas museums or placed in on-site storerooms and museums in Egypt. A number were restored. At this final stage, jars—particularly intact vessels—regained a different form of value through their age, rarity, as evidence of past human activity from ancient Egypt, and a tangible link to antiquity. A near-complete disassociation from the original place of manufacture is complete.

CONCLUSIONS

The preceding analysis demonstrates that unraveling the nature of imported liquid commodity imports during the Old Kingdom is a difficult task. To assess the contents and other aspects of imported jars, an object itinerary approach helps to examine the materiality of its manufacture and subsequent handling, the archaeological context, and modern interference. Analysis of contents thought to be from MFA 47.1662, including radiocarbon dating, demonstrates the complex archaeological questions and complications of legacy data in a museum context. All these elements inform the data obtained from multi-proxy analyses of the residues. A similar approach could be used with ceramic containers of any period.

At Giza, the absence of jar stoppers and contents on discovery suggests that at least some jars were interred empty or with a minimal deposit of loose material, perhaps representing a symbolic or

magical offering. Thus, rather than holding the original imported or even a secondary commodity, the jar itself could be the burial item: “the exchange [and its political and economic context] was the source of value.”⁴¹ It signaled the privilege and status of the owner and even the social control of the royal house.⁴² Their value as markers of status or social mobility indicated proximity to royal power, esteem, and access—real, imagined, or symbolic—to their exotic contents. Owning imported pottery was a social and political statement.

Due to their place in the palace economy, imported ceramic containers could continue in circulation beyond their initial arrival in Egypt and were likely washed out and used multiple times before interment. In their journey from Byblos to their ultimate destination in an elite tomb or royal establishment, the purpose and symbolism of the jars underwent a cognitive shift in the hands of the Egyptian consumers—from container to status item. The nature of cultural entanglement involved in this shift meant that while the jars were eventually embraced as funerary equipment, they never lost their ‘otherness.’ In fact, this quality was their appeal, a visual and symbolic reminder of proximity to the king and his divine qualities embodied in the projection of Egypt’s power beyond its borders, even if they bore little content.

APPENDIX 1: RESULTS OF RADIOCARBON DATING SAMPLES FROM MFA OP.1.47.1662

Due to the uncertainty regarding the date of the contents from MFA OP.1.47.1662, and the relationship of the material to jar MFA 47.1662, four different samples were selected and subjected to AMS radiocarbon dating at the Australian Nuclear Science and Technology Organisation (ANSTO) facility at Lucas Heights in Sydney, Australia.⁴³ Sample selection was based on the nature and quantity of each sample type so as to ensure material was left for future analysis.

Because of the nature and uncertainty of potential contamination sources, extensive pre-treatment was performed on all samples. Plant material, rodent droppings, and grape seeds were washed with acetone (45°C, 1hr) x2, methanol (45°C, 1hr) x2, thoroughly rinsed with high-purity water, and oven-dried at 60°C. Samples were then treated with 2M HCl (60°C, 1hr), 0.1M NaOH (RT, 1hr), 2M HCl (RT, 1hr), and rinsed thoroughly with high-purity water and oven-dried at 60°C.

Degraded plant material (i.e., dissolved with the methods used for plant material) was washed with acetone (45°C, 1hr) x2, methanol (45°C, 1hr) x2, thoroughly rinsed with high-purity water, and then oven-dried at 60°C. Samples were then treated with 2M HCl (60°C, 1hr), rinsed thoroughly with high purity-water and oven-dried at 60°C. All samples were then processed to graphite in the AMS chemistry laboratories.⁴⁴

Delta (13C) values relate solely to the graphite derived from the fraction that was used for the radiocarbon measurement. Sometimes, the delta (13C) of this fraction is not the same as that of the bulk material. Measurements are determined using EA-IRMS. Some delta (13C) values may not have an associated uncertainty due to the limited number of determinations. The Conventional Radiocarbon ages were rounded following Stuiver and Polach (1977). The definition of percent Modern Carbon and Conventional Radiocarbon age can also be found in this publication. The calibration of the conventional radiocarbon ages was performed against the latest international radiocarbon calibration curve for the northern hemisphere (IntCal20).⁴⁵ Calibrations of the two modern samples were performed against the Post-bomb atmospheric Northern Hemisphere Zone 2 Calibration curve.⁴⁶ All calibrations were performed using the OxCal 4.4 calibration software.⁴⁷

Results revealed wide variations in the dates of the four samples (Table 2). Sample OZY550 (rodent droppings) and OZY551 (grape seed) were identified as modern. In contrast, the third sample (OZY544, of plant matter) returned a date of 2151–2034 cal BCE (78.7% probability), placing it in the First Intermediate Period. This latter result is much later than the 5th Dynasty date of the tomb in which it was found. A fourth sample (OZY543, also of plant matter, with some resinous pieces) returned a date broadly consistent with the tomb. This and other similar resinous pieces, including

loose pieces attached to ceramic, likely belong to the original phases of the life-cycle of the jar. The other results suggest two possibilities, either the likely contamination of ancient material or that the contents of the bag were gathered together in modern times from several ancient and modern sources, which may have included ancient residues from the jar.

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TABLE 3: Summary of observations from the original field notes, registration, photographs, museum records, and observations made on the jars between November 2017 and July 2019. The Photo ID # refer to the image numbers recorded on www.gizapyramids.org; the original field records were also available on the site.

Museum no. / Field Registration no.	Pottery Type	Provenance (owner's name noted if preserved)	Date	Vessel Condition	Field Notes (www.gizapyramids.org)	Photo Observations (www.gizapyramids.org)
MFA 13.5638 / Reisner Field # 13-11-64	Combed jar	Western Cemetery Pit G 4240 A Sneferu-seneb (plundered)	Early 4th Dynasty	Body, neck, and rim mended from fragments with some pieces missing	No indication of contents or stopper (Photo ID # OR02_p035)	No indication of contents or stopper in vessel photo (Photo ID # C5384_NS)
MFA 13.5639 / 13-11-65	Combed jar	Western Cemetery Pit G 4240 A (plundered)	Early 4th Dynasty	In fragments	No indication of contents or stopper (Photo ID # OR02_p035)	No photos in archive
MFA 13.5671 / 13-11-106	Combed jar	Western Cemetery Pit G 4440 A, shaft (plundered)	Probably early-mid 4th Dynasty	Body mended from fragments; neck and rim intact	No indication of contents or stopper (Photo ID # OR02_p047)	No indication of contents or stopper in vessel photo (Photo ID # C5410_NS; Fig. 2a)
MFA 13.5672 / 13-11-107	Combed jar	Western Cemetery Pit G 4440 A, shaft (plundered)	Probably early-mid 4th Dynasty	Neck, rim, and shoulder mended from fragments; body missing	No indication of contents or stopper (Photo ID # OR02_p048)	No indication of contents or stopper in vessel photo (Photo ID # C5424_NS, left)
MFA 13.5673 / 13-11-108	Combed jar	Western Cemetery Pit G 4440 A, shaft (plundered)	Probably early 4th Dynasty	Body mended from fragments with some pieces missing; neck, rim, and shoulder missing	No indication of contents or stopper in field notes (Photo ID # OR02_p048)	No indication of contents or stopper in vessel photo (Photo ID # C5424_NS, right)
MFA 37.2729; Peabody 43-42-50/5887.43-42-50/5887.1 & 2 / 35-8-11	Combed jar	Western Cemetery Mastaba G 5020-Annex From top of mastaba and pit	4th Dynasty	Body mended from fragments with some pieces missing; neck and rim intact	No indication of contents or stopper (Photo ID # OR27_p1279)	No indication of contents or stopper in vessel photos (Photo ID # B8594_NS, right; # SC139372)
MFA 37.2725 / 35-8-8	Combed jar	Western Cemetery Mastaba G 5020-Annex From top of mastaba and pit	4th Dynasty	Body, neck, and rim mended from fragments with some pieces missing	No indication of contents or stopper (Photo ID # OR27_p1278)	No indication of contents or stopper in vessel photos (Photo ID # B8594_NS, left; # SC183712)
MFA 37.1319 / 34-6-17]	Combed jar	Eastern Cemetery Pit G 7330 A, debris of pit (plundered)	4th Dynasty	Body mended from fragments with some pieces missing; neck and rim intact	No indication of contents or stopper (Photo ID # OR25_p1216)	No indication of contents or stopper in vessel photos (Photo ID # C13432_NS; # C13433_NS; # SC183702)
MFA 13.5593 / 13-10-29	Combed jar	Western Cemetery Pit G 4340 A, debris in shaft (plundered) Pottery found at the bottom of Shaft G 4340 A and in the burial chamber, precise findspot of vessel not stated	4th Dynasty	Body mended from fragments with some pieces missing; neck and rim intact	No indication of contents or stopper; "burnt black inside" but this is crossed out and "with grey interior" is written above (Photo ID # OR02_p007; OR02_p008)	No indication of contents or stopper in vessel photo (Photo ID # B2092_NS, bottom left)
MFA 20.1881 / 14-1-82	Combed jar	Western Cemetery Pit G 4530 A (plundered) Pottery found at the bottom of Shaft G 4530 A and in the burial chamber, precise findspot is not stated	4th Dynasty-early 5th Dynasty	Body mended from fragments with some pieces missing; neck and rim intact	No indication of contents or stopper (Photo ID # OR02_p087)	No indication of contents or stopper in vessel photo (Photo ID # C5578_NS)

Museum no. / Field Registration no.	Pottery Type	Provenance (owner's name noted if preserved)	Date	Vessel Condition	Field Notes (www.gizapyramids.org)	Photo Observations (www.gizapyramids.org)
MFA 19.1456 / 14-1-10	Combed jar	Western Cemetery Pit G 4630 A chamber Medew-nefer (plundered)	Late 4th-early 5th Dynasty	Body and neck intact; part of rim missing	No indication of contents or stopper (Photo ID # 0R02_p069; # 0R02_p070)	No indication of contents or stopper in excavation photo (Photo ID # C5486_NS) or vessel photos (Photo ID # C5518_NS; SC139330)
MFA 20.1889 / 14-1-14	Combed jar	Western Cemetery Pit G 4630 A shaft (plundered)	Late 4th-early 5th Dynasty	Body mended from fragments with some pieces missing; neck intact with part of rim missing	No indication of contents or stopper (Photo ID # 0R02_p069; # 0R02_p070)	No indication of contents or stopper in vessel photos (Photo ID # C5547_ _ NS; # SC139340)
MFA 20.1914 / 14-3-67	Combed jar	Western Cemetery Pit G 4620 A of Kanefer, probably from burial chamber, found in fragments (plundered)	5th Dynasty	Egyptian imitation. See Sowada 2018, <i>Bulletin de liaison de la céramique Égyptienne</i> 28, 117–122.	Not seen	No indication of contents or stopper in vessel photos (Photo ID C5752_NS) No contents visible on MFA photo
MFA 47.1661 / 32-12-18	Combed jar	Western Cemetery Pit G 2140 A, debris of chamber (plundered) Found in burial chamber at bottom of shaft	Mid 4th-early 5th Dynasty	Body intact; part of neck and rim missing	No indication of contents or stopper (Photo ID # 0R24_p1158)	Heavy accretions on exterior visible on vessel photos (Photo ID # B9313_NS, bottom middle right; # SC139375)
MFA 20.1903 / No number	Combed jar	Western Cemetery Pit G 1031 A (intact tomb)	4th-early 5th Dynasty (?)	Body intact but with 'kill hole' and heavy accretions on upper part; neck intact but part of rim missing	No field notes in archive	Possible residues on upper body but no stopper visible in vessel photos; neck and rim completely cleaned (Photo ID # C10232_OS, # C13023_ _ OS; # 13024_OS; # 13031_OS; # C5375_NS; SC139344)
MFA 13.5132 / 13-1-506	Combed jar	Western Cemetery Pit G 2175 B Khnun-nefer (plundered?)	Late 4th-5th Dynasty	Vessel seen amidst coffin debris in exca- vation photo with broken neck nearby (Photo ID # C3268_NS) but mended and in place in vessel photo (Photo ID # B1682_NS); now in fragments	No indication of contents or stopper (Photo ID # 0R01_p076)	No indication of contents or stopper in excavation photo (Photo ID # C3268_NS) or vessel photo (Photo ID # B1682_NS, bottom left)
MFA 47.1662 / 40-57	Combed jar	Western Cemetery Pit G 2350 L (= G 5290) (chamber plundered) Vessel found lying on its side inside sarcophagus near body	5th Dynasty	Body and neck intact; part of rim missing	'contains dried oil, shiny black color cf. Lucas analysis of 32-12-18'; no indication of stopper (Photo ID # 0R30_p1590)	No indication of contents or stopper in excavation photo (Photo ID # B9276_NS; Fig. 8) or vessel photos (Photo ID # B9294_NS, bottom middle; # SC139376)
MFA 37.2724 / 35-7-41	Combed jar	Western Cemetery Pit G 2370 B Senedjem-ib Inty Precise findspot not known; field notes mention 'broken pottery' near sarcophagus but no other detail	Mid-late 5th Dynasty	Body, neck, and rim mended from fragments with some pieces missing	No indication of contents or stopper (Photo ID # 0R27_p1274)	No indication of contents or stopper in vessel photos (Photo ID # C13649_NS; SC183711)
MFA 37.2723 / 35-7-41	Combed jar	Western Cemetery Pit G 2387 A, main shaft of G 2385, chamber	6th Dynasty	Body mended from fragments; neck and rim not visible	'plaster (gypsum) jar cover, cover not complete with pencil drawing; no indication of contents (Photo ID # 0R27_p1266)	Broken plaster stopper in place in vessel photos (Photo ID # C13647_ _ NS; # SC183710)

Museum no. / Field Registration no.	Pottery Type	Provenance (owner's name noted if preserved)	Date	Vessel Condition	Field Notes (www.gizapyramids.org)	Photo Observations (www.gizapyramids.org)
MFA 13.2928a-b / 12-12-573	Combed jar & stopper	Western Cemetery Pit G 2381 A, burial chamber Impy, also known as Mepthah- ankhmerye (intact tomb)	Late 6th Dynasty, reign of Pepy II	Body intact; neck broken off	'broken off at neck in antiquity fibrous ball in neck small amt (sic) organic matter' (Photo ID # OR01_p072). Organic matter now numbered MFA OP1.13.2928.	Plaster stopper intact but not at- tached to vessel in excavation photo (Photo ID # B1612_NS, Fig. 2b, 5-6); broken plaster stopper in place in vessel photo (Photo ID # B1680_NS, right)
MFA 13.2929 / 12-12-569	Combed jar	Western Cemetery Pit G 2381 A, burial chamber (intact tomb) Vessel found standing alongside coffin	Late 6th Dynasty, reign of Pepy II	Body, neck, and rim intact	No indication of contents or stopper (Photo ID # OR01_p071). Organic matter now numbered MFA OP1.13.2929 may be misnumbered and actually belong to MFA 13.2930 (below).	No indication of contents or stopper in vessel photos (Photo ID # B1681_ NS, right; SC183586 Fig. 6)
MFA 13.2930 / 12-12-571	Combed jar	Western Cemetery Pit G 2381 A, burial chamber (intact tomb) Presumably found alongside coffin	Late 6th Dynasty, reign of Pepy II	Body, neck, and rim intact	'contains organic matter' (Photo ID # OR01_p072); no indication of stopper. Organic matter now numbered OP1.13.2929 may be misnumbered and actually belong to this vessel.	Possible remains of a leather stopper on neck (Photo ID # B1612_NS, Fig. 6 left) but no indication of contents in excavation photo or vessel photo (Photo ID # B1681_NS, left, Fig. 3a)
MFA 13.2931 / 12-12-572	Combed jar	Western Cemetery Pit G 2381 A, burial chamber (intact tomb) Vessel found standing alongside coffin	Late 6th Dynasty, reign of Pepy II	Body intact; neck and rim not visible	'large lime-plaster stopper. Unopened.' (Photo ID # OR01_p072)	Plaster stopper intact and in place in excavation photo (Photo ID # B1612_NS) and vessel photos (Photo ID # B1680_NS, left; # SC183588, Fig. 6)
MFA 13.2932 / 12-12-570	Combed jar	Western Cemetery Pit G 2381 A, burial chamber (intact tomb) Vessel found standing alongside coffin	Late 6th Dynasty, reign of Pepy II	Body intact; neck and rim not visible	'large mud stopper sealed with cyl. seal' (Photo ID # OR01_p072)	Nile mud stopper intact and in place in excavation photo (B1612_NS) and vessel photos (Photo ID # C3363_NS; # SC183589)
MFA 20.1899 / 13-10-25	One- handled jug	Western Cemetery Pit G 4340 A Pottery fragments found amongst debris in shaft and in burial chamber; precise findspot is not stated	4th Dynasty	Body and neck mended from fragments with some pieces missing; rim and top of handle missing	No indication of contents or stopper (Photo ID # OR02_p005; # OR02_p006)	No indication of contents or stopper in vessel photos (Photo ID # B2092_ NS, bottom right; # SC139342)
MFA 13.5615 / 13-10-68	One- handled jug	Western Cemetery Pit G 4340 A Pottery fragments found amongst debris in shaft and in burial chamber; precise findspot is not stated	4th Dynasty	Body mended from fragments, in two parts; neck intact but rim missing	No indication of contents or stopper (Photo ID # OR02_p018; # OR02_p019)	No indication of contents or stopper in vessel photo (Photo ID # B2092_ NS, top left & middle)

Museum no. / Field Registration no.	Pottery Type	Provenance (owner's name noted if preserved)	Date	Vessel Condition	Field Notes (www.gizapyramids.org)	Photo Observations (www.gizapyramids.org)
MFA 20.1904 / No number	One-handed jug with trefoil mouth	Western Cemetery Pit G 1233, Annex A (intact burial)	Early–mid 4th Dynasty	Body intact but with 'kill hole' on lower part	No indication of stopper or contents in excavation photo (Photo ID # A10923_OS) but white accretions on neck, rim, and shoulder visible in original vessel photos (Photo ID # C13022_OS; # C13032_OS) suggest that one was present. Vessel now heavily cleaned (Photo ID # SC125197)	No indication of stopper or contents in excavation photo (Photo ID # A10923_OS) but white accretions on neck, rim, and shoulder visible in original vessel photos (Photo ID # C13022_OS; # C13032_OS) suggest that one was present. Vessel now heavily cleaned (Photo ID # SC125197)
MFA 20.1905 / No number	One-handed jug	Western Cemetery Pit G 1233, Annex A (intact burial) Found west of coffin lying on its side	Early–mid 4th Dynasty	Body intact but with 3 'kill holes' on upper and lower body (Photo ID # C13026_OS); neck intact but part of rim missing	No field notes in archive	No indication of stopper or contents in excavation photo (Photo ID # C11399_OS) but traces of white plaster around the neck and handle in vessel photos (Photo ID # C13027_OS; # SC139345) suggest that one was present.
MFA 33.721 / 32-12-13	One- handed jug	Western Cemetery Pit G 2170 A (plundered) Vessel found in debris of chamber	Late 4th to early 5th Dynasty	Body mended from fragments with some pieces missing; neck, rim and top of handle missing	No indication of contents or stopper (Photo ID # OR24_p1157)	No indication of contents or stopper in vessel photos (Photo ID # A7065_01 NS, middle right; # SC139360)

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NOTES

- ¹ Reisner and Smith 1955, 74–76; Helck 1971, 28–34; Esse 1991, 110–124; Stager 1992; Marcus 2002; Sowada 2009, 154–182; Bárta et al. 2009, 243–271; Knoblauch 2010; Thalmann and Sowada 2014; Badreshany et al. 2020. It is assumed that such jars were imported during the 3rd Dynasty, but none have survived.
- ² Sowada, Ownby and Wodzińska 2020; Sowada, Ownby and Bárta, 2021; Badreshany et al. 2022.
- ³ Badreshany et al. 2020.
- ⁴ Sowada, Ownby and Bárta 2021.
- ⁵ Sowada 2009, 64–65, Fig. 10; Reisner and Smith 1955, 75; Knapp 1991, 30; Sowada 2009, 62, Fig. 9 Pl. 13, MFA 47.1661; Lucas and Harris 1989, 319–320; Serpico and White 1996, 132–133; Hassan 1936, 145–147.
- ⁶ The results of the analyses are being prepared for publication, led by Dr. Margaret Serpico (University College London) and Dr. Sophia Aharonovich (Australian Catholic University) as part of ARC Project FT170100288.
- ⁷ Reisner and Smith 1955, 73–76; Helck 1971, 28–34; Thalmann and Sowada 2014, 369–374; Sowada 2009, 55–74, 154–182.
- ⁸ Reisner 1942; Reisner and Smith 1955; www.gizapyramids.org accessed 23 April 2020.
- ⁹ For curatorial details, see Sowada 2009, 71 [55], Fig. 12, Pl. 7. The modern treatment was observed on examination of the jug by the writer in July 2019.
- ¹⁰ Reisner and Smith 1955, pl. 52g, d (MFA 13.2932); Brunton 1948, 29, 45, pl. 37; Bárta et al. 2009, 243–271. Two sealed jars from Tomb G 2381 A, MFA 13.2831 (weighed 7.27 kg) and MFA 13.2932 are heavier than jars from the same tomb without stoppers (e.g., MFA 13.2929 = 5.188 kg). The weight of the sealed jars indicates that the contents are still inside (Sowada 2009, 162). The identity of the contents is not known.
- ¹¹ Bárta et al. 2009, 349, Pl. 32.5; Sowada, Ownby and Bárta 2021, Fig. 10a. The underlying white coating may represent the original jar sealing.

- ¹² Brunton 1948, 29, 45, pl. 37; Seidlmayer 1990, Fig. 81; Sowada 2009, 83 [95], Fig. 14.
- ¹³ The field records and original photographs in Table 3 were examined online by the writer in 2019, but the images could not be viewed online at the time of writing due to a web software issue.
- ¹⁴ See, for example, the broken plaster stopper of jar MFA 37.2723 from Giza Tomb G 2387 (Sowada 2009, Pl. 5[47]).
- ¹⁵ See also Figs 3, 5, and 7 in Sowada, Ownby and Wodzinska 2020.
- ¹⁶ Reisner and Smith 1955, 76; Sowada 2009, 68–69 and references.
- ¹⁷ Evidence of multiple plaster stoppers may represent reuse in Lebanon prior to export. We are grateful to Dr. Christian Knoblauch (University of Swansea) for this observation.
- ¹⁸ Reisner 1915, no. 76; Reisner 1942, fig. 299, Pl. 63d; Reisner and Stevenson Smith 1955, 76; Sowada 2009, 60–61, Fig. 9, Pl. 2.
- ¹⁹ Formerly Tomb G 2350 L; for the jar, see Sowada 2009, 65–66 and references therein.
- ²⁰ Some combed jars are small and could have been removed: jar MFA 47.1661 is only 27.6 cm high, see Sowada 2009, 62, pl. 3[25]. Reisner also reported that sherds of several combed jars were found in street debris outside the mastabas, see Reisner 1942, 462–465, 477.
- ²¹ Sowada, Ownby and Wodzinska 2020; Reisner and Smith 1955, 76, Fig. 97, Pl. 52f; Sowada 2009, 65–66 [39], 171.
- ²² A sample of the contents from MFA 47.1661 was analyzed by A. Lucas and found to be ‘true resin of the coniferous tree’ (Reisner and Smith 1955, 75; Lucas and Harris 1989, 320).
- ²³ Archaeological excavations were wound back in 1940 as war pressed in. Reisner died in 1942, and by 1947, the region was still recovering from World War 2.
- ²⁴ Sowada and Wetterstrom decided it was not worthwhile to continue sorting the contents after AMS dating determined that only one of the submitted samples was within the age range of the jar. However, Dr. Wetterstrom assessed the unsorted contents on the final MFA visit and saw no materials other than what had been already identified.
- ²⁵ Murray 1992, 10–11. The AERA Giza Expedition reported the discovery of olive wood charcoal dated to the 4th Dynasty (Gerisch, Wetterstrom and Murray 2008, 3). Olive wood or olive fruit is not otherwise attested in Old Kingdom Egypt, although there has been speculation based on the textual record (e.g., Krauss 1999).
- ²⁶ Panagiotakopulu 2001, 1238.
- ²⁷ Panagiotakopulu 2001, 1238.
- ²⁸ Panagiotakopulu 2001, 1238.
- ²⁹ Badreshany et al. 2022.
- ³⁰ This can be contrasted to the imported bottle shape from Naqada IIIA1 tomb U-j, which have few direct parallels in the Levantine archaeological record and appear to have been ‘made to order’ for the tomb owner: see, for example, Ware Group 1 in Hartung 2001, 71–125; Hartung et al. 2015, 298–299.
- ³¹ Appadurai 2013, 12.
- ³² See, for example, the ‘seal-bearer of the god [ie king], Iny’: Marcolin and Diego Espinel 2011.
- ³³ See, for example, the Levantine-Egyptian relationships discussed in Biga and Steinkeller 2021.
- ³⁴ Appadurai 2013, 29.
- ³⁵ On this, see the row of foreign jars depicted on the causeway of Sahure: Borchardt 1910–13: Pl. 3.
- ³⁶ Lehner 2015, 413–315; 455–460; Sowada et al. 2020.
- ³⁷ Lehner 2015, 407–411.
- ³⁸ See jars from Ballas and sherds from Elephantine, summarised in Sowada 2009, 84–85. Jars found outside the capital zone of Abu Rawash to Dashur tend to date to the mid-Fifth to Sixth Dynasty. See also n. 12.
- ³⁹ For curatorial information and references, see Sowada 2009, 83, Fig. 14.
- ⁴⁰ Richards 2005, 134, quoting S. Quirke.
- ⁴¹ Appadurai 2013, 56.
- ⁴² Appadurai 2013, 57.
- ⁴³ Fink et al. 2004.
- ⁴⁴ Procedure as per Hua et al. 2001.
- ⁴⁵ Reimer et al. 2013.
- ⁴⁶ Hua, Barbetti, and Rakowski 2013.
- ⁴⁷ Ramsey 2009.