

# RADIOCARBON EVIDENCE FOR NEW KINGDOM TOMBS: SEDIMENT 254 AND 246

By Henning Franzmeier,\* Felix Höflmayer,\*\* Walter Kutschera\*\*\* and Eva M. Wild\*\*\*

## 1. INTRODUCTION<sup>1</sup>

Although the radiocarbon method was originally developed using archaeological objects from Egypt,<sup>2</sup> up until recently radiocarbon dating has not been used extensively in the Nile Valley, leaving the dating of archaeological contexts mainly reliant on inscriptions bearing royal names or archaeological material – usually pottery. The most substantial radiocarbon sequence for a single site was established for Tell el-Dab<sup>a</sup>, ancient Avaris, in the Eastern Nile Delta; although still unpublished, preliminary reports suggest a substantial difference between archaeological and scientific dates of up to ~120 years.<sup>3</sup> Further data comes from a recently published project on Egyptian chronology and radiocarbon dating.<sup>4</sup> From this, over 200 new measurements for dynastic Egypt proved the reliability of the historical chronology as outlined by Kenneth Kitchen,<sup>5</sup> although a slightly earlier start for the New Kingdom seems to be possible (the accession date for Ahmose, based on the New Kingdom model published by Christopher Bronk Ramsey and colleagues, falls between 1566 and 1552 for 1 $\sigma$  and 1570 and 1544 for 2 $\sigma$ ).<sup>6</sup> Furthermore, the testing of samples of known age from the 19<sup>th</sup> century AD (short-lived plants) suggests a regional offset for radiocarbon dates of  $+19 \pm 5$  radiocarbon years that has to be considered when working with radiocarbon data in Egypt.<sup>7</sup>

Still, as most archaeological contexts do not provide a clear link to the historical chronology, contexts have to be dated by material culture in general, usually by pottery. However, as the current understanding of pottery development and dating in Egypt has never been checked scientifically, radiocarbon data for archaeological contexts containing diagnostic pottery are of considerable importance not only for the context being dated, but also for linking material culture to absolute dates.

In this paper we present new radiocarbon determinations from two tombs of the cemetery of Sedment (tomb 254 and 246). We selected tombs containing Cypriote pottery, as the date of the first appearance of certain Cypriote wares (e.g. White Slip, Base Ring, Red Lustrous Wheel-Made Ware) often provides key-arguments for dating the context proper, as well as for discussions on absolute chronology and archaeological synchronisms throughout the Eastern Mediterranean. The radiocarbon dating was done at the *Vienna Environmental Research Accelerator* with generous support from the SCIEM 2000 project. Calibration and modelling was undertaken using the OxCal 4.1 software with resolution = 1 and the INTCAL09 calibration curve.<sup>8</sup>

## 2. THE SITE OF SEDMENT

Sedment was excavated several times between 1891 and the 1990s.<sup>9</sup> The most extensive work

\* Freie Universität Berlin.

\*\* Deutsches Archäologisches Institut, Orient-Abteilung.

\*\*\* Universität Wien, Fakultät für Physik / Isotopenforschung.

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McNamara (Ashmolean Museum, Oxford) and Karen Exell (The Manchester Museum) for their great help in finding objects and their generous permission to publish the objects.

<sup>2</sup> ARNOLD & LIBBY 1949.

<sup>3</sup> BIETAK & HÖFLMAYER 2007, 14 fig. 1.

<sup>4</sup> BRONK RAMSEY *et al.* 2010.

<sup>5</sup> KITCHEN 2000.

<sup>6</sup> BRONK RAMSEY *et al.* 2010, Supporting Online Material.

<sup>7</sup> DEE *et al.* 2010.

<sup>8</sup> BRONK RAMSEY 1995; BRONK RAMSEY 2009; REIMER *et al.* 2009.

<sup>9</sup> NAVILLE 1894; CURRELLY 1905; PETRIE & BRUNTON 1924; GALAL ABD EL-FATTAH 1999.

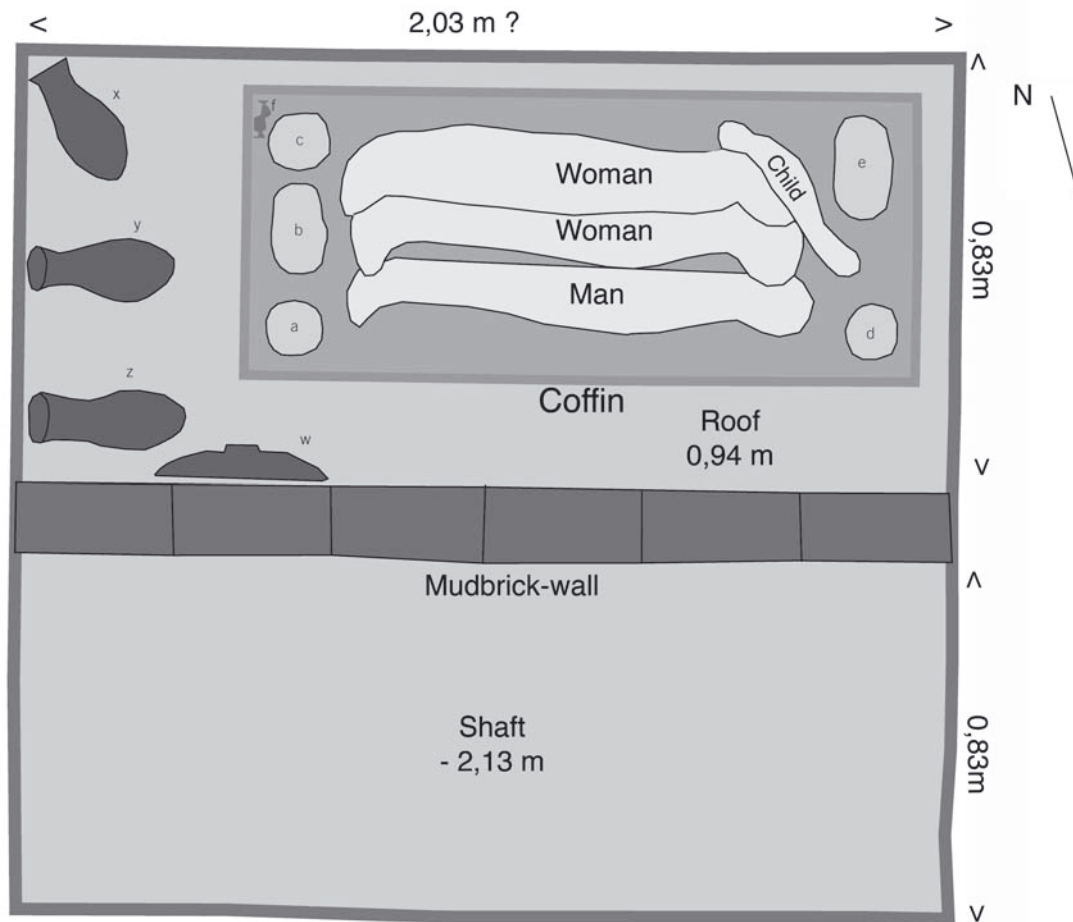


Fig. 1 Plan of tomb 254 after sketch on tomb card

took place in the winter of 1920/21 under the direction of Flinders Petrie and Guy Brunton. Within approximately four months they excavated well over 1000 tombs, the highest recorded tomb number being 2253.<sup>10</sup> The tombs are spread over a wide area of approximately 4 km<sup>2</sup> and cover almost every period of ancient Egyptian history, ranging from Dynasty 1 down to the Coptic period. About 280 tombs can be dated to the New King-

dom.<sup>11</sup> Both tombs from which organic samples for radiocarbon dating have been obtained were found in Cemetery A, an area in the north of the site adjacent to various other cemeteries that can be dated mainly to the New Kingdom.<sup>12</sup>

### 2.1. Sedment tomb 254<sup>13</sup>

Tomb 254, located within Petrie's Cemetery A at Sedment, contains four interments and represents

<sup>10</sup> This is the highest number on a tomb card preserved in the archives of the Petrie Museum of University College London. There is reason to assume that not all numbers were used as different sequences had been in use for the different cemeteries. Nevertheless there is evidence for well over 1000 tombs from tomb cards and notebooks.

<sup>11</sup> A reassessment of these tombs is currently underway as the PhD thesis of Henning Franzmeier at the Freie Universität Berlin.

<sup>12</sup> See PETRIE & BRUNTON 1924, pls. 90 and 85 for a general overview. A plan of Cemetery A can be found on pl. 86.

<sup>13</sup> A complete list of all known objects can be found as an appendix to this article.



Fig 2 Finds from tomb 254 and 53 a) leather bag shaped flask from tomb 254 (Ph E 15426); b) Kohl-pot Ph E.17680 a-b; c) calcite-alabaster kohl-tube (Ph E.15853); d) BR I juglet (Ph E.15425) e) Mycenaean jug, Furmark shape 114 from tomb 53 (OA 1921.1436A; f) leather bag shaped flask from tomb 53 (OA 1921.1436E)

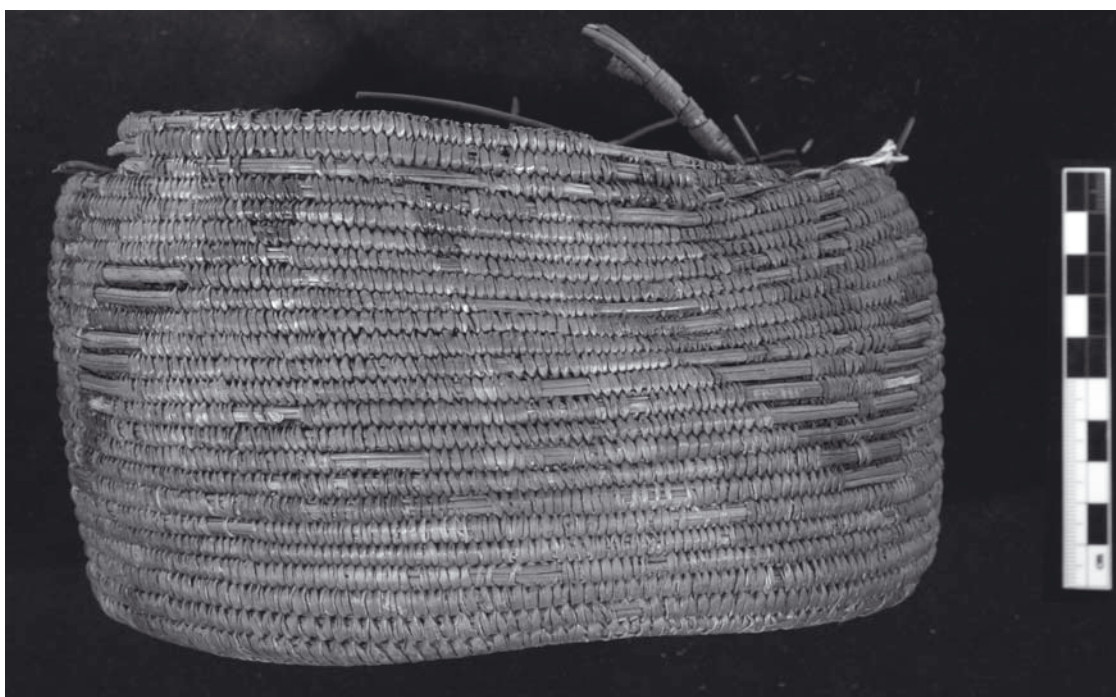


Fig 3. Basket Ph E. 15428 from which the sample has been taken

one of the very few undisturbed 18<sup>th</sup> Dynasty burials at this site.<sup>14</sup> At the bottom of a shaft about 2.15m deep, a loculus had been separated by means of a small wall made of sun-dried mud-bricks. In this small chamber four persons – two female, one male, and one infant<sup>15</sup> – had been laid to rest within a rectangular wooden coffin with gabled lid.<sup>16</sup> Outside the coffin, four pottery vessels were discovered. According to the sketches three of them were ovoid jars and one was a dish with a flat base.<sup>17</sup>

Except for some jewellery that was placed directly on the body of the deceased, all finds within the coffin were stored in five baskets made of

plant fiber (Ph E. 14279, 14280 and Ph E.15427–15429, Fig. 3); altogether 17 objects. Amongst them were five BR I juglets (Ph E.15421–15425, Fig. 2d) and an Egyptian vessel in the shape of a leather bag (Ph E.15426, Fig. 2a). This vessel bears traces of Cypriote influence, as its neck and handle imitate BR I features, including two raised straps around the neck where the handle is attached. The fabric is fine II.A marl and the vessel is covered with a thick red slip that was finely burnished. The second Egyptian vessel is a pilgrim bottle of finely polished red slipped ware, similar to the previously mentioned piece (Ph E.14337). Furthermore, two travertine kohl-pots

<sup>14</sup> PETRIE & BRUNTON 1924, 24. The whole group has also been discussed *in extenso* by Robert Merrillees (MERRILLEES 1974).

<sup>15</sup> As the state of preservation or mummification of the bodies is not known, the sex determination should not be taken as absolutely secure.

<sup>16</sup> This coffin had not been identified by MERRILLEES 1974. It is the only object that is not in the University of Pennsylvania Museum of Archaeology and Anthropology in Philadel-

phia, except for those for which there is no evidence at all. It is, in fact, in the Egyptian Museum Cairo and has the number TR 12.5.21.4.

<sup>17</sup> These vessels are not known to the authors and it is very possible that they were left on site by Petrie. Egyptian archaeologists re-excavating in the 1990s found a ‘cache’ with objects Petrie had left (GALAL ABD EL-FATTAH 1999, 121–122, endnote 1).

(Ph E. 15850 and Ph E.17680 a–b, Fig. 2b),<sup>18</sup> one travertine double kohl-tube (Ph E.15853, Fig. 2c)<sup>19</sup> and one wooden double kohl-tube (Ph E. 15556) were found. This tomb can therefore be placed at the pivotal point when kohl-tubes started to replace kohl-pots, usually assumed to have taken place in the reign of Thutmose III,<sup>20</sup> although this assumption can be traced back to Petrie and has not been reviewed recently.<sup>21</sup> Two caskets were also amongst the finds, one of them of a very unusual type with a gabled lid.<sup>22</sup> Last but not least, one wooden comb of a typical New Kingdom type (Ph E.15439) and three travertine vessels were found, as well as one bowl, one footed vase and one dipper juglet. While the bowl and footed vase seem to be in line with the rest of the assemblage<sup>23</sup> (Ph E.14241 and 14270), the dipper juglet is a very rare type in Egypt. Robert Merrillees has convincingly shown that this vessel was already damaged when it was placed in the tomb (Ph E.16138)<sup>24</sup> and the rather early date for this type (Middle Kingdom until the 18<sup>th</sup> Dynasty), seems to support this interpretation.<sup>25</sup>

The jewellery that was found on the central body consists of two necklaces and possibly a bracelet; one of them made of steatite, jasper and glass beads (Ph E. 15787), the other made of carnelian, jasper and gold beads (Ph E.15788). The most precious object is the bracelet, which consists of a row of golden *nfr*-signs (Ph E. 15789). The whereabouts of finger-rings and a child's bangle mentioned on the tomb card are not known.

No epigraphic material has been found in the tomb and therefore we have no written information concerning the four buried people or any possible date. However, from an archaeological point of

view it is important to stress that all four persons were certainly buried at the same time, and that there is no evidence for any later use, as is often common in New Kingdom tombs. This conclusion can be drawn from the fact that all bodies and all the objects were found within the coffin and in an orderly fashion.<sup>26</sup> There is also no evidence for any later use of the tomb as a whole, as is also often common in New Kingdom tombs.<sup>27</sup>

Based on the material culture, a date in the Thutmosid period or shortly afterwards seems likely.<sup>28</sup> BR I pottery makes its first appearance in Tell el-Dab'a not earlier than Str. C/3, dated to the reign of Thutmose III,<sup>29</sup> and also the kohl-pots are of a generally early 18<sup>th</sup> Dynasty type.<sup>30</sup> Without the actual objects it is not possible to date the pottery from outside the coffin exactly, but the types in general are consistent with a Thutmosid date. This holds true for the ovoid vessels as well as the bowl with a flat base.

For radiocarbon dating, samples were taken from two of the baskets found in the coffin (Ph. E 15428a–b (Fig. 3) and 15429a–b) and submitted to the Vienna Environmental Research Accelerator. Both samples yielded very similar <sup>14</sup>C-ages (VERA-5475: 3170 ± 30 yr BP; VERA-5476: 3190 ± 40 yr BP). As it can be assumed that both baskets represent the same date (within a few years) both results have been combined using the R\_Combine function of Oxcal 4.1. Furthermore the radiocarbon age has been corrected by +19 ± 5 <sup>14</sup>C-years using the function Delta\_R, to account for the observed offset for the Nile Valley as argued by Mike Dee and colleagues.<sup>31</sup> The calibrated age for the combined samples ( $\chi^2$ -test: df=1 T=0.2 (5% 3.8)) falls with 3.4 % probability

<sup>18</sup> Ph E.15850 is type 163 after ASTON 1994, 147. PhE.17680a-b is somewhere in between types 163 and 164 after ASTON 1994.

<sup>19</sup> ASTON 1994, 149 type 168. Note that the published drawing is not one of the vessels from Sedment, even though it is given as the only example for this type.

<sup>20</sup> ASTON 1994, 149 type 168; PULAK in: ARUZ *et al.* 2008, 338.

<sup>21</sup> PETRIE 1927, 28; PETRIE 1937, 10. That this assumption is indeed not fully valid can be shown by the tomb Sedment 1810, that contained kohl-pots and a scarab inscribed for Amenhotep II (see below). There is also evidence that kohl-tubes were already in use prior to the reign of Thutmose III (see MERRILLEES 1968, 107).

<sup>22</sup> The casket PhE 14198 has been recently discussed *in extenso* in BUSCH 2010, 226 cat.-no. V4.

<sup>23</sup> Types 180 and 173 respectively after ASTON 1994, 153 and 151.

<sup>24</sup> MERRILLEES 1974, 28, fig. 16.

<sup>25</sup> SPARKS 2007, 35, fig. 9.4. See also 303, cat.-no. 292 for an example from Tell el-Ajjul.

<sup>26</sup> MERRILLEES 1974, 19 came to the same conclusion.

<sup>27</sup> See for example the so-called tomb of Maket in Kahun that Flinders Petrie had excavated 30 years before (PETRIE 1891, 21–22)

<sup>28</sup> Phase XVIII B according to MERRILLEES 1968, 64.

<sup>29</sup> BIETAK & HÖFLMAYER 2007, 18 fig. 4.

<sup>30</sup> ASTON 1994.

<sup>31</sup> DEE *et al.* 2010.



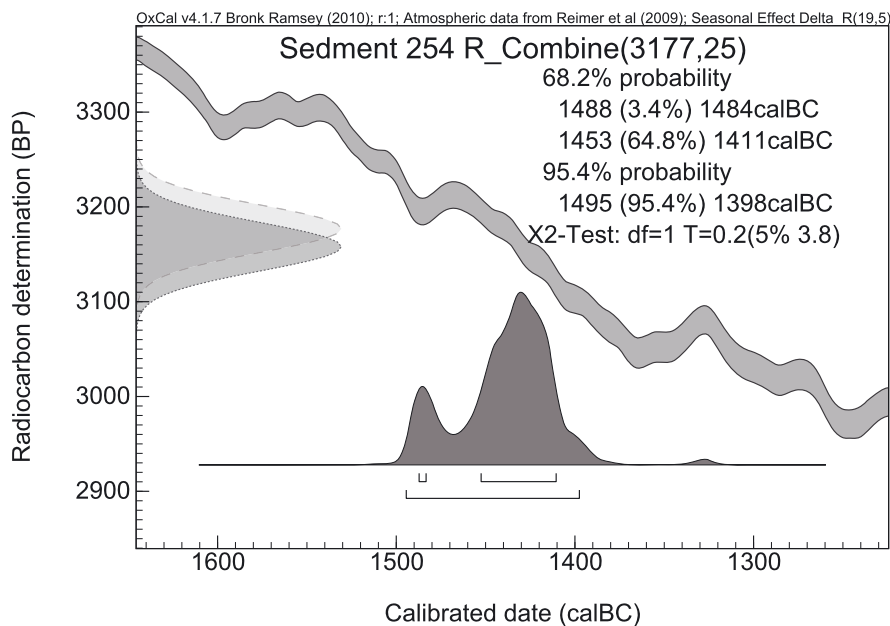


Fig. 4 Calibrated date range for combined samples VERA-5475 and VERA-5476 from basket PHe. 15428

between 1488 and 1484 BC, and with 64.8 % probability between 1453 and 1411 BC; or with 95.4 % probability between 1495 and 1398 BC (Fig. 4). A date during the reign of Thutmose III or shortly thereafter is therefore also confirmed by the radiocarbon data. Based on the New Kingdom chronological model published by Christopher Bronk Ramsey and colleagues, the start of Thutmose III's reign can be dated between 1494 and 1483 BC while the beginning of the reign of Amenhotep II can be dated between 1441 and 1431 BC.<sup>32</sup> The scientific date agrees well with the archaeological estimation and shows that at least in the mid-18<sup>th</sup> Dynasty there is no discernable difference between radiocarbon data and dating based on material culture in Egypt.

Regarding the radiocarbon data of tomb 254, another burial from Sedment is of considerable interest and should be mentioned here. Burial 1810, located within Petrie's Cemetery G,<sup>33</sup> contained a comparable assemblage of grave goods: seven ceramic vessels, all of similar types as found in tomb 254;<sup>34</sup> a basket containing two kohl-pots,<sup>35</sup> one wooden kohl-tube;<sup>36</sup> a BR I juglet;<sup>37</sup> a footed vase of calcite alabaster;<sup>38</sup> and a small wooden box with a scarab and a ring,<sup>39</sup> were placed beside a wooden coffin similar to the one from Sedment 254 (Fig. 5a–f). The ring's plaque depicts the king as a sphinx trampling his enemies and mentions the name of Amenhotep II, providing a *terminus post quem* for this burial. The approximate contemporaneity of both tombs is not only suggested

<sup>32</sup> BRONK RAMSEY *et al.* 2010, Supporting Online Material.

<sup>33</sup> PETRIE & BRUNTON 1924, 24, pl. 89, square Je.

<sup>34</sup> As is the case with the vessels from tomb 254, they are not held by any museum to my knowledge. They comprise of one bowl and five ovoid jars, one of them with two black horizontal lines and a storage vessel with a straight neck and a sharp bend halfway down the body. For the development of this type see SEILER 2005, 150 and Faltafel 4. The vessels have not been published, but they have been

sketched on the tomb card now in the archive of the Petrie Museum, London.

<sup>35</sup> Types 166 (MM 6986) and 162 (MM 6987) after ASTON 1994.

<sup>36</sup> MM 6983.a–b.

<sup>37</sup> Type IBa (ii), MM 6985.

<sup>38</sup> Type 173 after ASTON 1994, 151 (MM 6988).

<sup>39</sup> PETRIE & BRUNTON 1924, pl. 58, nos. 40–41.

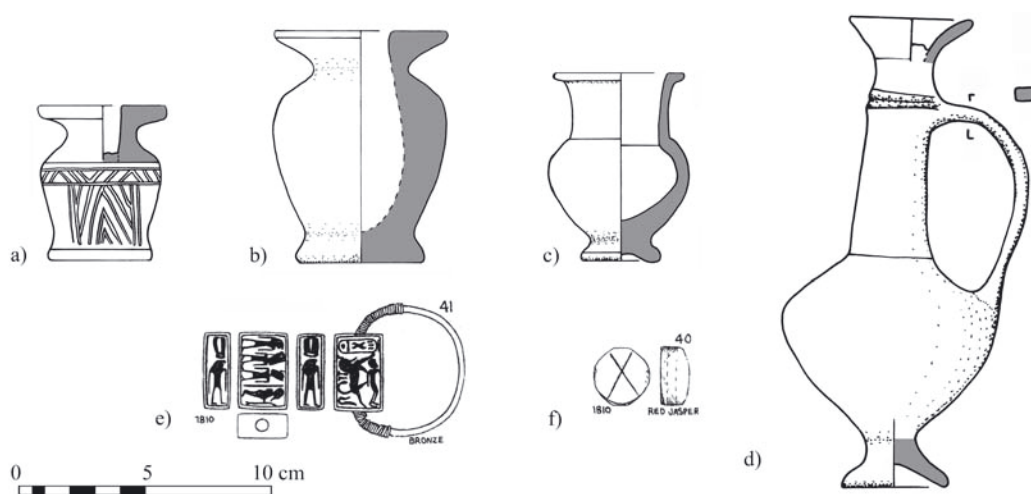


Fig. 5 Group from tomb 1810 a) kohl-pot with yellow incised decoration (MM 6986); b) large kohl-pot (MM 6987); c) footed vase (MM 6988); d) BR I juglet (MM 6985); e) ring with plaque inscribed for Amenhotep II (MM 6981); f) scarab with cross-ornament (MM 6982); e) and f) are after PETRIE & BRUNTON 1924, pl. 58, 40–41) (scale 1:2, except e) and f) which are shown in original size)

by the similarity of the grave goods but is also confirmed by the radiocarbon results of tomb 254 and the Amenhotep II plaque from tomb 1810.

Other tombs that can be compared with Sedment 254 are problematic in terms of dating. The leather bag shaped flask with Cypriote BR handle and neck has a very close parallel (in fact an almost similar object) that most likely was made by the same craftsman in tomb Sedment 53 (Fig. 2f).<sup>40</sup> This tomb is somewhat larger than Sedment 254, also comprising of a shaft (c. 4.25 m deep) and a loculus that had been thoroughly robbed. According to the tomb card, the remains of one burial had been observed amongst the debris.<sup>41</sup> Seven objects found in Sedment 53 are known today, amongst them some exceptional pieces. Besides the leather bag-shaped flask with Cypriot BR handle and neck, a BR I tankard, a BR I juglet, a handle of another BR I vessel, an Egyptian imi-

tation of a BR I juglet with painted decoration,<sup>42</sup> and an Egyptian bowl were found in this tomb. Based on these objects, and mainly on the perfect match for the leather-shaped vessel, a date similar to Sedment 254 (late Thutmose III or Amenhotep II) is perfectly possible.

However, additionally the tomb contained a Mycenaean jug with linear decoration that finds close parallels in Late Helladic (LH) IIIA2–B (Fig. 2e).<sup>43</sup> This would make a date in the late reign of Thutmose III or Amenhotep II impossible, since the preceding LH IIIA1–phase continued at least until the beginning of the reign of Amenhotep III, as can be shown by a scarab mentioning the king's name *Nb-m3ʿt-Rʿ* that was found in Sellopoulo tomb 3 near Knossos together with LH IIIA1 and LM IIIA1 pottery.<sup>44</sup>

There are four possibilities to explain the (younger) Mycenaean vessel in Sedment tomb 53.

<sup>40</sup> This observation was made by the author who has closely examined both objects.

<sup>41</sup> The tomb card states: "skull and broken bones found in shaft".

<sup>42</sup> The provenance of this piece is somewhat doubtful. It was published as coming from tomb 53 (PETRIE & BRUNTON 1924, pl. 48 no. 4 and 59 no. 7) but the actual object (OA 1921.1436D) bears a pencil mark "132" pointing to tomb

132, which could be possible. As the documentation for both tombs is so meager, it is not possible to make a safe attribution to one of the tombs.

<sup>43</sup> PETRIE & BRUNTON 1924, pl. 47 no. 3 and 59 no. 6. The authors wish to thank Astrid Hassler for discussions about this piece; see MOUNTJOY 1986, 74 fig. 85 and 101 fig. 121; MOUNTJOY 1999, 117 fig. 24 no. 164.

<sup>44</sup> POPHAM, CATLING & CATLING 1974; HÖFLMAYER 2009, 188.

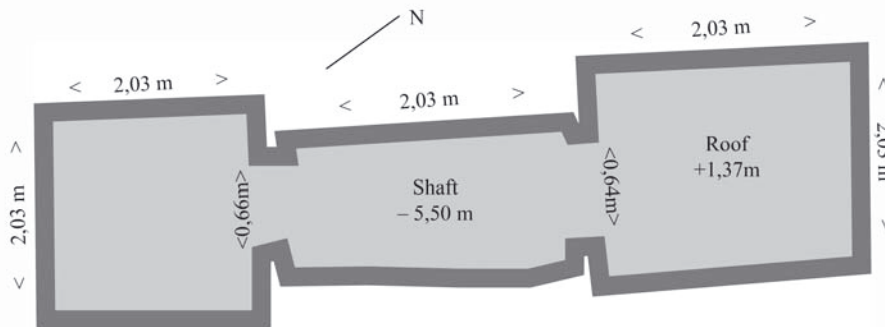


Fig 6. Plan of tomb 246 according to sketch on tomb card

First, the Egyptian and Cypriote pottery could be heirlooms, with only the Mycenaean juglet being representative of the time of burial, although this seems highly unlikely; in fact, usually one would rather suspect the opposite – the imported vessel being more valuable and therefore kept for a longer time. Second, the tomb could have been reused for later burials. Although this is not impossible, the type of tomb 53 (shaft with loculus) is not usually known to be reused for successive burials, in contrast to larger chambered tombs such as Sedment 246 (see below).

Two other explanations are more likely: the younger Mycenaean vessel might have entered the tomb from an adjacent burial by some later process, probably during robbing. Another possibility is that the recording of the objects was incorrect. As the pencil mark on the Egyptian imitation of the BR I juglet shows, pieces from other tombs may have been intermixed. The tomb card for Sedment 53 only mentions “1 pilgrims bottle; 1 fragment of ditto; fragments of Mycenaean pottery” and shows that several objects today associated with tomb 53 are not included among the registered objects. There is also evidence that some tomb numbers in Sedment have been used at least twice.<sup>45</sup> Therefore, although the second leather bag-shaped flask is marked “53”, it may have come from another tomb.

Therefore, tomb 53 should definitely not be considered as a parallel for the leather bag-shaped

vessel, due to possible later disturbance (by robbery) or due to flawed documentation in the field and/or during subsequent study of the material.

## 2.2. Sedment tomb 246

In contrast to tomb 254, tomb 246, located within the northern part of Cemetery A, about 25m north of tomb 254, was not undisturbed.<sup>46</sup> The tomb is larger than tomb 254, comprising of a shaft with a depth of approximately 5.50m and two chambers opposite each other to the northeast and southwest of the shaft. Both chambers are of the same size, being roughly square (2×2m) and 1.35m high. Again, no trace of a superstructure has survived and there is also no hint regarding who was interred within; no human remains were recorded and no remains of coffins either. Therefore, the number of people buried in the tomb cannot be ascertained. However, as there are two chambers, it seems reasonable to expect at least two different interments.

Altogether, 23 objects were discovered in the tomb and subsequently sent to the Manchester Museum. Amongst the objects recovered were two typical BR I juglets (MM 6946a & b, Types IAa (iii) and IBa (ii); Fig. 7c & d), originally wrapped together in a piece of linen and tied up together by a rope. There was also a typical earlier 18<sup>th</sup> Dynasty kohl-pot of limestone (MM 6944, Fig. 7b)<sup>47</sup> as well as three wooden kohl tubes with pivoted lids

<sup>45</sup> See for example PETRIE & BRUNTON 1924, pl. 86. On the map of Cemetery A in Sedment there are two tombs numbered 138, on pl. 87 showing Cemetery C there are two tombs 113 and 117.

<sup>46</sup> Only two objects have been published and discussed by Petrie (PETRIE & BRUNTON 1924, 26, pl. 63, 246 A, B). All further information is gathered from the tomb card and notebook 34a, 31 in the archives of the Petrie Museum, London.



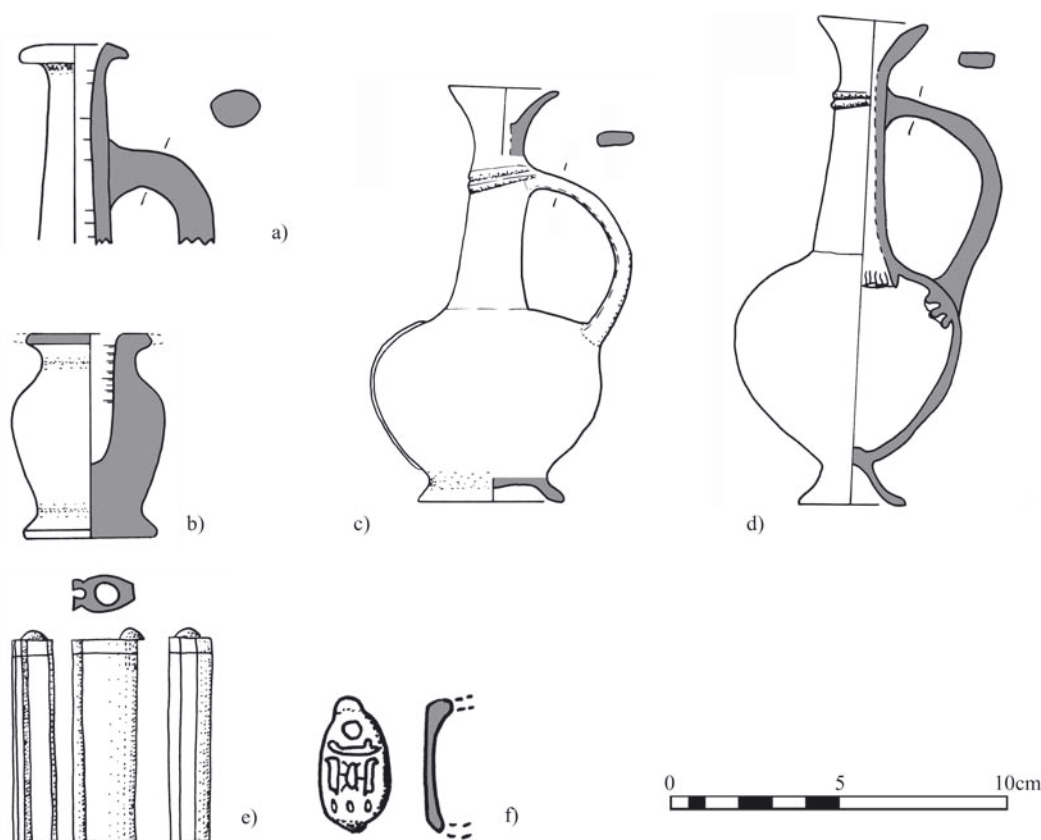


Fig. 7 Finds from tomb 246 a) RLWM spindle bottle fragment (MM 6949); b) kohl-pot, limestone (MM 6944); c)–d) BR I juglets (MM 6946a–b); e) kohl-tube, wood (MM6942); f) ring bezel with the name of Horemheb (MM 6932) (scale 1:2, except f) that is shown in original size)

(MM 6941–43, Fig. 7e). Other finds include a ball (MM 6938), a wooden piece that might have been part of a stool (MM 6939) and fragments of a small wooden box (MM 6931). A faience ring bezel bears the name of Horemheb *Dsr-hpr.w-R<sup>c</sup>-hk3-M<sup>c</sup>3.t* (Fig. 7f), providing a *terminus post quem* for at least one interment in the tomb. The date and possible earlier phases of the tomb have been disputed.<sup>47</sup> Robert Merrillees suggested that one phase should be dated to his phase XVIII B (Hatshepsut – Thutmose III) and a second one to the end of the 18<sup>th</sup> Dynasty, as shown by the ring mentioning Horemheb. The existence of the earlier phase, proposed by Robert Merrillees, has been questioned by

Kathryn Eriksson, who concluded that “*there seems no reason to speculate on early XVIII<sup>th</sup> Dynasty use of the tomb*”.<sup>49</sup> This is more relevant than it may at first seem, as the fragment of a RLWM spindle bottle (MM 6949, Fig. 7a), found within the tomb, was Eriksson’s latest securely datable example of a spindle bottle in Egypt.

From the lids of two baskets (MM 6948a&b, Fig. 8), samples were taken and submitted to the Vienna Environmental Research Accelerator for radiocarbon dating. Both samples yielded very similar <sup>14</sup>C-ages (VERA-5569: 3205 ± 35 yr BP; VERA-5570: 3240 ± 30 yr BP) and were combined as both should reflect approximately the time of the

<sup>47</sup> PETRIE & BRUNTON 1924, pl. 63, 246; ASTON 1994, type 162.

<sup>48</sup> MERRILLEES 1968, 61.

<sup>49</sup> ERIKSSON 1993, 96.



Fig. 8 Lid of a basket from which one of the samples had been taken (MM 6948a)

burial (within a few years). Furthermore the observed offset of  $+19 \pm 5$   $^{14}\text{C}$ -years was corrected using the Delta\_R function of OxCal 4.1. The calibrated age for the combined samples ( $\chi^2$ -test:  $df=1$   $T=0.6$  (5% 3.8)) falls with 68.2 % probability between 1497 and 1449 BC and with 95.4 % probability between 1517 and 1430 BC (Fig. 9). Therefore the baskets most likely date to the Thutmosid Period (start of the reign of Thutmose III, which, based on the New Kingdom model published by Christopher Bronk Ramsey and colleagues, falls with 68.2% probability between 1494 and 1483 BC and with 95.4% probability between 1498 and

1474 BC. This proves that at least two phases can be distinguished in this tomb, one represented by the radiocarbon data from the Thutmosid Period, the other represented by the ring mentioning the name of Horemheb.

This data sheds new light on the fragment of the RLWM spindle bottle. Although it is not impossible that the RLWM spindle bottle belongs to the younger phase (another spindle bottle was found in the tomb of Pay and Raia in Saqqara, dateable to approximately the time of Tutankhamun, if not later<sup>50</sup>), it seems far more likely that it should be associated with the BR I pottery and the early 18<sup>th</sup>

<sup>50</sup> ASTON in: RAVEN 2005, 117, cat.-no. 127 and pl. 126. The burials of Pay and his son Raia may have taken place in the reign of Tutankhamun and in the earliest years of the 19<sup>th</sup> Dynasty respectively (RAVEN 2005, 6 and 8). To which burial the spindle bottle might have belonged is unclear as the

interments had been very much disturbed and the burial goods were turned up and intermixed (ASTON in RAVEN 2005, 103). Also there is now evidence for spindle bottles in a Canaanite fabric from Amarna where ERIKSSON 1993, 98 had only doubtful evidence (ROSE 2007, 149–150).

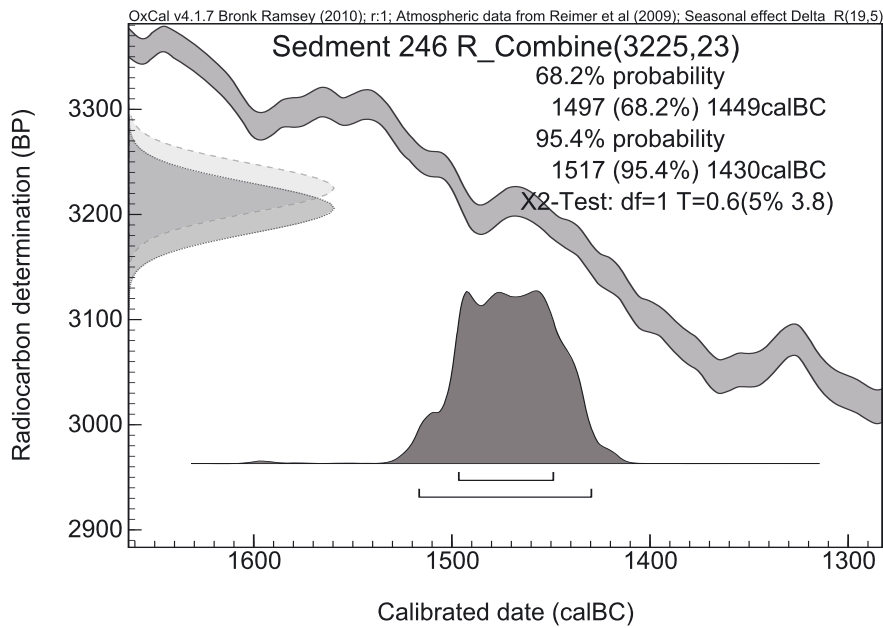


Fig. 9 Calibrated date range for combined samples VERA-5569 and VERA-5570 from basket MM 6948a

Dynasty kohl-pot and therefore with the earlier (Thutmosid) phase of the tomb. Furthermore, most RLWM spindle bottles are known from pre-Amarna contexts, the reign of Thutmose III being the *floruit* of this special class of pottery.

### 3. CONCLUSIONS

Radiocarbon data for archaeological contexts lacking epigraphic information (e.g. king's names) is still rare for Middle or New Kingdom Egypt. Although the recent project on Egyptian chronology and radiocarbon dating was able to prove that radio-

carbon confirms the Egyptian historical chronology, scientific dates for Egyptian and imported pottery and other forms of material culture are still rare. In this paper we have shown the possibilities of radiocarbon dating short-lived samples from clear contexts and its applicability for archaeology in Egypt. We are today also able to compare scientific dates for archaeological contexts with scientific dates for the Egyptian chronology and can thus build a common framework for chronological synchronisms based on scientific dating, not only in Egypt but in the entire ancient Near East.

## APPENDIX I: LIST OF ALL OBJECTS KNOWN FROM TOMBS SEDIMENT 53, 246, 254 AND 1810

### Sedment 53

	Type of object	Museum Number	Publication
1	LH IIIA–B jug (FS 114)	OA 1921.1436A	PETRIE & BRUNTON 1924, pl. 59 no. 6; 48 no. 3, 67
2	Fragment of BR I juglet or flask type IAa (vi)/IBa (vi)	OA 1921.1436B	MERRILLEES 1968, 59, pl. 8 no. 4
3	Fragment of BR I tankard type V	OA 1921.1436C	MERRILLEES 1968, 59, pl. 20 no. 2
4	Egyptian Imitation of BR I juglet (Provenance doubtful)	OA 1921.1436D	PETRIE & BRUNTON 1924, pl. 48 no. 4, 59 no. 7, 67
5	Two fragments of flask in the shape of a leather bag	OA 1921.1436E	Unpublished
6	Handle of BR I closed vessel	OA 1921.1436F	MERRILLEES 1968, 59, pl. 19 no. 3
7	Dish with flat base and direct rim	location unknown	PETRIE & BRUNTON 1924, pl. 59 no. 8

**Sedment 246**

	Type of object	Museum Number	Publication
1	Fragments of several wooden caskets	MM 6931	Unpublished <sup>51</sup>
2	Ring bezel with name of Horemheb, blue faience	MM 6932	Unpublished
3	Scaraboid, blue faience	MM 6933	Unpublished
4	Scaraboid, green faience	MM 6934	Unpublished
5	Two heart-shaped amulets, limestone	MM 6935a–b	Unpublished
6	Inlay, blue-green glass	MM 6936	Unpublished
7	Beads, blue and red glass and blue faience	MM 6937a–b	Unpublished
8	Ball, linen	MM 6938	Unpublished
9	Fragment of stool or chair, wood	MM 6939	Unpublished
10	Comb, wood	MM 6940	Unpublished
11	Kohl-tube with stick, wood	MM 6941	Unpublished
12	Kohl-tube with stick, wood	MM 6942	Unpublished
13	Double kohl-tube with stick, wood	MM 6943	Unpublished
14	Kohl-pot, limestone, type Aston 162	MM 6944	PETRIE & BRUNTON 1924, pl. 63 no. 246 B
15	Wooden stick, part of a piece of furniture?	MM 6945	PETRIE & BRUNTON 1924, 26, pl. 63 no. 246 A
16	BR I juglet type IAa (iii), attached to MM 6946b with a rope	MM 6946a	MERRILLEES 1968, 61
17	BR I juglet type IBa (ii), attached to MM 6946a with a rope	MM 6946b	MERRILLEES 1968, 61
18	Piece of linen fabric, was used to wrap MM 6946a–b	MM 6947	Unpublished
19	Two basket-lids	MM 6948a–b	Unpublished
20	RLWM spindle bottle, type I	MM 6949	ERIKSSON 1993, 96, 235, cat.-no. 742

**Sedment 254**

	Type of object	Museum Number	Publication
1	Coffin with gabled lid, wood	EM TR 12.5.21.4	PETRIE & BRUNTON 1924, pl. 63 no. 254
2	Casket, wood, ivory inlays	PhE 14197	PETRIE & BRUNTON 1924, 24, pl. 55 no. 3, 57 no. 30
3	Casket, wood	PhE 14198	PETRIE & BRUNTON 1924, 24, pl. 55 no. 4, 57 no. 31
4	Bowl, calcite-alabaster, type Aston 180	PhE 14241	PETRIE & BRUNTON 1924, pl. 48 no. 4, 59 no. 7, pl. 67
5	Footed vase, calcite-alabaster, type Aston 173	PhE 14270	PETRIE & BRUNTON 1924, pl. 55 no. 9, pl. 57 no. 38
6	Basket with lid	PhE 14279a–b	MERRILLEES 1974, 15, fig. 3
7	Basket with lid	PhE 14280a–b	MERRILLEES 1974, 15, fig. 15
8	Pilgrim flask	PhE 14337	PETRIE & BRUNTON 1924, 24, pl. 55 no. 11, pl. 57 no. 36
9	BR I juglet type IAa (iii)	PhE 15421	MERRILLEES 1974, 34, 42, fig. 24
10	BR I juglet type IBa (ii)	PhE 15422	MERRILLEES 1974, 34, 42, fig. 21
11	BR I juglet type IBa (ii)	PhE 15423	MERRILLEES 1974, 34, 42, fig. 21
12	BR I juglet type IBa (v)	PhE 15424	MERRILLEES 1974, 36, 42, fig. 24

<sup>51</sup> All objects from the Manchester Museum can be found in the online-database: <http://emu.man.ac.uk/mmcustom/EgyptQuery.php> (Last accessed on May 30, 2012).

	Type of object	Museum Number	Publication
13	BR I juglet type IBa (iii)	PhE 15425	MERRILLEES 1974, 34, 42, fig. 22
14	Flask in the shape of a leather bag	PhE 15426	PETRIE & BRUNTON 1924, pl. 55 no. 12, pl. 57 no. 33
15	Basket with lid	PhE 15427a–b	MERRILLEES 1974, 42
16	Basket with lid	PhE 15428a–b	MERRILLEES 1974, 16, 42, fig. 4
17	Basket with lid	PhE 15429a–b	MERRILLEES 1974, 16, fig. 5
18	Comb, wood	PhE 15439	PETRIE & BRUNTON 1924, 24, pl. 55 no. 5
19	Double kohl-tube, wood	PhE 15556	PETRIE & BRUNTON 1924, 24, pl. 55 no. 6, pl. 57 no. 40
20	Necklace of beads of various types and materials	PhE 15787	MERRILLEES 1974, 19, fig. 8
21	Necklace of beads of various types and materials	PhE 15788	MERRILLEES 1974, 19, fig. 7
22	Bracelet(?) of golden <i>nfr</i> -signs	PhE 15789	MERRILLEES 1974, 16, fig. 6
23	Kohl-pot, calcite-alabaster, type Aston 163	PhE 15850	PETRIE & BRUNTON 1924, pl. 55 no. 10
24	Double kohl-tube, calcite-alabaster, type Aston 168	PhE 15853	PETRIE & BRUNTON 1924, pl. 55 no. 7, pl. 57 no. 39
25	Dipper juglet, calcite-alabaster	PhE 16138	PETRIE & BRUNTON 1924, pl. 55 no. 8, pl. 57 no. 35
26	Kohl-pot with lid, calcite-alabaster, type Aston 163–164	PhE 17860a–b	PETRIE & BRUNTON 1924, pl. 55 no. 2, pl. 57 no. 35
27	Dish with flat base and direct rim	location unknown	PETRIE & BRUNTON 1924, pl. 82 no. 254w
28	Ovoid jar	location unknown	PETRIE & BRUNTON 1924, pl. 82 no. 254x
29	Ovoid jar, filled with bread	location unknown	PETRIE & BRUNTON 1924, pl. 82 no. 254y
30	Ovoid jar	location unknown	PETRIE & BRUNTON 1924, pl. 82 no. 254z

### Sedment 1810

	Type of object	Museum Number	Publication
1	Rectangular wooden box with bone inlays	MM 6980	BUSCH 2010, 233, cat.-no. VI.6
2	Faience plaque Amenhotep II	MM 6981	PETRIE & BRUNTON 1924, pl. 58 no. 41
3	Small carnelian scarab with decorated with a scratched cross	MM 6982	PETRIE & BRUNTON 1924, pl. 58, no. 40
4	Wooden kohl-tube and bronze kohl-stick	MM 6983a–b	Unpublished
5	Wooden kohl-stick and bronze kohl-stick	MM 6984a–b	Unpublished
6	BR I juglet type IBa (ii)	MM 6985	Unpublished
7	Kohl-pot, limestone, type Aston 168	MM 6986	Unpublished
8	Kohl-pot, calcite-alabaster, type Aston 162	MM 6987	Unpublished
9	Footed vase, calcite-alabaster, type Aston 173	MM 6988	Unpublished
10	Undecorated rectangular wooden coffin	location unknown	Unpublished
11	Basket of unknown type	location unknown	Unpublished
12	Ovoid jar with two horizontal black lines	location unknown	Unpublished
13	Ovoid jar	location unknown	Unpublished
14	Ovoid jar	location unknown	Unpublished
15	Ovoid jar	location unknown	Unpublished
16	Ovoid jar	location unknown	Unpublished
17	Jar with straight neck, sharp bent shoulder and pointed base	location unknown	Unpublished
18	Dish with flat base	location unknown	Unpublished



## APPENDIX II: RADIOCARBON DATA

Lab-code	object	tomb	$\delta^{13}\text{C}$ (‰)	$^{14}\text{C}$ -age $\pm 1\sigma$ (years BP)
VERA-5475	Basket PhE 15428	Sedment 254	$-22.2 \pm 1.4$	$3170 \pm 30$
VERA-5476	Basket PhE 15429a	Sedment 254	$-25.7 \pm 1.7$	$3190 \pm 40$
VERA-5569	Basket MM 6948a	Sedment 246	$-26.6 \pm 3.3$	$3205 \pm 35$
VERA-5570	Basket MM 6948b	Sedment 246	$-13.1 \pm 1.3$	$3240 \pm 30$

## Abbreviations:

EM Cairo, Egyptian Museum

MM Manchester Museum

OA Oxford, Ashmolean Museum

Ph Philadelphia, University of Pennsylvania Museum of Archaeology and Anthropology

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