

# THE OSTRACON

THE JOURNAL OF THE EGYPTIAN STUDY SOCIETY

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*Publication of The Ostrakon is supported by a grant from THE PETTY FOUNDATION*

Egyptian Study Society, Inc.  
 P.O. Box 40754  
 Denver, Colorado 80204-0754  
 UNITED STATES OF AMERICA



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## CALL FOR ARTICLES

*The Ostrakon: The Journal of the Egyptian Study Society*

**Volume 23 (2011)**

***Submission deadline: March 1, 2012***

The Egyptian Study Society announces a call for additional articles for the 2012 (Vol. 23) publication of *The Ostrakon*. The publication is currently accepting more new articles, book reviews, reviews of significant lectures or exhibits, or interpretive articles that apply to the archaeology of Egypt for publication in late Fall 2012.

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*The Ostrakon* and the Egyptian Study Society thanks  
THE PETTY FOUNDATION for its generous  
and continuing grant support  
for the publication of *The Ostrakon*.

# TAUSERT TEMPLE PROJECT

## 2010-11 SEASON

By Richard H. Wilkinson

The 2010-11 Winter Season, our final one of excavation planned currently for the Tausert temple site in western Thebes was particularly profitable. This article summarizes the results of our last season of excavation at the temple before the publication of the final site report. An additional season to conduct remote sensing at the site to confirm and map features that were not selected for excavation is in the planning stages.

As readers of this journal are aware, pharaoh Tausert's memorial temple was examined briefly by William Flinders Petrie in 1896 and ignored mostly since that time because it was assumed that the temple was never completed in antiquity.<sup>1</sup> Our own research and subsequent excavation of the site<sup>2</sup> shows that Petrie's assessment was based on very limited and faulty data, and that the Temple of Tausert was, in fact, completed or nearly completed, but torn down very soon afterward during the time of dynastic change from the 19th to 20th Dynasties.

Our final excavation season was conducted from November 2010 through January 2011. It consisted of two complementary sessions: a special study session focusing on the ceramic materials found during the project's previous field seasons, followed by a session of excavation in which most of the final clearance planned for the site was accomplished.<sup>3</sup> The results of these two sessions are summarized below.<sup>4</sup>

### The Ceramic Study Session

Ceramicist Rexine Hummel and artist Lyla Pinch-Brock worked on the ceramic collection from the Mortuary Temple of Queen Tausert from November 8 to December 14, 2010. The pottery analyzed came from all seasons of clearance and from all areas of the excavation.

This study proved to be very valuable and resulted in a better understanding of certain aspects of the site's history. The full results will be given in our final site report, but the following is a very brief synopsis of the material prepared by Rexine Hummel. This abridged version summarizes the ceramic material found in the temple's trenches and surface areas dating from modern times back through the Roman Period, Late Period, and finally the 19th Dynasty when the temple was constructed (Fig. 1).

*MODERN PERIOD* – Eleven fragments of modern *qullal jars* were found in the temple trenches and must date to the time of Petrie's investigation. An excellent indicator of where his workmen kept their water jars (and thus where they worked), it reveals their primary interest: the temple's foundation deposits.

*ROMAN ERA* – *Amphorae* bases, cooking pots and shallow fineware plates reflect a Roman presence on the site. Although many of the forty-four fragments dating to this period cluster in Loci S-30 and S-41, the remaining Roman sherds appear randomly over the site.

*LATE PERIOD* – A large assemblage of Late Period pottery (25th–27th Dynasties) was excavated. Storage jars manufactured in both marl and silt characterize this period.

*NINETEENTH DYNASTY* – The pottery found in the sealed strata of the temple that date to the 19th Dynasty is very important, for it represents one of the only extant sealed corpora from that period. Rims from thirteen different blueware vessels were found: six in the sealed strata and seven in the fill

above it. Excluding the rims, forty-four fragments of blue-ware vessels came from the sealed strata, while twenty-three fragments came from the fill above.

*IMPORTS* – Fragments of amphorae imported from the Levantine coast dominate the list of imports. Eighteen fragments were found in Stratum II and thirty more were found in the fill above. Levantine amphorae are found on temple sites since they were used to carry pistachio resin, olive oil and wine to the temple storerooms. Two small fragments from Mycenaean stirrup jars were found in the fill. These vessels were a popular import to Egypt. They were prized for their fine workmanship as well as their precious contents of perfumed oils, herbs and unguents. The fragments were found in Trench TB-10, Unit 7 and Surface S-30, Unit 2A.<sup>5</sup> Two fragments from amphorae from the Western Oases were found in the fill in Trench TA-14, Unit 16, and Trench TA-14, Unit 17. Wine from the Oases was considered a luxury. Ten fragments of amphorae from Phoenicia were found with the Late Period sherds.

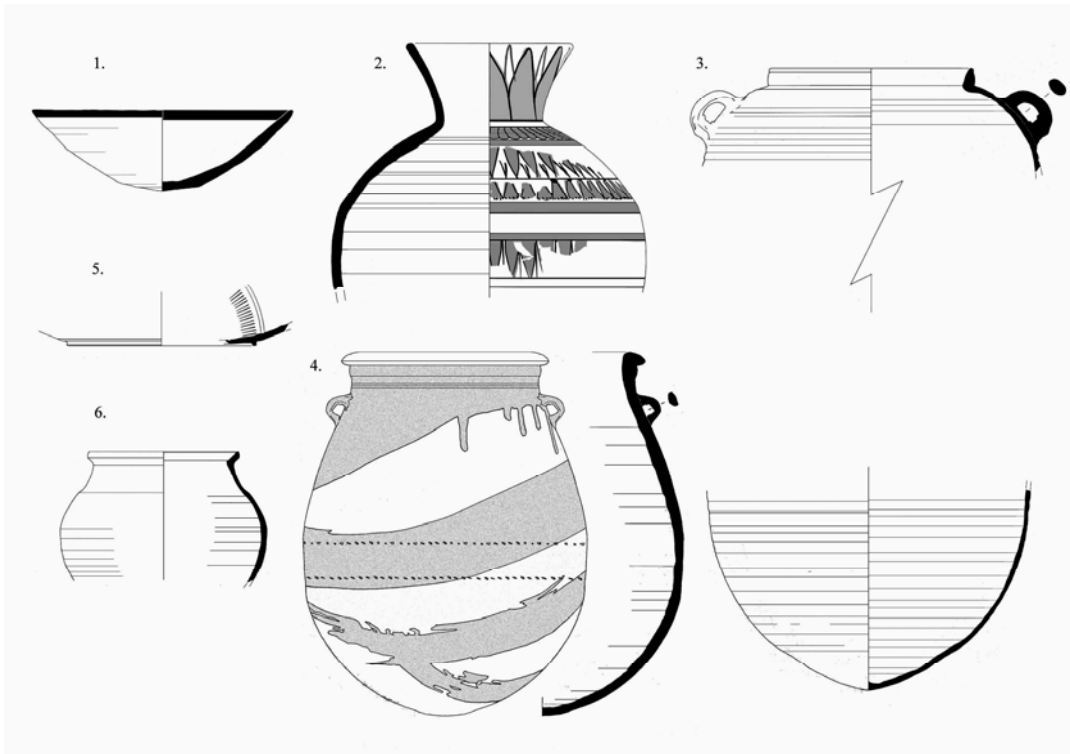


Fig. 1. Examples of ceramic types from the Tausert Temple: 1. Red-rimmed bowl of Nile Silt, 19th Dynasty. 2. Decorated Nile D jar with registers of large blue petals interspersed with red triangles, 19th Dynasty. 3. Wide mouth storage jar of marl clay, early 26th Dynasty. 4. Wide mouth Nile Silt Storage jar decorated with a painted white band spiraling downward around pot, 26th – early 27th Dynasty. 5. Shallow Egyptian A ware plate with ring base, Roman Period – AD 460–500 or 510–540. 6. Cooking pot of dense brown fabric with an inner ledge to accommodate a lid, Roman Period. Drawing by Lyla Pinch Brock.

## Site Mapping

In previous seasons, all of our work concentrated on the temple's foundation trenches and smaller surface units (the temple's rooms). For this work, we utilized a dedicated mapping system which followed the exact contours of the trenches and divided them into two-meter units which were split further into single meter areas. This dedicated system was used to allow detailed database entry and analysis of find locations relevant to the actual structure of the temple, rather than one that merely

identified finds scattered across arbitrary grid squares containing both trench and surface units.

In this season, however, we cut several test trenches in the area of the temple's great courtyard, along with other test trenches outside of the temple core. In addition, we prepared for a remote sensing survey of several areas which we did not plan to clear. For these larger areas, we applied a standard alpha-numeric 10/5 meter grid to the whole site so we may utilize these grid notations in future discussion of our work (Fig. 2). The grid is a floating one based on the site itself.

Our primary datum point, however (the northwest<sup>6</sup> corner of the Merenptah Temple wall), will be tied to the Theban Mapping Project's survey of the West Bank. As a result, it will be possible to locate any point on our site in reference to that larger grid.

During every season we worked on the Tausert site, we found and mapped areas which were considerably different from Petrie's, whose details were frequently not the results of excavation or even probing, but his speculations as he looked at the mounds of debris covering the site.

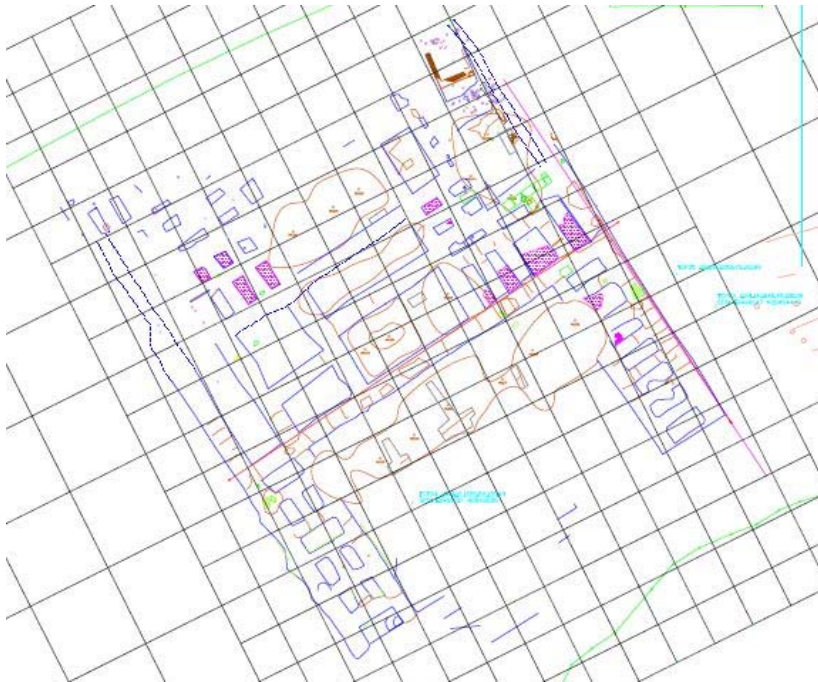


Fig. 2. The 10/5 meter grid applied to the temple site and its surrounding area.

## Clearing and Cleaning

This season, our clearing and cleaning of the temple remained concentrated on selected areas in the southwestern and northwestern quadrants of the site (the grey areas in Figure 3). In addition, we cleared trench TB15 that connected these areas. In the southwestern quadrant, we corrected Petrie's plan significantly in a number of areas, while in the northwestern area, we concentrated on further analysis of the features associated with intrusive burials at the back of the temple site (See p. 7).

A number of artifactual finds were made during the course of this clearing work, but apart from the foundation block inscription discussed (See p. 8), the most significant finds were the ceramic ones that were found after the close of our ceramic study session. This additional material will be incorporated into our ceramic database as soon as possible.

All the artifacts found in the course of the 2010-11 season were cataloged and stored in the SCA magazine behind the Carter House on Luxor's West Bank. The most important items will be documented in our forthcoming report.

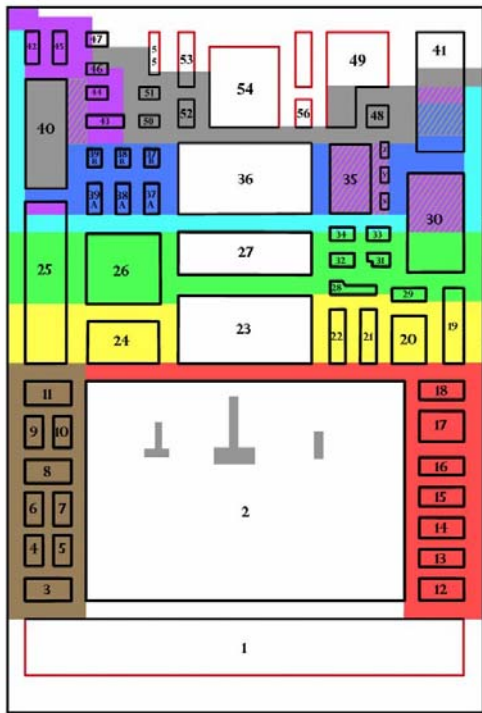


Fig. 3. Plan of the Tausert Temple showing the areas cleared, recorded, and mapped in the University of Arizona Expedition's eight seasons on the site. Areas cleared in the 2010-11 season are highlighted in grey. The three narrow units on Surface 2 are test trenches 1-3. The three units on the northeastern (right) side of the plan are: adjacent to S19, test trench 4; adjacent to S30, test trench 5; and across the top of S41, test trench 6.

### Test Trenches

Three sondages (TT1-3) were cut to bisect the large mud brick mass that runs along the western edge of the temple's courtyard (S2). It was not clear if this undulating mass represented the remains of a collapsed mud brick wall or pylon, or merely bricks thrown up from the great trench (TB8) which bounds the western side of the court. The test trenches we excavated indicate that the mounds are composed mainly of bricks and stone fragments from Trench TB8 - thrown here when the temple trenches were emptied of their stones in ancient times, in recent times by Petrie's men, or both. There is a complex of wall stubs evident at ground level, moreover, which indicate the remains of small rooms beneath the accumulated mud brick mass. While this whole area could not be cleared during our examination of the temple site, the ground-level walls seem to run most of the width of the court. They are composed of New Kingdom bricks and are built directly on the

*gebel* bedrock surface. The bricks may be reused however, and the wall stubs are partial and broken and do not indicate when they were built. There was no artifactual evidence or any sign of habitation on the floor areas around these walls, so their purpose cannot be presumed. They may possibly have been part of an early mud brick temple structure, if such existed, or features built in the area at some later point.

Another two test trenches (TT4 and TT5) were made along the northern edge of the temple core, directly north of trench units TA14:22-23 and 29-30 in an area which, based on our analysis of satellite images of the site we suspected that mud brick magazines were constructed. Both trenches revealed the bases of walls beneath a crumbled mass of mud brick residue. It is doubtless that they are the remains of temple storage magazines (they are in the same location relative to the temple as those in the temple of Merenptah and the Ramesseum) or other administrative buildings. No ancillary structures were shown on Petrie's

inaccurate plan of the temple. This is the first confirmation we have found of other structures which we believe also to have been present as part of the larger site. A final test trench (TT6) will be discussed below.

### **Intrusive burial areas**

A number of intrusive tombs were cut in the escarpment at the western end of the temple and, in the northwest part of the site that we studied this season, we found more evidence of these intrusive structures. In addition to additional human remains (to be discussed in our final report) and fragmentary artifactual remains associated with the burial structures, we cleared more of surface unit S41 and exposed more of the low mud brick wall which we interpreted as a tomb surround for one of the burials. A comparison of this feature with a Late Period parallel in the Temple of Amenhotep II, kindly made possible by Professor Angelo Sesana, indicates that the structure forms a courtyard fronting a smaller tomb chapel now lying under the modern embankment. Further clearance reveals that this is likely the situation, although in this case the tomb entrance probably leads forward into the *gebel* rather than being constructed as a vertical shaft tomb. In earlier reports, we dated this feature and its associated human remains to the Third Intermediate Period. This was based on our consideration of some ceramic and other evidence of a confusing nature. After our most recent season, it is now clear that the burial is to be dated to the Late Period.

As we cleaned a number of surface areas in this part of the temple last season, we found the evidence of walls built of large New Kingdom bricks, although these walls were broken down and only stood to the height of four or five courses in one area (S30). We were unsure of the nature of these walls due to a stratigraphic situation that we did not understand then, but we feel we are able to explain now. The stratigraphic puzzle was difficult, especially on the surface area enumerated by us as S35. Unlike most surface areas of the temple that we investigated which bore damaged *dekka* (mud-gypsum) flooring,

S35 was notable for having an extremely well-preserved *dekka* floor. Above this 19th Dynasty surface we found a stratum of pure sand topped by several centimeters of sandstone chips, then a layer of mud upon which walls of New Kingdom bricks were built. This sequence was difficult to interpret because there seemed to be no reason to build up the surface to construct the walls instead of using the flooring already in place.

In our latest season we found that the same stratigraphic profile extant on S35 is present also on surfaces S30 and S41 – all of which are in the region of the intrusive burials at the back of the temple, and all of which have the same mud brick features. We realize now that this situation is probably the result of redeposition of the sand from the foundation trenches when the temple stone was taken at some point after the monument's completion. While building blocks could be taken down and carried without significant resultant stratigraphic evidence beyond the damaged floorings we have found across the site, the massive foundation blocks set in beds of sand would have had to be dug out, and the sand likely thrown onto surface areas next to the trenches in the process. If, as we suspect, much of the stone was taken by Ramesses III for his own funerary temple at Medinet Habu, there may have been no need for foundation blocks which may have been already set in place. There would be a need for great quantities of smaller building blocks, however, and once these were stripped from Tausert's Temple, the foundation blocks from that monument were likely cut into building block sizes on site before being removed. This would have resulted in the stratum of sandstone chips and chunks lying above the sand that was found on these units and elsewhere in the site. It would have left an uneven surface that needed to be sealed and leveled later with a layer of mud upon which later brick structures found at the rear of the site could be erected. Such is probably the history of the stratigraphy evident in the area where the brick features were erected in association with the Late Period tombs at the back of the temple. The mud brick magazines of Tausert's Temple which we

believe were constructed immediately nearby would have provided a convenient source for the mud layer and for the whole bricks used in

building the Late Period chapels or tomb features.

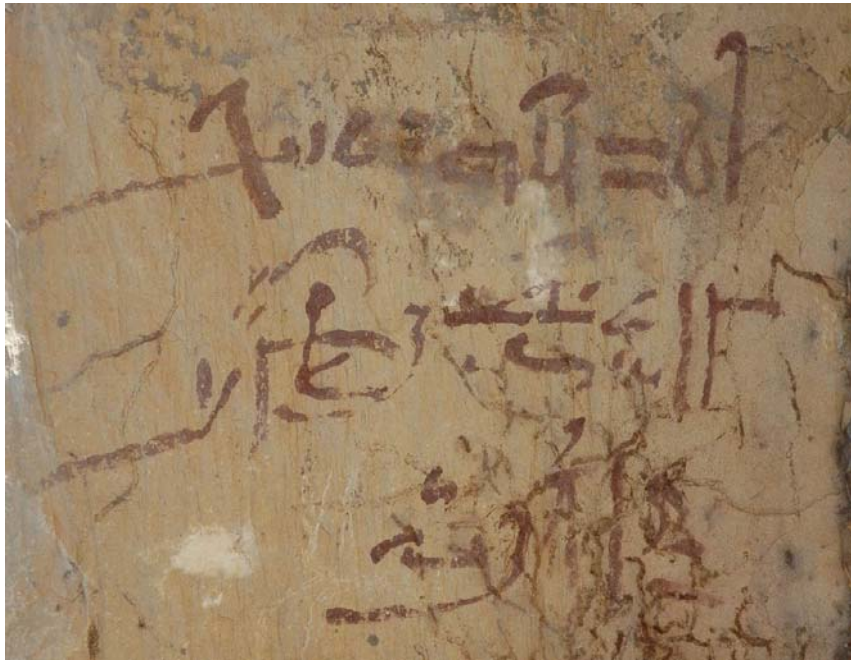


Fig. 4. Hieratic inscription found on Foundation Block FB2.

### A New Foundation Block Inscription

In the course of the season's work another inscription was discovered on one of the massive foundation blocks (FB2) in Trench TB8 (Fig. 4). The inscription was examined by our expedition Heiraticist, Dr. Robert Demerée of Leiden University, who stressed that the first line reads clearly: "Year 8, 2nd month of shemu, day 29". This has particular significance, for it provides confirmation for the text we discovered in 2006 on an adjacent foundation block (FB1) which was dated also to the eighth year of the queen's reign. Although Tausert's reign (including her regency for Siptah) has been understood commonly as being seven years (as stated by Manetho in his *History*), or eight at the most, the inscriptions on the foundation blocks show otherwise. Because they were made when the temple was begun, and we now have archaeological evidence that the temple was completed or nearly so (it must have taken a couple of years), these texts indicate clearly that Tausert must have reigned nine, or perhaps, even ten years.

According to Dr. Demaree, the second line of the inscription most likely says: "the gang/crew (*is.t*) (named) *Kka-em-mesha=f*". The first word (*is.t*) is a little difficult palaeographically, but he sees no other solution for the moment. The name of this gang is also unusual (yet very clear) - "who appears in his army". The third line is very clear also (despite the termite markings on the stone!): "on the right side" (*hr wnmy*). This continuation of the text is significant, for it paints a clear picture of the temple being constructed by two separate work gangs (as we know was the practice for royal tombs). The fact that the foundation block FB2 was dedicated to the right hand gang in an area near where we believe a foundation ritual was performed (based on the evidence of a ritually smashed decorated blue ware dedication vessel) makes it seem more than likely that another block with a parallel inscription was dedicated to the left hand gang at the other side of the temple. Although the foundation stones from that part of the monument were robbed at the temple's destruction, there is, perhaps, indication



of a dedication based on the concentration of sherds from a similarly decorated blue ware vessel we found in the area where the “left hand gang” dedication stone would have been located.

### **Preliminary Conclusions**

Although the Tausert Temple site is large, to date we have cleared a great deal of its total area. It appears that little, if any, further work beyond the planned remote-sensing survey needs to be conducted to understand the history of the temple. In the interest of good archaeological method, it will be wise to leave part of the site uncleared so that future researchers may examine sections with methods that are not currently available. As it is, at this point we have been able to

demonstrate conclusively that the site was not excavated by Petrie, but only probed in limited areas. Our excavations have led also to a number of important new understandings:

- 1) Tausert reigned longer than previously suspected.
- 2) The temple of this regnant queen was actually completed, or nearly completed.
- 3) The temple was torn down shortly after its completion.
- 4) The site reveals considerable evidence of later building activity associated with intrusive Late Period burials.

These findings will be elaborated in our final report which is now being produced and which should be published in book form<sup>7</sup> in late 2011, or very early 2012.

### **NOTES:**

1. W. M. Flinders Petrie’s cursory exploration of the site of the Tausert Temple is recorded in his book, *Six Temples at Thebes* (London, 1897), pp. 13-16.

2. The reports of our own work have been published in *The Ostrakon: The Journal of the Egyptian Study Society* and elsewhere. A full bibliography will be published in our final site report.

3. We would like to thank the Director General and the members of the Permanent Committee of the Supreme Council of Antiquities for granting us permission to continue this project. We would also like to thank Dr. Mohamed Ismail Khaled, Director of Foreign Missions, for his kind and continued help in arranging our work in Egypt. In Luxor, the Director of Upper Egypt, Mr. Mansour Boraik, encouraged us, as always, and we thank him particularly. We also thank Mr. Mostafa Waziri, Director of West Bank Antiquities for his help, and Mr. Mohamed Hamdan, Director of the West Bank Missions Office. We particularly thank our assigned inspector, Mr. Yasser Youssef Ahmed who was a great help throughout our work both on site and in the magazine. Reis Omar Farouk Sayed El-Quftawi, Reis Ali Farouk Sayed El-Quftawi, and Assistant Reis Kamal Helmy were exceptionally helpful in making arrangements for all aspects of our work and directing the workmen. As always, our thanks are also due to the American Research Center in Egypt which facilitated our Expedition - and most especially to Amira Khattab and Jane Smythe whose kind and able help we appreciate greatly.

4. Our project staff for the season consisted of Dr. Richard Wilkinson (director), Rexine Hummel (co-director, ceramicist), Lyla Pinch-Brock (artist), Dr. Robert Demarée (hieraticist), Richard Harwood (section leader), Damian Greenwell (section leader), Danielle

Phelps (object registrar), Ashley Goodwin (mapping specialist), Linda Regan Gosner (section leader), Dr. Gonzalo Sanchez (medical consultant), Suzanne Vucobratovich (photographer), Matei Tischindlein (excavation assistant), and Stephanie Denkowicz (project recorder). We employed some sixty Egyptian workmen during the course of the season as well as drivers and boatmen.

5. The temple's foundation trenches were assigned designations TA1-14 for East-West trenches and TB1-19 for South-North trenches. This system makes possible a better analysis of artifact distribution than a regular grid system would allow. Surface units defined, studied, or cleaned so far are designated S1 – S56.

6. Note that “north” and other cardinal points mentioned in this article are based on local north as utilized by the ancient Egyptians. Local north on the Tausert site lies at 40 degrees east of magnetic north.

7. The final report for the Tausert Temple Project, including full excavation results and digital reconstructions of the temple, will be published by the University of Arizona. Copies may be reserved in advance, or requests for further information may be placed, by sending an email with “Temple Volume” in the subject line to: [egypt@u.arizona.edu](mailto:egypt@u.arizona.edu).

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*Dr. Richard Wilkinson is professor of Egyptian archaeology at the University of Arizona and director of the University's Egyptian Expedition, which has conducted research and excavation in Egypt since 1989. He is the author of many articles and books on ancient Egypt and editor of Egyptology Today, published by Cambridge University Press.*

# PRELIMINARY REPORT ON THE DISCOVERY OF THE LOST ANCIENT COPPER MINES OF GEBEL SAFARIAT, SOUTHWEST SINAI, EGYPT

By Aly A. Barakat

The name Gebel Safariat refers to a small area of southwestern Sinai 35 kilometers due northwest of al Tur City. It measures roughly 42 square kilometers between latitudes  $28^{\circ} 36' 17'' - 28^{\circ} 30' 43''$  N and longitudes  $33^{\circ} 36' 18'' - 33^{\circ} 40' 37''$  E (Fig. 1). This area is accessible via several desert tracks which join the Suez-al Tur Highway. Gebel Safariat is an island-like remnant of a sedimentary succession on the eastern side of el Qaa Plain (Fig. 2, next page). It is delimited partially on the southeast by Precambrian high mountains and the Wadi Hebran, while open to the el Qaa Plain in other directions. In describing the sedimentary successions of southwest Sinai, Thomas Barron pointed out the geological significance of Gebel Safariat: "Gebel Safariat [is] a mass of highly tilted and dislocated strata opposite the mouth of Wadi Hebran. Topographically it is not of much importance, although of great interest geologically."<sup>1</sup> Abdallah et al described the lithostratigraphy and structural framework of the Gebel Safariat area in detail.<sup>2</sup> According to them, the succession exposed at Gebel Safariat attains an aggregate thickness of about 500 meters, which occurs as a series of dissected hills and ridges. They are comprised of fossiliferous carbonates (limestone and dolomite), marl, and shale with subordinate sandstone interbeds. They range in age from early Cretaceous to early Miocene. Several faults deform, dissect and dislocate the whole succession of Gebel Safariat.<sup>3</sup>

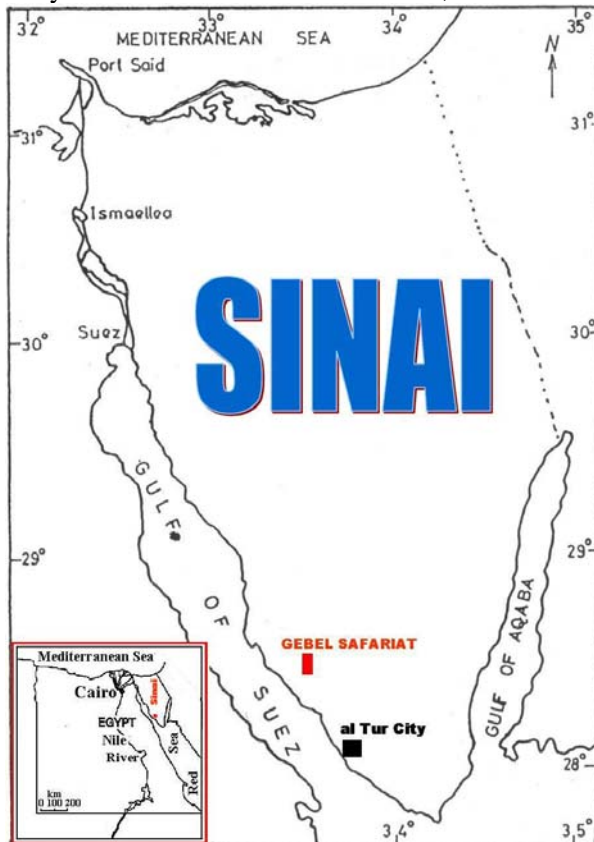


Fig. 1. Gebel Safariat area. Author's map.

## ANCIENT COPPER SMELTING IN GEBEL SAFARIAT

Barron reported the location of an ancient copper smelting camp on one of the numerous limestone hills at Gebel Safariat. This report astonished geologists and archaeometallurgists, because there were neither traces of visible copper mineralization in the area nor signs of greenish or bluish colors. There were, moreover, no visible indications of mining activities which might identify the source of the copper ore utilized by the ancient Egyptian smelters.<sup>4</sup> Hume agrees with Barron, stating "there were no indications of the source from which this copper was derived."<sup>5</sup> Consequently, the ancient copper slag of Gebel Safariat was considered to be of unknown origin, like that of Wadi Gharandal (North Abu Zenima), Sih Baaba (South Abu Zenima), and Bir Nasib.<sup>6</sup> Rothenberg<sup>7</sup> and Barakat (unpublished report), however, did report ancient copper mining activities that might be the source of the copper ore used in the Bir Nasib copper smelting camp. To date, copper ores sources in the three other locations remain unknown.

This article reports for the first time the presence of ancient copper mine(s) in Gebel Safariat, which are the probable sources of the ore for the copper smelting camp of the area.

Fig. 2. General view of Gebel Safariat, which seems like a small island in el Qaa Plain. Author's photo.



## COPPER MINERALIZATION IN THE GEBEL SAFARIAT AREA

On 31 Jan. – 1 Feb. 2001, the author, along with geologist Adel A. Bayomi, investigated the ancient smelting camp of Gebel Safariat. The coordinates of the site were determined latitude  $28^{\circ} 29' 28''$  N and longitude  $33^{\circ} 39' 09''$  E), and general observations were made. Among the observations related to ancient copper mining operations is the location of the smelting camp, which is situated on the sharp northwestern side of the hill to face the prevailing northwesterly winds. In addition, the hill itself opens to the surrounding plain leading to Wadi Hebran, where water and acacia trees are available (Fig. 3). Accordingly, the site conforms to the physical specifications established by ancient smelters. Only the source of the copper ore remains unknown. The team surveyed the site of Gebel Safariat searching for easily observed greenish or bluish copper minerals in order to locate a source of the copper ore which could have been used in the smelting camp. Unfortunately, they were unsuccessful. They did, however, discover some features of interest: 1) the existence of greenish-grey silty sandstone in the form of lenses and pockets that was intercalated with the sedimentary succession of the area, along with 2) hard dark-brown ferruginous silty sandstone nodules with an abnormal faint submetallic bluish luster. As a result, there was hope that the area might contain definite copper mineralization, after all. Between

4–9 January 2008, the author noticed a trace of copper mineralization associated with manganese minerals in the basement rocks along a shear zone in the Wadi

Hebran. The copper mineralization was in the form of faint bluish stains which filled small cavities in the highly metamorphosed rocks along a shear zone. One of the collected samples from the site yielded a partial chemical analysis of 0.06 % copper. This is consistent with the study of Mehanna and Soliman which showed a clear anomaly in the copper content (456 ppm) within mylonitized chlorite schist from the site.<sup>8</sup> It is possible that this exposure may mark the site of ancient copper mining, as indicated by several features: 1) it is opposite the hill where the copper smelting camp is located, 2) the exposure and Gebel Safariat are connected by a flat



Fig. 3. Part of the Gebel Safariat slag heap. The site opens to the plain leading to Wadi Hebran. Author's photo.

surface, and 3) ruins of ancient settlements are present. On the other hand, it is difficult to confirm that the site is one of the main sources of copper for the Gebel Safariat smelting camp, because the site is now cut by a deep channel which may have removed the expected signs of ancient mining activity. Because of the channel, it is difficult to reach a definite conclusion about the source without serious chemical analyses for trace elements in both this basement exposure and the slag.

Clearer evidence of copper mineralization comes from Gebel Safariat, itself. The copper mineralization occurs as traces of copper minerals associated with the iron oxides from the brownish-grey to yellowish-grey silty sandstone patches intercalated with the Gebel Safariat succession. The copper content in these patches is relatively low. Partial chemical analysis on one of the collected samples from these exposures shows 0.08 % copper content. On the other hand, the copper mineralization is clearer in the tectonically deformed yellow dolomite layers in the Gebel Safariat succession. In these, the mineralization occurs in the form of veinlets and irregular patches in the cracks of the dolomitic beds in association with iron and manganese oxides. The copper mineralization shows no evidence of malachite or azurite, which characterizes the oxidization zones in both sedimentary or basement rocks. The recorded copper minerals consist mainly of covellite. Covellite may oxidize to malachite and azurite, however. The question arises: why there are no visible colors indicating the occurrence of malachite and azurite? There is no definite answer to this question, except the possibility that the malachite and azurite occur as tiny grains and their colors are masked by the dark colors of manganese and iron oxides. Otherwise, the absence of malachite and azurite may be attributed to the presence of carbonaceous material which inhibits the oxidization of covellite.

#### ANCIENT COPPER MINING IN GEBEL SAFARIAT

In addition to the ancient copper slag heap, there are several interesting features in the area. These include many sites with ruins of ancient settlements as well as small artificial holes and adits (nearly horizontal passages leading into a mine) in the cherty limestone hills. Just north of the smelting site, there is an “adit” of unknown purpose under the foot of a cherty limestone hill. The entrance is hidden artificially by boulders. The visible ore is chert which occurs as pockets, lenses, bands, and nodules in the limestone. It is possible that the site may have been mined in ancient times for the chert which was used in making stone tools. It is true that a great amount of chert is available on the hills’ surfaces which can be picked up easily, eliminating the need for hard mining operations. Nonetheless, ancient miners may have required large and fresh chert masses, rather than the weathered lumps available on the surface. Further research is required for a better understanding of these ancient operations.

There is a verified ancient copper mine in the area located in a yellowish hill 400 meters due west-southwest of the Gebel Safariat smelting installations. At this site, there are several visible horizontal tunnels developed from an artificial terrace about 30 meters long and 2 meters wide in the yellowish dolomite bed of the hill (Fig. 4). The local inhabitants call the site *Magharet el Safraa (The Yellow Cave)* and *Magharet el Dabaa (Hyena Cave)*.

Fig. 4. Lateral view of the ancient copper mine of Gebel Safariat, showing animal bones left by Hyenas. The dashed line marks the fallen blocks which represent the outer roof of the mine. Author's photo.



According to local inhabitant Fawzi el Shetawi, the visible holes leading off the terrace arrive at an extensive underground space. The face of the mine is seriously eroded. Masses of the mine's roof rocks have collapsed, closing the main access to the interior (Fig. 5). Falling dust and rock debris from the upper part of the hill now obscure the main part of the terrace. This physical occurrence creates a safe den for a hyena. The hyena attacks the local sheep and most of the other animals in the surrounding area and drags their bodies to the mine terrace. He enters the mine via the narrow holes between the fallen rock masses. Consequently, there is good collection of different animal bones at the site. The mine seems extensive, below this terrace; there are two other adits in the foot of the hill. Once again, dust and falling rock debris partially hide the main entrances.



Fig. 5. One of the visible holes leading to the interior of the ancient copper mine that is hidden partially by collapsing blocks (hammer 25 cm).

Along the walls of the adits, faint traces of iron, copper and manganese mineralization can be discerned easily in the form of brownish-purple to violet patches and veinlets within the fractures of the dolomite bed (Fig. 6, next page). It seems likely that the mineralization replaced the patches of silty sandstones that were intercalated occasionally with the dolomitic rocks of the area. The mineralized zones contain iron, manganese and copper in different proportions. Partial chemical analysis of one sample collected from the veinlets of the outer face of the mine yields 0.16 % copper and 0.09 % manganese. In this instance, the content of copper was relatively low, but was just a quick test. It is likely that the ancient miners exploited richer copper zones from the interior of the adits. For that reason, this ancient copper mine is very similar to that of the Wadi Kharig which, according to Rothenberg, is a very rough and irregularly excavated adit, containing copper mineralization in association with iron and manganese.<sup>8</sup> Ancient miners extracted the copper-rich patches, while the manganese- and iron-rich zones were left untouched.

## CONCLUDING REMARKS

The slag heap of Gebel Safariat was first investigated and reported on by Thomas Barron, who noticed that the slag contained small visible grains of metallic copper. Along with the native copper and copper minerals in this slag, his chemical analysis of one sample showed an appreciable amount of Iron (ii) Oxide ( $\text{Fe}_2\text{O}_3$ ) (23.46 %), in addition to a small amount of Manganese (ii) Oxide ( $\text{MnO}$ ). In this regard, it is important to mention that the slag of Gebel Safariat is very similar to the slag of Bir Nasib and the adjoining sites which contain iron and manganese. Rothenberg mentions in his article that archeologist Hans-Gert Bachmann found that the slag of Bir Nasib site contained manganese-rich minerals.<sup>10</sup> This is in harmony with established observations that copper is associated with iron and manganese minerals in the Paleozoic succession in southwest Sinai.<sup>11</sup> The same feature is encountered in the copper mineralization of Gebel Safariat, also.

Manganese was a desired impurity in copper ores during ancient smelting activities. The established data shows that manganese forms a slag more readily than iron, and thus the copper ores containing manganese were the ideal ores.<sup>12</sup> Accordingly, the Gebel Safariat copper ore was ideal for the development of slagging technology.

Based on what we know now, no definite age can be assigned to copper mines at Gebel Safariat. Adequate study has yet to be done of tool marks (if present) on the stone walls of the adits. No tools were found exposed in the site except one chert tool associated with the dumps and tailing which face the adits (Fig. 7). The tool is fashioned from the local ore associated with the carbonate beds. The author, however, suspects that the site may be a pure prehistoric copper mine, and no historical mining of copper ore took place there.



Fig. 6. Iron, copper and manganese mineralization due to fractures of the yellow dolomite in the Gebel Safariat ancient copper mine (hammer 25 cm.). Author's photo.



Fig. 7. Chert tool fashioned from the local ore found associated with the dumps and tailing facing the adits (scale in cm.) Author's photo

The discovery of Gebel Safariat ancient copper mines negates previous ideas that the ancient Egyptians transported copper ores from distant sites to smelt at Gebel Safariat. In addition, this discovery confirms that the ancient Egyptians were good explorers for ore minerals, and in particular, copper mineralization.

#### **ACKNOWLEDGMENT**

Thanks are due to Prof. C. Tim Shaw for reading the text and providing valuable comments.

## NOTES

1. Barron 1907, 21.
2. Abdallah et al 1996a; b.
3. Abdallah et al 1996a.
4. Barron 1907, 21.
5. Hume 1937, 833.
6. Hume 1937; Afia 1985.
7. Rothenberg 1987.
8. Mehanna and Soliman 1998.
9. Rothenberg 1987.
10. *Ibid.*
11. Hilmy and Mohsen 1966; Hassan et al. 1989.
12. Craddock 1995.

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# AN “UNKNOWN WEAPON” OF ANCIENT EGYPT: IDENTIFYING A MYSTERY WEAPON IN A WORK BY SIR RICHARD FRANCIS BURTON

By Don Arp, Jr.

Sir Richard Francis Burton, famed explorer, polymath, and scholar founded a field of study he called “hopology.” Simply put, hopology is the study of “the history of arms and armour, their connection and their transition.”<sup>1</sup> In addition to recording and preserving humankind’s known weapons and martial ways, examining an unknown weapon and determining its identity and uses is a particularly important endeavor for the hopologist. Buried in one of his best known works, *The Book of the Sword*, Burton presents just such an unknown implement in an illustration of ancient Egyptian weapons. The image shown is enticingly vague, sadly two dimensional, and a little out of the ordinary. By examining Burton’s sources and, in turn, his sources’ sources all the way back to an Egyptian tomb wall, it was possible to identify this weapon and understand the possible use of weapons of its class in the martial culture of ancient Egypt.

## BURTON’S “UNKNOWN WEAPON”

The unknown weapon in Burton’s work appears in an illustration along with other ancient Egyptian weapons that include a dagger, a hatchet, and a so-called whip-goad.<sup>2</sup> There is also an item identified as a sling, which may be, in fact, an axe. The unknown weapon, shown in Figure 1a, looks to consist of a disc or ring attached to one end of a stout, short shaft (looking much like a club) with a short lash of unknown material at the opposite end. The lack of detail, small image size, and two dimensional nature of the drawing presents major challenges to understanding the weapon’s structure, especially the disc or ring portion.

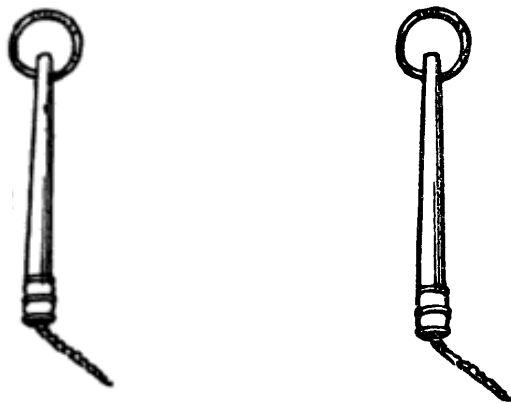


Fig. 1a. Unknown weapon. Fig. 1b. Unknown weapon  
as it appeared in Burton’s as it appeared in Demmin’s  
*The Book of the Sword.* *Weapons of War*

Research on discoid blades supports the conclusion that the structure at the one end is a ring. Discoid blades are rare. There is a species of wrist-knife in Africa that is disc-shaped, but not attached to a shaft.<sup>3</sup> Pacific Ocean New Caledonians produced a weapon that resembles the unknown Egyptian weapon in some aspects. The New Caledonia weapon, however, has a discoid jade blade attached to a shaft through a central fenestra in the disc.<sup>4</sup> Although older sources note the New Caledonian weapon was used for “slicing up enemies”,<sup>5</sup> it was actually a ceremonial item that saw no martial use. Given the rarity of a discoid metal blade, in

general, and the lack of an example mounted to a shaft, specifically, it seemed undeniable that the structure was a ring. Considering that Burton used illustrations from other publications regularly, determining the source of this image was critical in attempting to identify it and understand its function.

### DEMMIN'S "UNKNOWN WEAPON"

A review of Burton's sources led to Auguste Demmin's *Weapons of War* which provided the source for Burton's illustration. In Demmin's work, the weapon (See Fig. 1b, previous page), a match of Burton's image, is part of a full page collection of weapons from ancient Egypt. Demmin notes that the weapon is "unknown," and says that although it was impossible to note sizes, the weapons on the page "appear to be 25 to 27 inches in length and made from bronze or iron."<sup>6</sup> At best, these statistics are supposition and should be taken very lightly, given the questions of accuracy surrounding the source of Demmin's image. On his chart, Demmin notes that some of the weapons, including the one in question, came from the work of Vivant Denon.<sup>7</sup>

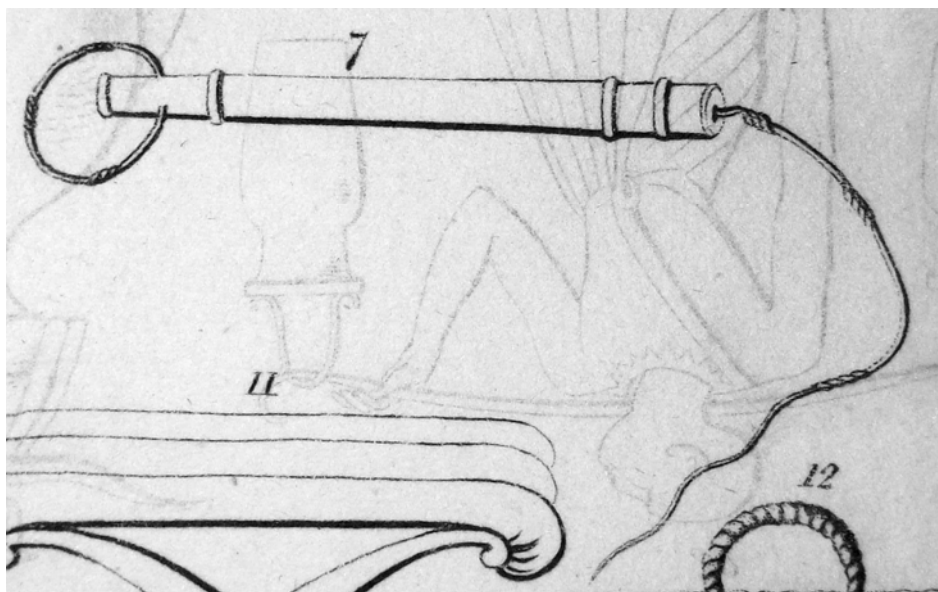


Fig. 2. The weapon as it appeared in Denon's *Voyages dans la haute et basse Egypte* and labeled as a "scourge."

### DENON'S "SCOURGE"

Dominique Vivant, Baron de Denon (1747-1825), was an artist, diplomat, writer, and amateur archaeologist who had the good fortune of being part of Napoleon's Egyptian expedition. Denon chronicled his adventures with Napoleon's forces in his book, *Voyages dans la haute et basse Egypte*. Denon made many studies and executed several drawings of the archaeological sites he visited. Figure 2 shows his drawing of the weapon in question, from Plate LIV (mislabeled as LXIV) of his book. Along with many others, Denon drew the image in the span of a few minutes from the wall of a then unidentified tomb.<sup>8</sup>

This image shows a few critical features of the weapon in more detail than the image used by Demmin and Burton, from which it varies to some degree. Denon labels the image as a "scourge."<sup>9</sup> Like other versions of the image, the weapon does look like a club with a whip lash attached. Denon's more detailed drawing shows the structure to be a nonmetallic ring, and the instrument to be a type of

whip weapon. Despite the clarity of Denon's image, an accurate name for and use of the weapon remains unknown.

Denon's use of the term "scourge" presents a few issues, as scourge descriptions vary with regard to size, number of lashes, presence of a handle, and use. For example, in Latin, scourge is known as *scutica*.<sup>10</sup> Horace (Quintus Horatius Flaccus) claims *scutica* had a single thong and makes no mention of a handle of any kind.<sup>11</sup> The identification is complicated further when it is compared to the Egyptian royal flail, which has several lashes and is sometimes called a scourge.<sup>12</sup> For the remainder of this article, the instrument in question will simply be called a whip.

## IDENTIFYING THE TOMB

The image Denon drew came from a tomb wall, but the identity of the tomb is not disclosed. In his book, Denon notes he had fewer than twenty minutes to draw several images, for the forces he was accompanying were preparing to move. Denon said the tomb had small chambers, each featuring different elements representing Egyptian society, such as household goods, agriculture, and weaponry. In one chamber, Denon noted an image of a man playing a harp.<sup>13</sup>

This last observation helps pinpoint Denon's location: the tomb of Ramesses III (KV 11), also known as the Harper's Tomb.<sup>14</sup> This tomb is well known for having a room, exactly like the one Denon mentions, that contains a large collection of images representing the weapons used during the time of Ramesses III. G. Wilkinson notes that the room, ". . . contains various arms and warlike implements of the Egyptians; among which are knives, quilted helmets, spears, yatakans or daggers, quivers, bows, arrows, falchions, coats-of-mail, darts, clubs, and standards."<sup>15</sup> Of the two rooms that contain significant images of weapons, the room called Side-chamber Ch by the Theban Mapping Project and Side-room M by Porter and Moss is most likely the room Denon visited.<sup>16</sup>

## THE WHIP OF KV 11

An image from Bresciani (1993) of the KV 11 side-chamber shows a collection of whips amongst the helmets, swords, spears, and other ephemera of war.<sup>17</sup> What is curious is that the whip looks only slightly like the image Denon drew and is a much thinner whip, similar to one illustrated in G. Wilkinson's *Manners and Customs of the Ancient Egyptians* (see Fig. 3). The whip's shaft is painted yellow. Since the early days of European exploration of Egyptian tombs, it has been held widely that certain colors denoted certain materials. For example, red denoted bronze and blue denoted iron.<sup>18</sup> The yellow color denotes possibly that the shaft was made of wood. This conclusion is supported by the archaeological record, for the whips found to date in Egyptian tombs most often have wooden shafts. Supporting examples are found in the tomb of Yuya and Thuyu,<sup>19</sup> Tuthmosis IV,<sup>20</sup> and Tutankhamun.<sup>21</sup> In appearance, these whips resemble closely the whip depicted on the wall of KV 11.



Fig. 3. A whip from G. Wilkinson's *Manners and Customs of the Ancient Egyptians* that matches the images from Side-chamber Ch in KV 11.

What of Denon's whip? We are presented with a few options. Either Denon's drawing is accurate, but based on an image that has yet to be presented in a publication, or he is wrong, and the "scourge" he drew is really a much lighter whip. Another image published by G. Wilkinson supports Denon's drawing. Figure 4 shows a whip hanging from the wrist of a chariot-borne archer.<sup>22</sup> The weapon resembles Denon's drawing closely. G. Wilkinson notes, "The whip consisted of a smooth round wooden handle, and a single or double thong; it sometimes had a lash of leather, or string, about two feet in length, either twisted or plaited; and a loop being attached to the lower end. . . ."<sup>23</sup> The archer's whip has a pommel ring which, in this case, is used as an attachment point for another ring or loop through which the archer's arm passes, and a shaft that has some ridges. The handle of the archer's whip is straight (not tapered like Denon's), and the whip appears to have several thongs braided into a single lash attached to the side of the distal end of the shaft (not to the actual end like Denon's). The side attachment of the lash is similar to much later dated Turkish whips and so-called "gun whips" from India that combine a lash with a gun barrel concealed as the whip's handle.<sup>24</sup> The archer's whip differs greatly from the seemingly longer whips depicted in KV 11, however.

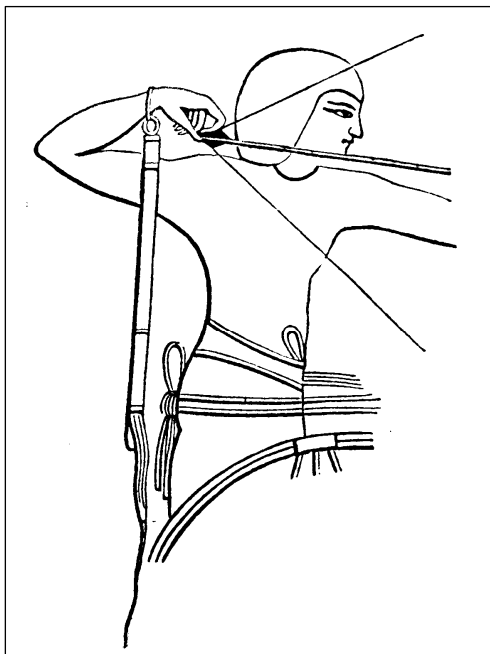


Fig. 4.  
A chariot-borne archer  
and his whip from G.  
Wilkinson's *Manners  
and Customs of the  
Ancient Egyptians*.

One argument against the accuracy of Denon's drawing compared to the images from KV 11 is the quality of ancient Egyptian art. Speaking about examples of weapons found, Hasel notes, "The few examples that do exist testify to the accuracy of the Egyptian reliefs in depicting the weaponry of the Late Bronze Age. . . ."<sup>25</sup> The archaeological record shows no actual artifacts resembling Denon's whip, whereas several whips have been found that resemble the paintings in KV 11 closely. At this point, it is difficult to determine if Denon's image is at fault (possibly due to the constraints under which he worked), or if there is some other image of a whip yet to be published from the tomb. To date, the examination of KV 11's walls remains incomplete.<sup>26</sup> Some damage to the wall plaster containing the images has occurred, moreover. Only further examination of KV 11 can possibly offer a final answer.

## THE WHIP AT WAR?

Regardless of the accuracy of Denon's image, the whip depicted in KV 11 is accompanied by other weapons of war, placing the whip in a context seen rarely outside of action films. Whips skirt a gray area in weapons studies. Considering the amount of energy needed to swing the implement and the resultant mild injury to the enemy, whips are really not efficient weapons. This leads some to note that "Although not effective for military use, such objects have often been used as impromptu weapons."<sup>27</sup>

The whip could, however, be effective in chariot combat. In the beginning of the Battle of Kadesh in 1274 BCE, Ramesses II deployed infantry to either board or topple Hittite chariots attacking the Egyptian camp.<sup>28</sup> Having ground forces attack chariots was a fundamental part of chariot warfare, for removing or killing either horses or charioteers neutralized the vehicle. "Horses and charioteers were endangered by determined skirmishers, known to the Egyptians as 'runners', mercenaries skilled in hit-and-run attacks."<sup>29</sup> Defending the chariot against these attackers was no easy task. Use of a sword was dangerous in a chariot holding two people. An errant swing could kill or incapacitate the driver. Because of the blade's short length, a dagger wound could entangle the chariot-warrior and his attacker.

The use of a whip by the chariot-warrior, *snny* in Egyptian,<sup>30</sup> may be quite useful, moreover, as a secondary weapon. G. Wilkinson's description of an archer's whip, the implement that resembles to a great degree Denon's drawing, gives some credibility to this whip in such a scenario. Wilkinson writes, "... a loop being attached to the lower end, the archer was enabled to use the bow, while it hung suspended from his wrist."<sup>31</sup> The ready availability of the whip to the chariot-warrior certainly implies that the implement was important to have at hand. An archer, sending

arrows down range, could bring the whip to his hand easily and level strikes either with the lash or the bludgeon-like handle at an ambitious ground soldier attempting to board the chariot. Barring further obstacles, once the attacker was stunned, the chariot could maneuver away. The bludgeon-like handle brings to mind actual war clubs and bears a resemblance to the *phalanga* or *palanga*, a war truncheon known from a tomb painting at Paestum shown in Figure 5.<sup>32</sup> It may be possible that Denon's whip did exist and was a whip specifically designed for chariot warfare.

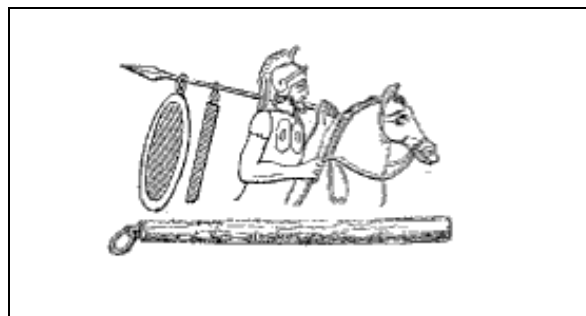


Fig. 5. The *phalanga* or *palanga* from a tomb at Paestum. Image from Rich's *A Dictionary of Roman and Greek Antiquities*.

## CONCLUSION

Further examination of KV 11 is needed to determine the source image of Denon's drawing and make a final determination with regard to the specifications of the whip it depicts. Given the diversity of whips portrayed in other images, the weapon drawn by Denon may exist and represent a class of whip that was used in warfare. The dynamics of chariot warfare present situations specifically in which a whip, with or without a stout handle, could be used as a weapon when other implements like a sword or spear would not be feasible. This possible employment of the whip in ancient Egypt may make the reassessment of the martial application of the whip in other cultures necessary.

## NOTES

1. Burton 1884, 1.
2. *Ibid*, 157.
3. Spring 1993, 115.
4. Starr 1895, 139.
5. Cope 1880, 63-69.
6. Demmin 1870, 104.
7. *Ibid*.
8. Denon 1803, 38.
9. *Ibid*, 254.
10. Adam 1831, 24.
11. Horace 1853, 357.
12. Frazer 1919, 108; Hall 1912, 85.
13. Denon 1803, 36-37.
14. G. Wilkinson 1847, 369.
15. *Ibid*, 370.
16. Theban Mapping Project. Side-chamber Ch. [accessed on 8 September 2009].
17. Bresciani 1993, 209.
18. G. Wilkinson 1871, 110.
19. Davis et al 1907.
20. Carter et al 1904
21. Littauer 1985.
22. Wilkinson 1854, 373.
23. *Ibid*, 372.
24. Diagram Group 2007, 73; Stone 1961, 666 and 668.
25. Hasel 1998, 105.
26. Personal Communication with N. Spencer, 25 November 2008.
27. Diagram Group 2007, 73.
28. Cotterell 2004, 10-11.
29. *Ibid*, 14.
30. Bard 1999, 193.
31. G. Wilkinson 1854, 372.
32. Rich 1874, 497-498.

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