

Egyptology at the Dawn of the Twenty-first Century

Proceedings
of the Eighth
International Congress
of Egyptologists
Cairo, 2000

- Volume 3
- Language
- Conservation
- Museology

- With a preface by Zahi Hawass

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Volume 3
Language
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Edited by
Zahi Hawass

In collaboration with
Lyla Pinch Brock

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Preface

Zahi Hawass

The Eighth International Congress of Egyptologists, held in Cairo in March 2000, marked the opening of the new millennium as an opportunity to evaluate and redefine the focus and goals of Egyptology in the twenty-first century. Through the Millennium Debates and the papers of other participants published here, we are made aware that now more than ever, Egyptology is facing a period of change and challenge and we must meet these challenges if our field is to remain relevant to the modern world. The Congress was attended by some 1,400 scholars, and of the 400 papers delivered, 248 were selected by our scientific review committee to be published in these volumes. It is notable that this Congress included a higher number of Egyptian Egyptologists than we have seen in many years. In fact, some 500 Egyptian Egyptologists attended the conference. Their inclusion with the more well-known names in Egyptology is an indication of one of the frequently mentioned themes in the Congress: the need for education and training of more Egyptian scholars and excavators to study and maintain their country's monuments as part of the world's heritage.

The enormous quantity of submissions to the Proceedings led to the decision to publish them in three volumes. Volume One contains all the archaeology papers; Volume Two, those dealing with history and religion; and Volume Three covers the topics of language, literature, museology, and conservation. Each volume of these Proceedings opens with the text of the corresponding Millennium Debates and their respondents, and the papers of the specific subjects follow in alphabetical order by the contributor's name.

The Millennium Debates formed a special focus for this Congress. Chaired and responded to by eminent experts in the field, the Debates covered archaeology, art, history, language, literature, museology, religion, site management, and conservation. In his paper (opening the Debates in Volume One) on "Egyptology in the Twenty-first Century," David O'Connor provides a cogent summary of the trends in field work in Egyptology in the last forty years and discusses three points crucial to the future of Egyptian archaeology: the changing attitudes of Egyptians toward

their archaeology, the need for comprehensive mapping (rather than excavation) of the national archaeological landscape, and theoretical issues and their impact on archaeology, epigraphy, and other scholarly disciplines.

Volume Two continues with keynote speakers addressing the Millennium Debate issues of history, art history, and religion. In his paper, "Writing the History of Ancient Egypt," Donald B. Redford challenges the appropriateness of new approaches to historiography such as retrospective economic theory, Egyptology as anthropology, deconstruction, and 'history from below,' as he characterizes the tendency to use anecdotal evidence to draw far-reaching conclusions about the 'common people' in Egyptian history. Edna R. Russmann, in her contribution to the Millennium Debate on the study of the art of ancient Egypt laments the failure of Egyptian art scholarship to coalesce into a recognized subdiscipline with an academic tradition of acknowledged interests and methods of its own. She goes on to give a summary of the most urgent needs facing the study of Egyptian art as well as possible solutions. In the last Millennium Debate paper in Volume Two, Herman te Velde writes on "The History of the Study of Ancient Egyptian Religion and its Future," which he considers one of the most urgent topics in Egyptology today, since the core of ancient Egyptian culture is its religion. He speculates that although Egyptologists with various special interests will contribute to the study of religion, the most progress should be expected from those willing to focus their research specifically on religion and its accompanying issues, such as polytheism versus monotheism, pharaonism versus local religions, and religion in life as well as death.

Perhaps the most challenging of Millennium Debate papers come in Volume Three. John Baines' comprehensive examination of the current and future possibilities for research on Egyptian literature is complemented by Antonio Loprieno's notes on the problems and priorities in Egyptian linguistics. Baines provides extensive analysis and definition of the Egyptian literary corpus, its relation to the wider stream of tradition and range of written forms, and the social and ideological situation and status of what was written. Loprieno concentrates on the achievements of Egyptian linguistics over the last fifteen years and considers the impact of recent developments in linguistic research on Egyptian phonology and lexicography. Regine Schulz's paper, "Museums and Marketing: A Contradiction" is a timely examination of the pressures facing museums around the world to provide "blockbuster entertainment" while maintaining their five basic mandates of collecting, preservation, research, presentation, and mediation. Finally, my own contribution to the Millennium Debates, "Site Management and Conservation," addresses some of the principal problems and threats to the conservation of Egyptian heritage sites and makes recommendations, some perhaps controversial, for improving site management methods and protection as well as giving suggestions for salvage and excavation over the next ten years.

In addition to being a forum for debate and report, the Congress honored several prominent Egyptologists for their outstanding contributions to the field, including Abdel-Aziz Saleh and Sayed Tawfik from Egypt; Harry Smith of England; William K. Simpson from the United States; Rainer Stadelmann from Germany; Jean Leclant of France; Sergio Donadoni from Italy; Kazimierz Michalowski of Poland; and the late Gamal Mokhtar, former Chairman of the Antiquities Organization of Egypt and Member of the Supreme Council of Culture.

I took great pride in the many complimentary comments I received regarding the organization and success of the Eighth International Congress of Egyptologists, but credit for this must be shared with the many people whose efforts made that success possible. I would like to thank the members of the different committees who planned and executed the many aspects involved in holding such a large conference. The Congress was held at the Mena House Oberoi Hotel in

the shadow of the Giza Pyramids and thanks to its General Manager, Rajiv Kaul, everything ran smoothly in the day-to-day operations. The Congress would also not have been possible without the financial support of many Egyptian business corporations. Another important contributor was the American University in Cairo Press. Its director, Mark Linz, and the Press's editorial staff were of great help in completing the Congress's mission by publishing the Abstracts, edited by Angela Jones, and of course these final three volumes of Proceedings edited in collaboration with Lyla Brock.

In conclusion, I would urge the International Association of Egyptologists to review and expand its activities in the future, with the aim of making itself better known to the general public and potential sponsors. This would enable it to raise the funds to undertake and complete valuable projects, many of which are discussed in these volumes. I would also urge that scientific studies and research programs should be geared less to the personal interests of the researcher, but should follow an overall action plan targeting those areas where monuments are especially endangered, such as the Delta and the great deserts of Egypt. I believe that all who participated in the Eighth International Congress of Egyptologists and all those who read these volumes of Proceedings will take wise and positive action in regard to these concerns.

Scientific Methods Used in Excavating and Conserving a Painted Mud-Brick Tomb on the Giza Plateau

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In 1999, a painted tomb in a unique architectural style, with two intact burial shafts and a limestone socket in the floor inscribed with the titles of the tomb owner, was found in the Western Cemetery at Giza where many other Old Kingdom tombs had been discovered. This tomb belongs to a priest named Kay, who has two other tombs in the same cemetery. It is located near the western end of the Western Cemetery and was excavated by the Supreme Council of Antiquities under the supervision of Zahi Hawass. Excavation began in early 1990, when many mud brick tombs, including the tomb of Kay, were uncovered. Initially, the delicate condition of the plaster presented many difficulties while we were removing the debris from the eastern entrance. Due to this situation, excavations were suspended and the tomb reburied until a scientific solution to preserve the painted plaster could be found.

The tomb was built of mud brick covered with plaster and painted with beautiful scenes on a layer of gypsum. The excavation was supervised by Zahi Hawass on behalf of the Supreme Council of Antiquities. The excavation resumed in November 1998 and continued until February 1999. A conservation plan was put in place to preserve the painted plaster during excavation. As conservators, our role was to conserve the artifacts discovered during excavation as well as to oversee the final restoration of the wall paintings.

The discussion will cover the following topics:

- The steps followed during the excavation.
- The major problems encountered during the conservation of the wall paintings.
- The method and material used in treating the wall paintings.

Introduction

It is not known exactly when the ancient Egyptians first began using mud brick in the construction of buildings, but the oldest known mud-brick structures in ancient Egypt are the Pre-dynastic tombs at Naqada and Abydos.¹ At the beginning of the Early Dynastic Period mud brick was used widely in tomb construction, especially at Saqqara.²

In the Old Kingdom, mud brick was used in building mastabas and tombs. Many examples are still extant in the Western Field at Giza, where the subject of the present paper is located. Early on, mud brick was used mainly for lining the burial shafts, and later, the interior and exterior walls. The size of ancient Egyptian mud brick varied; some had the same dimensions as modern ones, while others were very large. In the Egyptian museum there are two ancient mud bricks with dimensions of 96.5 x 53.3 x 30.5 cm. Mud brick is composed of sand, silt, and clay, and fibrous organic materials such as straw may also be added. Sand was used as a filler to increase compressive strength and minimize cracking while the adobe dried.³

Features of the Tomb's Construction

The plan of the tomb is very simple. It consists of only one room measuring 2.80 m x 2.10 m x 2.15 m. It is built of regularly-sized mud bricks, each one 40 cm x 16 cm x 13 cm. The thickness of the walls are as follows: western wall, 60–62 cm; eastern wall, 1.65 m; northern wall, 60 cm; southern wall, 62 cm.

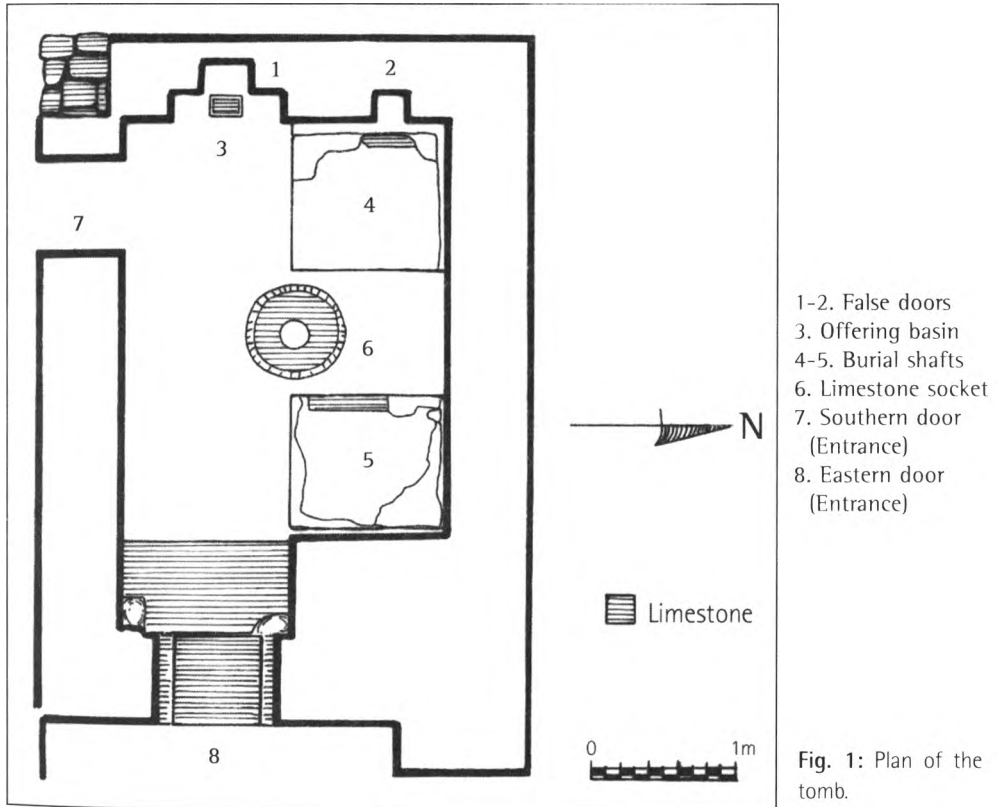


Fig. 1: Plan of the tomb.

The southern wall preserves traces of a domed ceiling. We also found remains of wood and mortar in the inscribed socket in the middle of the floor, suggesting that the domed ceiling was once supported by a wooden beam. The exterior walls plastered with mud bear colored representations showing the tomb owner together with his wife enacting daily life activities.

The tomb consists of two doorways; one located to the east paved with fine limestone slabs and a socket which once held a wooden door. The second one is at the western end of the southern wall.

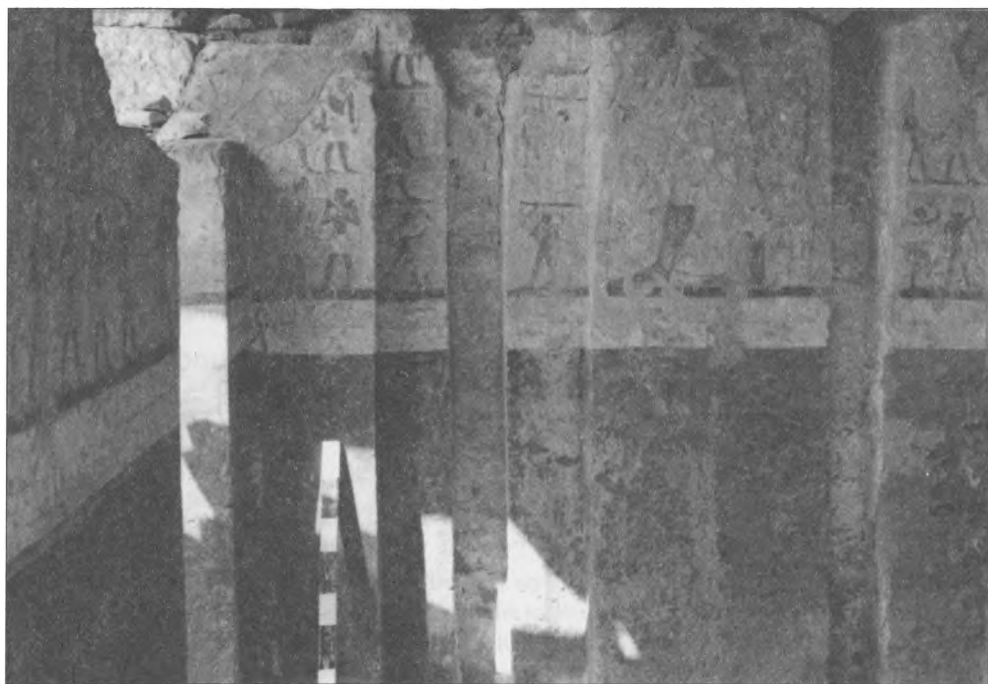


Fig. 2: Western wall after restoring the paintings.

1. Two false doors in the western wall, decorated with offering bearers (see fig. 2). An offering basin of limestone measuring 20 x 16 x 6 cm was found at the foot of the southern false door.
2. Two burial shafts inside the room next to the northern wall. Both of them were cut into the bedrock, and each contained an intact burial in a flexed position.
3. A fine limestone socket in the center of the room inscribed with the titles and name of the tomb owner, Kay (see fig. 3).



Fig. 3: A fine limestone socket in the center of the floor in the tomb of Kay inscribed with the names and titles of the tomb's owner.

Painting technique

The adobe backing was irregular during the Predynastic Period. It consists of a mixture of sand and clay and usually contains a little natural calcium carbonate and gypsum.⁴ The backing was covered with another layer of thick Nile silt clay plaster mixed with chopped straw. On almost all the walls, the clay plaster varied in thickness. The practice of mixing chopped straw with clay for the wall covering was to ensure greater adhesion and to minimize cracking.⁵ The surface of the clay plaster, found to be rough, was made smoother with three layers of plaster. These layers vary in thickness, the first one, which is creamy in color and fragile, had a thickness of 2.5–4.0 cm. The second layer is gray in color and had a thickness of 0.8–1.0 cm., while the third layer (whitewash) was rather compact and had a thickness of 3 mm. (fig. 4).

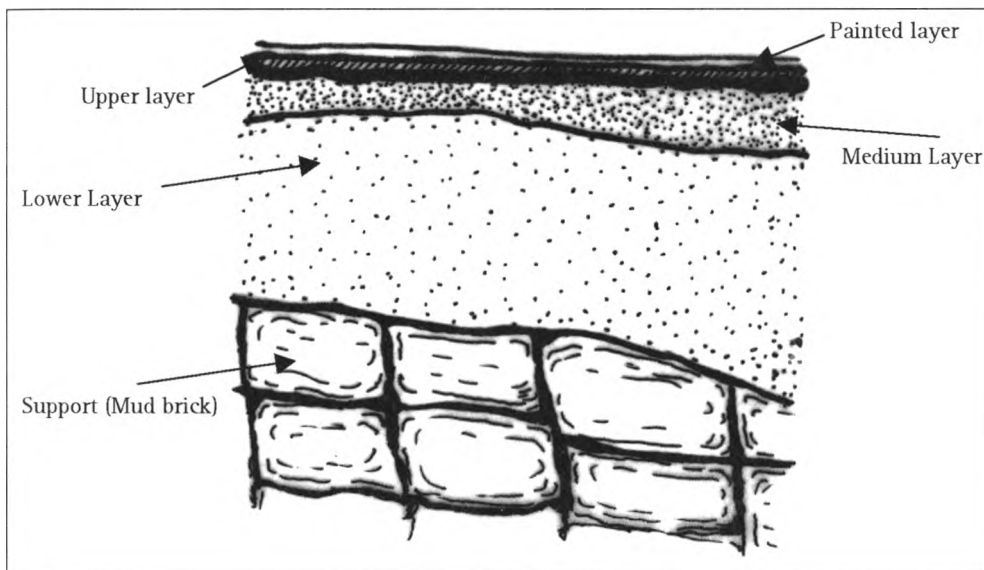


Fig. 4 : Section of the plaster layers.

On the whitewashed layer, scenes were outlined in pigment, and then filled in with a thin layer of gypsum plaster 3 mm thick, then the figures were painted with different pigments. The scenes were painted on the upper parts of the walls, while the lower portions were simply colored black.

The analysis was carried out by the use of X-ray diffraction (XRD) on numerous samples taken from different parts of Kay's tomb. The resulting data showed that the preparatory layers contained α -quartz SiO_2 (46 – 1045), calcite CaCO_3 (05 – 0586), gypsum (33 – 0311) and Dolomite $\text{CaMg}(\text{CO}_3)_2$ (11 – 0078).

The preparatory layers mainly contained α -quartz and lesser quantities of calcite, gypsum, and dolomite. The ratio between calcite and gypsum is nearly 1:1.

Experimental Work

Testing was carried out on laboratory specimens similar to the original mural painting in the tomb of Kay for practical reasons. Specimens were artificially weathered to simulate the original

state of the painting. In order to find a suitable consolidant and good adhesive to restore the mural painting and attach the loose parts, different synthetic polymers dissolved in organic solutions as well as synthetic emulsions were applied to the specimens. Polyvinyl acetate, paraloid B 72, ethyl silicate, polymethyl metacrylate, polyvinyl alcohol, primal AC33, and the emulsion of vinyl acetate were tested. However, in the tested emulsions, the polymer globules suspended in water are relatively large, the liquid has a high viscosity, and penetration is low.

In addition, water is not a good carrier in the case of adobe, since it causes swelling of the clay particles and decreases the mechanical properties. Emulsions should therefore be applied as adhesive only, by injecting it inside the walls but never on the surface.

Conservation during excavation

1. First, we decided to excavate from the top of the deposit to the bottom, layer by layer. Each layer turned out to be 5–10 cm thick.
2. While removing a layer of debris lying against the western wall, a portion of the painted decoration became detached from the wall. We immediately covered it with soft sand and left it until the next day to dry.
3. The next day we removed the soft sand and cleaned the wall. Then we treated the painting with paraloid B 72.
4. While digging the second layer, we discovered painted inscribed limestone fragments, partially covered with crystallized salts, which we removed and consolidated with paraloid B 72.

While excavating another layer along the northern wall, we used the same procedures as in no. 2.

The above methods were used to stabilize the wall decoration. When we started to treat the wall paintings on the western wall near the southern doorway, we found loose pieces of plaster, which we treated with primal AC 33.

The fourth layer of debris consisted of soil containing pottery shards, limestone fragments, and loose mud brick. Unfortunately, this debris adhered to the paintings and had dislodged parts of the plaster, causing many difficulties during excavation.

We also found parts of the painted plaster mixed in with the debris. These fragments were cleaned and treated on site with paraloid B 72, before preparing them for further conservation.

Finally, we constructed a new wooden roof to protect the wall paintings and the structure of the tomb itself until further reconstruction and architectural restoration can be carried out.

Conclusions

Various tests and measures were taken on different samples of adobe and clay plaster. Among the positive results one can note:

- Since moisture causes swelling of the clay particles and decreases the mechanical properties of mud brick with the risk of material detachment during treatment, emulsions should therefore be applied only by injection inside the wall to join the fallen plaster, and never on the surface. Among emulsions tested, primal AC 33 was found to be the most suitable material for making it adhere to the original surface.⁶
- Synthetic resins act as consolidants by penetrating the pores and coating the loosened particles. Therefore, and according to the literature and tests, the surface treatment of the vertical walls of the present tomb was accomplished by using Paraloid B 72 and ethyl silicate.⁷ Ethyl silicate has been used in the last twenty years with good success in the consolidation of adobe surfaces which contain a large quantity of free hydroxyl groups (-OH) capable of reacting with the consolidate during its polymerization.⁸

This paper is part of the Masters thesis presented to the Faculty of Archaeology, Cairo University, 1998, entitled "Scientific Study of conservation and restoration of mural paintings of mud brick applied on a Old Kingdom tomb at Giza during and after its discovery." The work was conducted under the supervision of Mohamed Abd El-Hady, Ahmed Shoeib, and Zahi Hawass.

Notes:

- 1 A. Lucas, *Ancient Egyptian Materials and Industries*, (Cairo, 1991), 88–89.
- 2 A. J. Spencer, *Brick Architecture in Ancient Egypt*, (London, 1979), 5.
- 3 M. Helmi Fatma, "Deterioration and conservation of some mud brick in Egypt," *Sixth International Conference on the Conservation of Earthen Architecture*, (New Mexico, 1990).
- 4 P. Mora and P. Philippot, "Conservation of Wall Paintings," *ICCROM*, (London, 1984), 73.
- 5 A. S. Shoeib, "The problem of lime-based plaster in ancient Egyptian wall paintings," *Journal of Archaeology*, (Cairo University, 1997).
- 6 A. S. Shoeib and M. Roznerska, "The problem of preliminary consolidation of ancient wall paintings being damaged by soluble salts," *Acta University Nicolai Copernici*, XXX (Toruni, 1998), 73–94.
- 7 C. Giocomo, "Chemical surface treatment and coping techniques of earthen structures," *Sixth International Conference on the Conservation of Earthen Architecture*, (New Mexico, 1990), 267–273.
- 8 C. Giacono, "Consolidation of adobe with Ethyl silicate: control of long term Effects using SEM," *Fifth International Meeting of Experts on the Conservation of Earthen Architecture*, *ICCROM*, (Rome, 1987), 25–32.