



# FRENCH-EGYPTIAN CENTRE FOR THE STUDY OF THE TEMPLES OF KARNAK



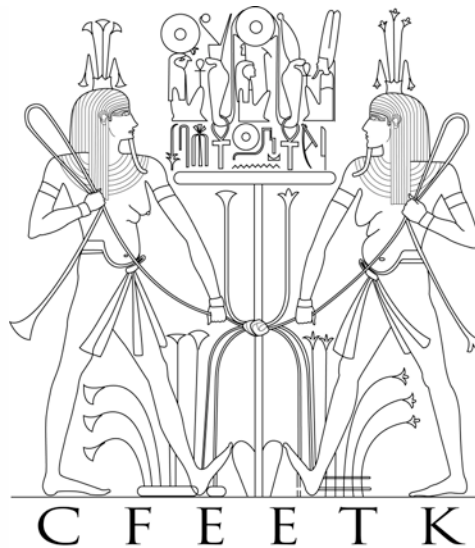
Luxor, 2018



*Ministry of Antiquities of Egypt  
Centre National de la Recherche Scientifique  
Ministère de l'Europe et des Affaires Étrangères*

# **FRENCH-EGYPTIAN CENTRE FOR THE STUDY OF THE TEMPLES OF KARNAK**

## **ACTIVITY REPORT 2017**



## TABLE OF CONTENTS

|   |           |
|---|-----------|
| <b>FOREWORD .....</b>   | <b>3</b>  |
| <b>1. SCIENTIFIC PROGRAMMES .....</b>   | <b>6</b>  |
| <b>1.1. Power and marks of Power at Karnak .....</b>                                      | <b>6</b>  |
| 1.1.1. The Sphinxes of Pinudjem .....   | 6         |
| 1.1.2. The façade of the 2nd Pylon.....   | 7         |
| 1.1.3. The 7th Pylon .....  | 8         |
| 1.1.4. The 8th Pylon .....  | 8         |
| <b>1.2. The Peripheral areas.....</b>   | <b>9</b>  |
| 1.2.1. Temple of Ptah: The Roman-Byzantine quarter .....                                  | 9         |
| 1.2.2. Ceramic studies .....  | 18        |
| 1.2.3. Conservation of archaeological artefacts .....                                     | 22        |
| <b>1.3. Cults and places of worship .....</b>   | <b>25</b> |
| 1.3.1. The Bark-shrine of Philipp Arrhidæus .....   | 25        |
| 1.3.2. The Central sanctuaries of the <i>Akh-menu</i> and the “Northern storerooms” ..... | 25        |
| 1.3.3. The Edifice of Taharqo by the Sacred Lake.....                                     | 27        |
| 1.3.4. Graffiti in the court of the 7th Pylon .....                                       | 27        |
| 1.3.5. Demotic graffiti .....   | 28        |
| 1.3.6. The Osirian sanctuaries .....  | 29        |
| <b>1.4. The <i>Karnak project</i> .....</b>   | <b>42</b> |
| <b>2. RECONSTRUCTION PROGRAMMES.....</b>  | <b>45</b> |
| The walls of the Cachette courtyard .....   | 45        |
| <b>3. CONSERVATION-RESTORATION PROGRAMMES .....</b>                                       | <b>48</b> |
| 3.1. The “Funeral rooms” of the <i>Akh-menu</i> .....                                     | 48        |
| 3.2. The “Sokarian rooms” of the <i>Akh-menu</i> .....                                    | 51        |
| 3.3. The “Axial sanctuaries” of the <i>Akh-memu</i> .....                                 | 55        |
| 3.4. The screen-walls of Osorkon III .....  | 59        |
| <b>4. ARCHIVES AND SCIENTIFIC DOCUMENTATION .....</b>                                     | <b>64</b> |
| 4.1. Scientific archives.....   | 64        |
| 4.2. Photographic department .....  | 65        |
| 4.3. Topographical department .....   | 66        |
| 4.4. The scattered blocks survey .....  | 70        |
| <b>5. TRAINING PROGRAMMES .....</b>   | <b>71</b> |
| <b>6. PUBLICATIONS AND LECTURES .....</b>   | <b>71</b> |
| 6.1. Selected publications of the CFEETK members and associated missions (2017) .....     | 71        |
| 6.2. Colloquium and lectures.....   | 74        |
| 6.3. Photography exhibition .....   | 75        |
| <b>7. CFEETK MEMBERS .....</b>  | <b>77</b> |
| <b>8. ACADEMIC COLLABORATIONS.....</b>  | <b>78</b> |

## FOREWORD

Work of the French-Egyptian Centre for the Study of the Temples of Karnak in 2017 mostly took place on schedule, in accordance with the decisions of the Scientific Committee which took place in March 2016. Inside the temple, the activity of the Centre was mainly involved in three programmes, as an extension of the work of the previous seasons.

The first concerns the archaeological investigations of the eastern area of the Ptah temple. The Roman-Byzantine period settlement provided very interesting data and artefacts about the people who were living at Karnak at the end of the 4th century – beginning of the 5th century AD.

The second programme concerned the reconstruction of the east wall of the Cachette courtyard, allowing to rebuild a large part of this wall. This work, started this season, was also the opportunity to discover the presence of a niche on the east side of the wall, decorated in the name of king Tutankhamun.

The third programme was devoted to the conservation and restoration work in the *Akh-menu*. Following the conservation of the Alexander the Great's chapel and its vestibule, the programme concerned the “axial sanctuaries”, the “funeral rooms” (now opened for visitors), and the “Sokarian rooms”. An important conservation programme concerned nine sandstone blocks uncovered by the CFEETK in 1976-1977; they belong to screen-walls of a colonnade built by Osorkon III in front of Khonsu Temple.

The epigraphic work and graffiti studies continued on different parts of the temple, in preparation for various volumes. Three new epigraphic studies were initiated: the blocks of the western façade of the 2nd Pylon; the blocks of the Edifice of Taharqo by the Sacred Lake, and the 7th Pylon.

The online edition of all the hieroglyphic texts from Karnak (the *Karnak project*: <http://sith.humanum.fr/karnak>) started in January 2013; it is funded by LabEx Archimede (CNRS UMR 5140-Univ. of Montpellier 3-Univ. of Perpignan). In 2017, the *Karnak project* provided 5,000 hieroglyphic inscriptions of the temple of Karnak available online. The scientific archives of the Centre have been opened online this season.

Constant work has concerned the documentary database of Karnak, which was enhanced by the addition of photographs and new scans. The CFEETK website (<http://www.cfeetk.cnrs.fr/>) and social networks (Facebook and Twitter) ensure visibility the activities and work carried out by the center.

Celebrating the 50th anniversary of the Centre, a photography exhibition was displayed inside Karnak temple from April to June 2017, showing to the visitors old and recent photographs from the archives of the Centre. About twenty large panels supporting photographic prints were arranged in the temple to present in situ the diversity of the work carried out in Karnak.

On the occasion of this exhibition, a book celebrating 50 years of French-Egyptian cooperation in Karnak was published in partnership with the French Institute of Egypt. Let us also mention the publication of *Cahiers de Karnak* 16 (28 articles), printed on the MoA press.

The manuscript of volume III of the *Temple of Ptah*, devoted to the *favissa* discovered in 2014-2015, was given to the IFAO press. Other volumes are in preparation and will be submitted in 2018-2019.

At a ceremony held on February 17, 2017 at the Ministry of Antiquities in Cairo on the occasion of the “Luxor Times Egyptology Awards 2017”, the CFEETK was awarded first prize in the category “Top 5 Ongoing Achievements”.

All the work carried out at Karnak has benefited from the constant help of Amin Ammar and Mustafa el-Saghir, General Directors of Karnak temples, Abder Raheem Khazafi, Director of Karnak Temples, Mona Fathi and Fawzy Helmi, Directors of Karnak Temples, Ghada Ibrahim, Director of foreign missions, Tayeb Gharib, chief inspector, Abdel Nasser Ahmed and Abder Radi Abdel Monem Mohamed, Chiefs conservator, Tarek Milad Zikri, Chief architect of Upper Egypt, all the inspectors, the Raïs Mahmud Faruk and the workers of the MoA. It is a pleasure to thank all of them for their kind and constant support.

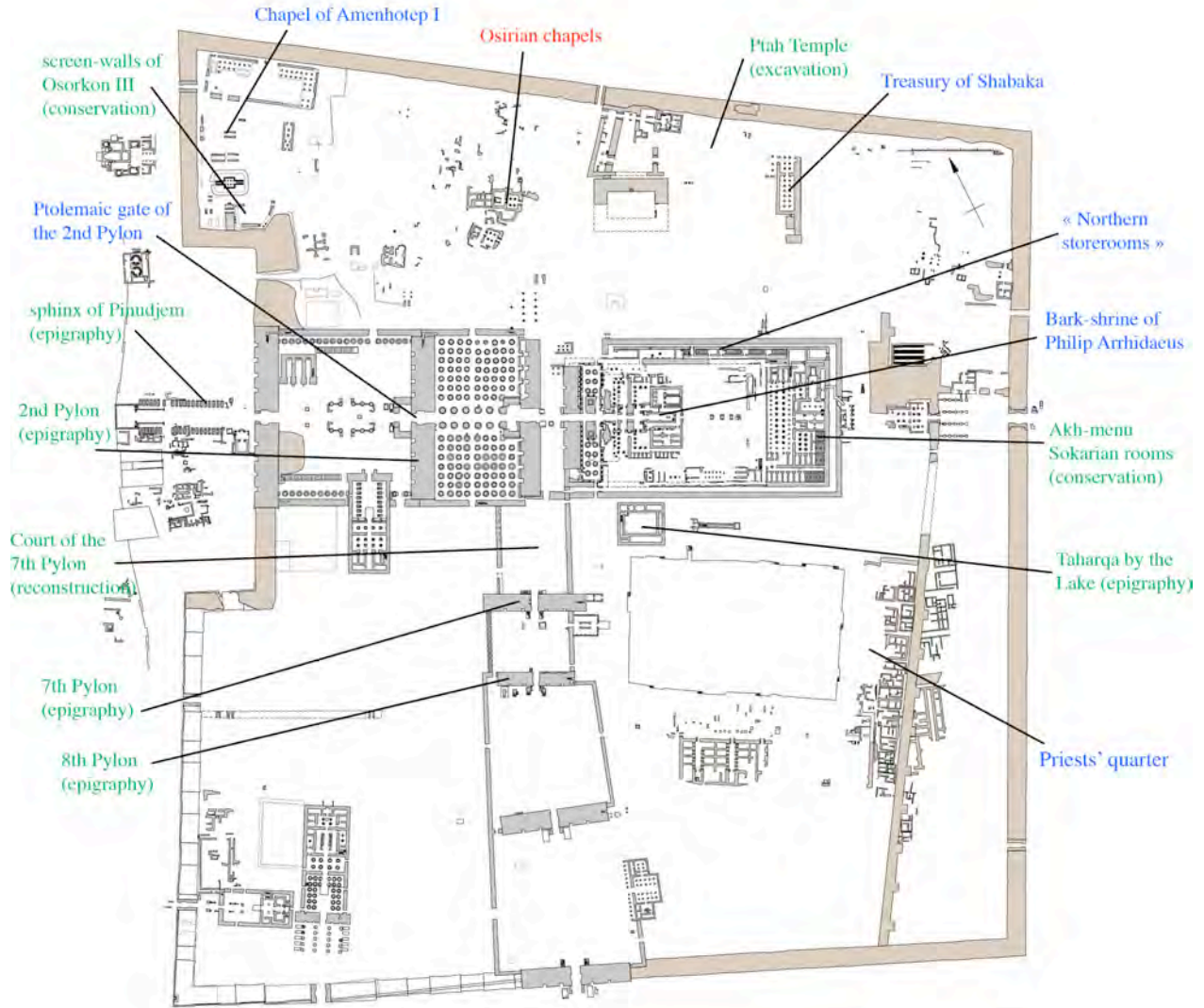
We would like to extend our grateful thanks to the French authorities of the *Centre National de la Recherche Scientifique* and of the *Ministère de l'Europe et des Affaires Étrangères* for their constant financial support and interest on the programmes led by the CFEETK.

We are always delighted with the excellent relationships between the French-Egyptian Centre for the Study of the Temples of Karnak and the *Ministry of Antiquities of Egypt* led by H.E. Minister of Antiquities Pr. Dr. Khaled el-Enany, and the Secretary General of the Supreme Council of Antiquities, Dr. Mustafa Waziri.

Badri Abd el-Sattar

Dr. Christophe Thiers  
Director of the USR 3172 (CNRS)

# Amun-Re Temple, main fieldwork in 2017



Temple of P'tah : main CFEETK projects  
 Osirian chapels : projects hosted by CFEETK  
 Priests' quarter : projects currently in publication



## 1. SCIENTIFIC PROGRAMMES

### 1.1. POWER AND MARKS OF POWER AT KARNAK

#### 1.1.1. The Sphinxes of Pinudjem I<sup>1</sup>

The study and epigraphic documentation of the inscriptions of Pinudjem I carved on the sphinxes continued and was completed between October-December 2016.

The epigraphic documentation of the inscriptions carved onto the fronts of the plinths of the sphinxes of the northern row of the Dromos was also completed (PAR.DO.sp1-4.n, PAR.DO.sp9.n, PAR.DO.sp13.n, PAR.DO.sp16.n, PAR.DO.sp18.n, PAR.DO.sp20.n). We also completed the documentation of the uniform inscriptions of Pinudjem I carved on the side and rear of the plinths of the sphinxes of the southern row of the Dromos (PAR.DO.sp1.s – sp4.s, PAR.DO.sp6.s – sp16.s, PAR.DO.sp18.s – 20.s).

All inscriptions of the loose blocks originally belonging to the bases of the sphinxes and reused later in the Dromos, in the southern tower of the First Pylon and in the ramp of Taharqo or stored at present in various areas of the temple like the Great Court and the Sheikh Labib storeroom were equally documented. The digitisation of the drawings was completed by Florie Pirou in May 2017. The photographic documentation of all inscriptions and loose blocks related to the western processional avenue of the Temple of Amun at Karnak under Pinudjem I was completed by Émilie Saubestre in January-May 2017. A 3D model of the original sphinx bases of Pinudjem I was reconstructed by Paul Mégard using photogrammetry on selected loose blocks dispersed in various parts of the temple.



Orthophotographs of a sphinx with loose blocks from its base. © CNRS-CFEETK/P. Mégard.

#### Bibliography

- G. Dembitz, “The building activity of Pinudjem I at Thebes”, in G. Rosati, M.C. Guidotti (eds.), *Proceedings of the XI International Congress of Egyptologists, Florence, Italy 23-30 August 2015, Florence Egyptian Museum, Archeopress Egyptology 19*, Oxford, 2017, p. 172-176.

<sup>1</sup> With Mamduh Abd el-Ghassul (MoA-CFEETK) and Fl. Pirou (LabEx Archimède–USR 3172-CFEETK).

### 1.1.2. The façade of the 2nd Pylon (Cl. Audouit, E. Panaite)<sup>2</sup>

The 2nd pylon served for a long time as the main entrance into the estate of Amon-Re in Karnak. Its construction was finished under Horemheb, but Ramses I completed the decoration. Ramses II also usurped several scenes and replaced all of the cartouches with his own.

The western face of the 2nd pylon is composed of hundreds of blocks still unpublished, currently stored on the north and south benches in the precinct of Amon at Karnak. The research project intends to proceed to a digital reassembling of the 2nd Pylon's west face.

The first mission took place from the 8th to the 25 October 2017. The first phase of the inventory of the blocks started with the southern benches. First of all, it was necessary to identify the blocks which belong to the western face of the 2nd pylon among others. They are made of roughly cut sandstones. Signs are deeply etched and the figures are made on a monumental scale. A first survey found an important concentration of the blocks at the front of the benches numbered from 5 to 7 (we numbered the benches from east to west). Thus, the inventory started in that area.

A template file with an individually number was created for every block. Therefore, for each, we noted some basic information: the ancient inventory number, the localisation, the dimensions, the description and the state of preservation. We also provide a photo coverage of every block inventoried so that we can continue the study in France. A professional photographic coverage will be done by a photograph of the CFEETK in the near future.

After this first mission, 128 blocks from the southern benches (5, 6 and 7) have been inventoried and recorded. Their study already permitted a better understanding of the pylon's architecture and of the layout of the western face decoration. Moreover, 334 blocks have been already identified on the benches 4, 5, 6, 7 and 8 and will be recorded during the forthcoming mission. We also noted several blocks belonging to the western face of the 2nd pylon on the benches 2 and 9 and also about one hundred on the northern benches. The latter have not an ancient inventory number and have never been photographed. They will be studied during the next missions.



General view of blocks lying upon southern benches. © Cl. Audouit, E. Panaite.

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<sup>2</sup> This programme operates with the support of the LabEx Archimede, "Investissement d'Avenir" programme ANR-11-LABX-0032-01.



### 1.1.3. The 7th Pylon (Ch. Labarta)<sup>4</sup>

The first step of this study, begun in March 2017, was to carry out the inventory of the whole epigraphic documentation. The lower part of the pylon is still in place, but a large amount of loose blocks belonging to the monumental gate are currently located on the southern blockyard, around the pylon. In order to document these blocks, a research in the CFEETK' Archives was realised, the photographic coverage and the drawings has been started.

The use of depth maps of the engravings (produced from photogrammetric process) was chosen to provide additional information and optimize the reading of the engravings of the highly deteriorated blocks.

The inscriptions from the lower part of the pylon were mostly incorporated into the *Karnak Project*, accessible from the CFEETK website.

For this first year, the study of the possibilities to reassemble the loose blocks focused on the north face (inner face) of the gate which is characterized by a jubilee decoration.



General view of the southern side of the 7th Pylon. © CNRS-CFEETK/Ch. Labarta.

### 1.1.4. The 8th Pylon (S. Biston-Moulin, E. Froid)<sup>5</sup>

Work on verification and correction of facsimiles continued this year for the finalization of the epigraphic survey. Work also continued on the recarved elements of the inscriptions up to the initial decorative state dating from Queen Hatshepsut and her numerous alterations.

All the inscriptions copied within this epigraphic survey and high resolution photographic documentation were incorporated into the *Karnak project*.

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<sup>4</sup> LabEx Archimède–USR 3172-CFEETK.

<sup>5</sup> With Ch. Salvador (univ. Oxford).

## 1.2. PERIPHERAL AREAS

### 1.2.1. Temple of Ptah: The Roman-Byzantine quarter (B. Durand, M. Ali al-Abady, A. Nasseh)<sup>6</sup>

During the season from September 2016 to June 2017, field works lasted a total of 35 weeks. The workers constituting the Egyptian team were among 10. Besides, several trainees followed one another all along. The Egyptian inspectors having collaborated in the works were Mona Abady, Ahmed Nasseh and Yasser Mustafa.

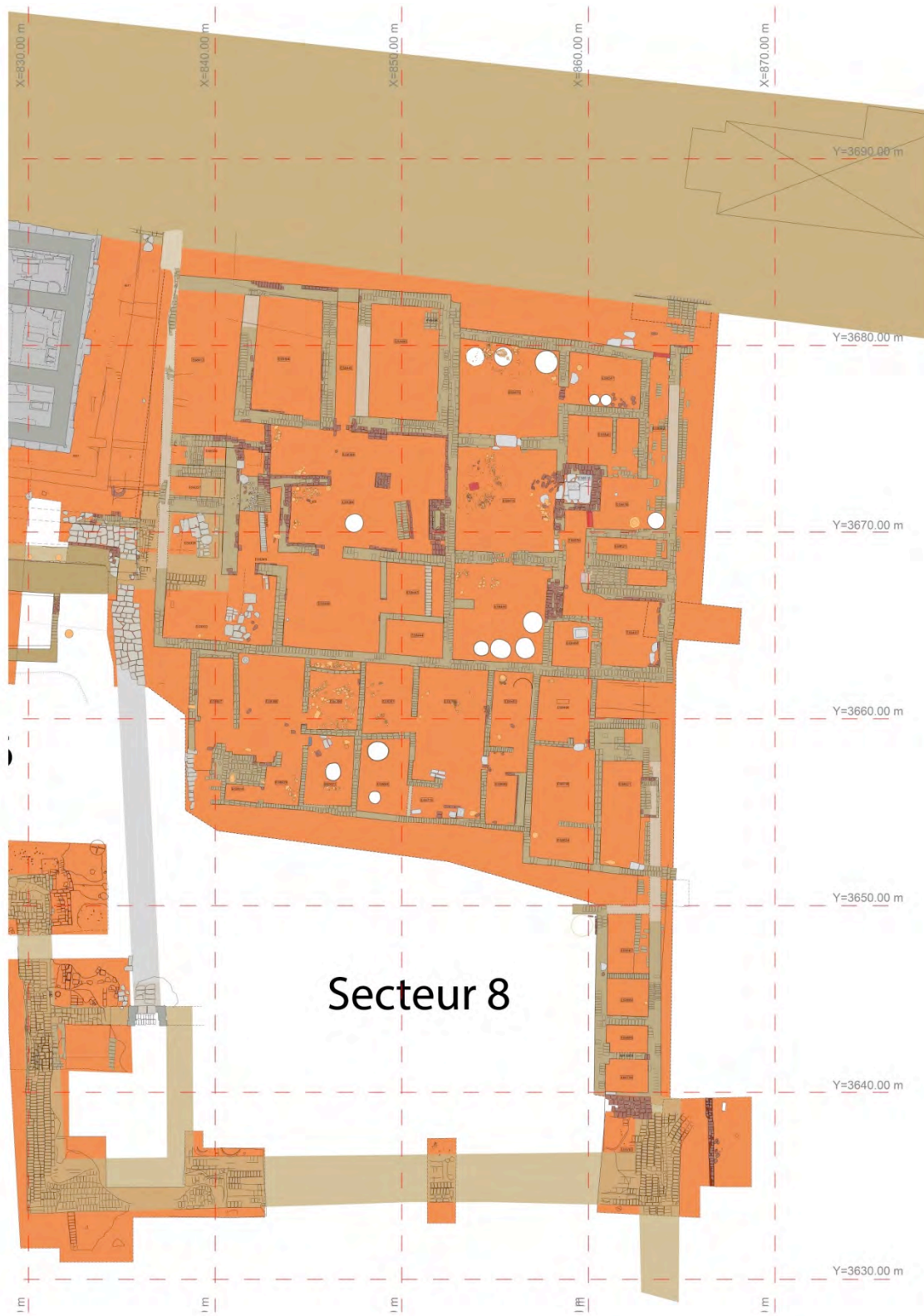
One of the objectives of this campaign was to continue the excavation of the Byzantine vestiges of the eastern sector of the Temenos. The remains are preserved on a surface covering about 1500 m<sup>2</sup>, among which 400 m<sup>2</sup> had already been excavated in the end of June 2016. This space corresponds to the location of a large-scale building, including at the same time a domestic part of 275 m<sup>2</sup> distributed on about ten rooms, and an economical part of about 190 m<sup>2</sup> intended for the storage and for the transformation of foodstuffs. It is on this last part that the works focused during the campaign of the end of 2016, the objective being not only to end the excavation of this building, but also to define the limit of the extension of the Byzantine occupation and the ptolemaic *temenos* on the east.

The second phase of the work, from January till April 2017, had for objective to clear the modern layer above archaeological layers to understand quickly the spatial organization of the sector bounded in the South by the ptolemaic surrounding wall. Guillaume Charloux's previous works in 2015 indeed allowed to define the location of it until a corner to the east on its southern part. In this sector it was thus suitable to define if the ptolemaic surrounding wall constituted or not the limit of the extension of the Byzantine occupation.



General view of the area excavated. CNRS-CFEETK/É. Saubestre.

<sup>6</sup> With Paul Mégard (VI MEAE-CFEETK), Antonin Durand, Amandine Madelpech, Louis Dautais, Rim Saleh (CNRS trainees), Florie Pirou (CFEETK-LabEx Archimede). This programme operates with the support of the LabEx Archimede, "Investissement d'Avenir" programme ANR-11-LABX-0032-01, in the framework of the programme "Expressions du pouvoir royal à Karnak : entre édification de l'espace sacré et construction du territoire urbain, le temple de Ptah à l'étude."



General map of the so called Byzantine sector. © CNRS-CFEETK.



### **Presentation of the results of the autumn 2016 campaign**

The excavations of the Byzantine remains benefits from an on-surface position which facilitates the release. Thus it is with a satisfactory speed that the structures can be brought to light. In the time granted to the search during the season of autumn 2016, it is an important surface, 280 m<sup>2</sup>, that was able to be exhaustively cleared and excavated.



The north-eastern part, looking south: the economic building. © CNRS-CFEETK/B. Durand.

Constituting the economic part adjacent to the building 8883 excavated during the previous seasons, the structure 8884 is constituted by 13 rooms, of which a stairwell allowing to reach a floor. It is characterized by the presence of 11 silos, distributed in several rooms. Built in raw clay, silos are rather badly preserved and only their diameter, more or less 1 m, can be measured. It remains impossible to

define exactly their capacity, their number being nevertheless important to bring information. Indeed, one can say that such an important number of silos in one house is over to much for a single family.



The southern storage room 8466. © CNRS-CFEETK/B. Durand.

The discovery of two millstones has to be mentioned. One of them corresponds to the rotating part of a so called pseudo-Pompeian millstone, the second constituting the meta of the so called Olynthus type.



The Olynthus millstone.  
© CNRS-CFEETK/P. Mégard.



The pseudo-Pompeian rotating millstone.  
© CNRS-CFEETK/P. Mégard.

If the presence of a the so called pseudo-Pompeian type does not have to be a surprise – its use corresponding well to the chronological frame of this context – that of the Olynthus type, is more surprising as it is more rare. Made in red granite, it could involve a local production, the presence of working area of stone cutting in Karnak from the Roman time being well attested. Nevertheless, it could



also come from Assuan, as this kind of production is well attested there for the Roman period. So, this kind of millstone, characteristic of the Greek culture, and generally dated at the latest 1st cent. AD, seems to have known a late production essentially located in Egypt. This Egyptian specificity thus finds here a new proof of its continuity until late period.

More difficult to highlight, a possible stable could have complete the panel of activities. A room of small dimensions – little more than 13 m<sup>2</sup> – associated with an even more reduced room – less than 5 m<sup>2</sup> – could have sheltered animals.



Rooms 8497 and 8468 interpreted as stable. © CNRS-CFEETK/A. Durand.

Other characteristic feature of this building, a room with wall completely built with red bricks and paved with blocks of sandstone. These features are important as they are the only example on the site.



Room 8518, interpreted as a storing place for water or grain. © CNRS-CFEETK/A. Durand.



The function of this room must be specific as it is of very reduced size, only 2,20 m<sup>2</sup>. Nevertheless, in this small space was found what could allow to understand this function. It is a block of sandstone, most probably reused, dug by three cavities with circular opening, among which only two are still whole.



Reused stone that could have been used as jar stand or measurement table for the grain, depending on the interpretation of the room 8518. © CNRS-CFEETK/P. Mégard.

Roughly cut, its general aspect is rather unpolished. The smallest cavity, as well as the broken cavity, are of tronconique shape, while the biggest is of conical shape. The inside of cavities was not polished by the use, and only the surface of the smallest cavity presents a circular polishing. These holes, directly connected to the function of the block, can be interpreted by at least two manners. The first one corresponds to the use of this block as a jar stand. The holes indeed correspond approximately to the shape of the bases of Roman amphora, in particular that of Late Roman 7 which could completely adapt itself to it.

But by taking into account the context of discovery, a room where apparently everything was made to isolate and strengthen, we would be inclined to see a table of measure for grain. These tables, rather rarely been attested in domestic context and more generally associated to the public places, serve to calculate the quantities of grain according to the volume capacity of the cavity. This proposal allows on one hand to understand the difference of diameter and form of both kept holes, but could bring on the other hand to propose a hypothesis concerning the function of the room.

Indeed, this table of measure must be certainly associated with a reserve of grain, a reserve that could stand directly on the room. The sandstone pavement could so have for purpose to facilitate the recovery of the grain fallen at the time of the opening of a possible valve.

In quite a different topic, an exceptional object found in front of this room informs us about the faiths of the inhabitant of this sector. It is a jar stand wearing a beautiful example of syncretic decoration. Are here associated Christian crosses with palms and bunches of grapes, and solar discs completed by uraei. The study of this object allows to replace the occupation of this district in a wider historic context, the 4th century AD, characterized by a religious transition between paganism and Christianity.



The triple jar stand decorated with christian and pagan symbols. CNRS-CFEETK/K. Abd el-Dowi.

### **Presentation of the results of the campaign of winter-spring 2017**

During this season, an important effort was supplied to end the excavation of the whole temenos of Ptah in the sector as defined by the Ptolemaic surrounding walls discovered by Guillaume Charlux. A surface of 817 m<sup>2</sup> was cleared, the covering of the archaeological levels varying from some centimeters to dozens of centimeters. The goal was to reach the level surface of the Byzantine remains to allow the drawing of the building in order to facilitate the organization of the work to come.



Beginning of the 2017 season. © CNRS-CFEETK/B. Durand.

This first cleaning allowed highlighting several sets of rooms. The first one goes along from east to west both buildings excavated during the previous seasons, sharing with it the long wall 8321. Here are standing at least three houses, among which two show the same spatial organization. The function of the rooms from these two domestic units was defined thanks to the discovery of several elements such as silo, grindstones, deposits of ceramic, or, on the contrary, by the absence of any artefact or traces of activity. In both cases, the plan includes a central court around which are articulated the other rooms.

If the plan of both houses presents an almost completed symmetry, we can observe even that the function of three spaces is to be the same from a house to the other one. The same room is occupied respectively by one and two grain lofts, letting clearly suspect the use of these two rooms as storage places. Following both symmetric rooms are occupied in their center by important firing traces left by firing place which nevertheless did not survived. In one room, a large number of ceramic was discovered, as well as a storing place along one of the walls, used to store amphorae. These rooms were thus able to serve at the same time as storeroom and as kitchen.

Set apart these parallels, the function of the other rooms varies from one house to the other. The central building housed a domestic oven, unfortunately very badly destroy. Its twin room of the western house revealed no remain or artefact allowing to propose a function. The space occupied by the stairwell in the house on the West corresponds, in the central building, to a room of small dimensions. The function is here also very difficult to define because of the absence of artefact.



Room 8465, characterized by the presence of different states of use of domestic kiln. © CNRS-CFEETK/L. Dautais.

The third house supplied much less indication. A staircase indicates the presence of a floor. It is nevertheless rather difficult to tell more about it as no feature is helping understanding the function of each room.

To conclude on these three units, most probably all three domestics building, it is important to underline that their size is more modest than that discovered previously. Both twin houses are 70 m<sup>2</sup>, the



third one on the east being 60 m<sup>2</sup>. Beside, the house standing in the north of the sector is 277 m<sup>2</sup>. It is an important component as it is highlighting the existence of two “social levels” materialized by the prioritization of the inhabitation.



Room 8398, storeroom and kitchen from the house 8690. Looking west. © CNRS-CFEETK/B. Durand.

A last building was excavated during this season. Unfortunately, very destroy, only its layout and some part of the ground were able to be found. It is a row of 4 rooms, of small dimensions, 4 m<sup>2</sup>, 3 m<sup>2</sup>, 4,5 m<sup>2</sup> and 7 m<sup>2</sup> from south to north.

The plan of the building, long and narrow, does not fit with a domestic unit, and among the working hypotheses, one can propose a storage place or a stable.

Finally, the last objective being to acquaint with most possible precision with the archaeological potential of the sector to be excavated, a simple cleaning was practiced to reach the archaeological levels. This surface cleaning revealed the presence of two other buildings of rather big dimensions, a court providing various activities, and an open space covered with ceramic evoking a garbage dump.

We can here underline that the standardization of the plan of two houses, the articulation of two big buildings with the other structures, and the organization of the spaces of circulation between domestic units and economic units betray the existence of a preliminary planning in the construction of this district. The highlighting of this planning allows to put the first elements of a reflection to refine on the nature of this district, and therefore, on its function, the status of these inhabitant, and finally the origin of its abandonment.



General view of the house 8886. © CNRS-CFEETK/B. Durand.

### **1.2.2. Ceramic studies (S. Marchand, R. David)**

#### **• Middle Kingdom and SIP/early New Kingdom pottery (S. Marchand)**

The third mission of study of ceramic resulting from the temple of Ptah Temple excavation (Sondage 6) took place from March 5th, 2017 till March 15th, 2017 with the cooperation of Florie Pirou for the drawing of ceramic. The chronology of the activity of this sector for the Pharaonic period before TIP is now better known thanks to the study of the archaeological artefacts, among with ceramic, brought to light during excavations with secure archaeological data. The first installation dates to the beginning of the 11th Dynasty. After an abandonment, a second activity continues, without visible hiatus in the ceramic facies, at the very beginning of the Middle Kingdom at the end of the 11th Dynasty and throughout the 12th Dynasty. The next period from the beginning of SIP (13th Dynasty) to early New kingdom (end 17th – early 18th Dynasty) are attested by pottery assemblages in relation with the foundation pit of the temple of Ptah. The last mission of pottery study took place during March, 2018.

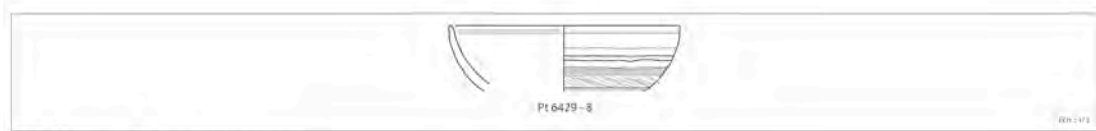


FIG. 18. Groupe 75 - Bols hémisphériques

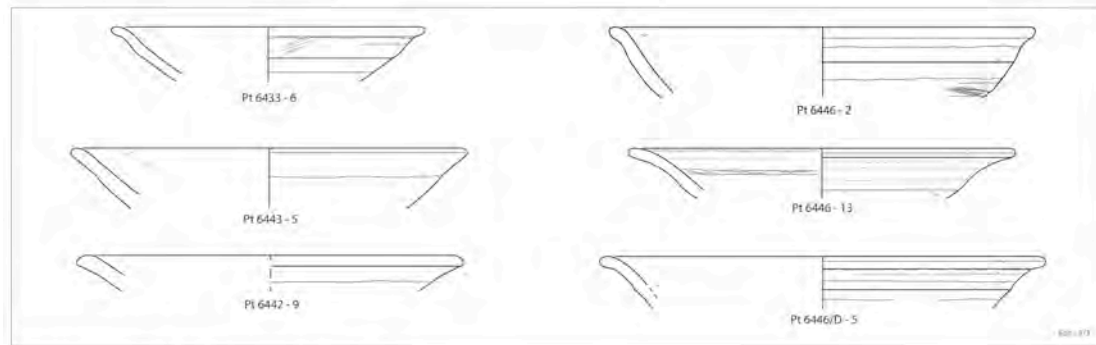


FIG. 19. Groupe 73, 79, 80 - Assiettes Nile B1, Nile B2



FIG. 20. Groupe 61 (1) - Bol à carène Nile B1 à surface «chamois»

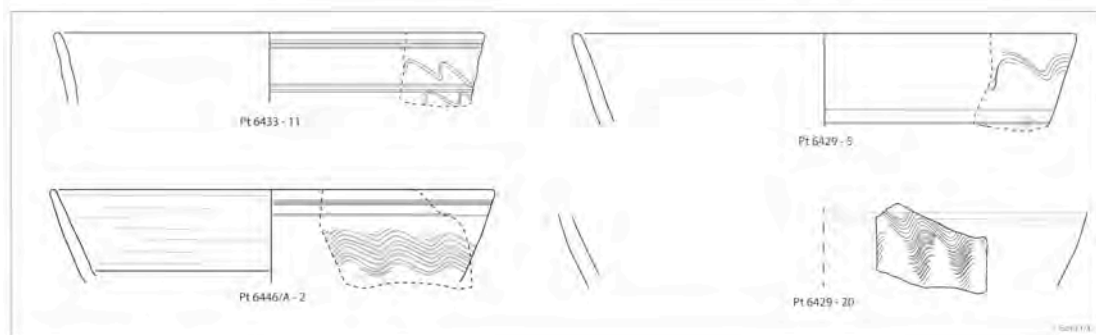


FIG. 21. Groupe 48 - Bols à carène avec décor en «wavy lines»

Pottery from Phase 2 (Middle Kingdom). CNRS-CFEETK/Fl. Pirou.

#### • Late-Roman pottery (R. David)

Following the work carried out by the project “Late Ceramics of Egypt” (ANR-11-LABX-0032-01 LabEx Archimede), a study of the ceramics found in the Byzantine levels of the temple of Ptah was carried out between 7th and 21st April 2017. It was mainly occupied with the inventory and the classification of the material for the next mission scheduled in November 2017. Some assemblages have been examined (US 8377, 8471, 8477, 8618) to determine first datings.

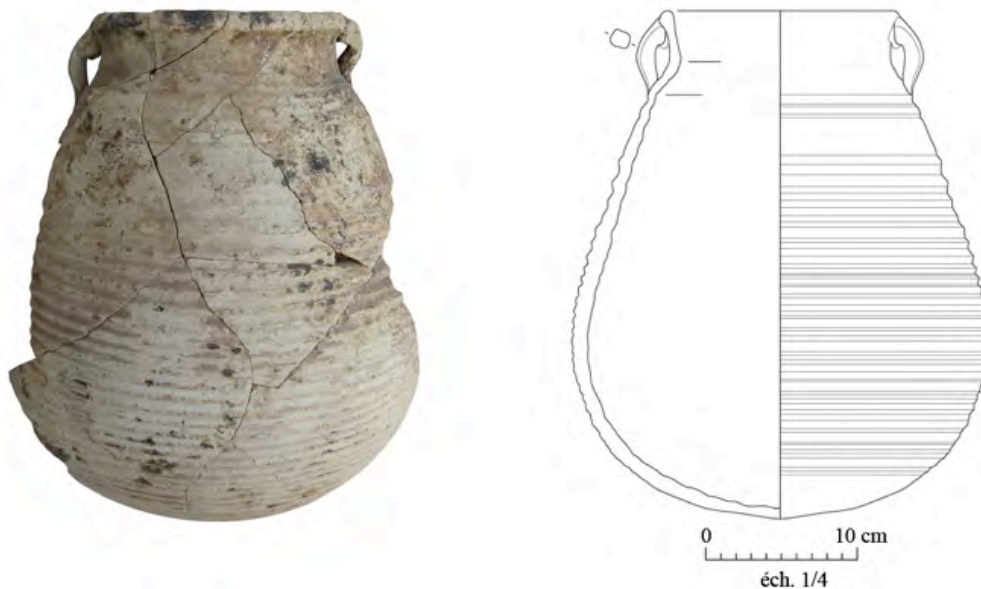
A second mission, more important in terms of time, people involved and material examined took place in November 2017. Led by Romain David, it also included two ceramologists, Elsa Jadot and Marie Antoine then in training at the CFEETK, a draughtsman, Khaled Zaza, a ceramic restorer, Mahmoud Moustafa Abd el-Hafez, and a specialist in archaeometry, Lars Heinze. Its purpose was to finalize the examination of the ceramic material from the Byzantine levels of the temple of Ptah in preparation of its



publication, as well as to carry out the chemical analysis of the Ptolemaic ceramics of the temple of Ptah and the Treasury of Shabaka in order to verify the classification established during the workshop held in Karnak in 2014, the results of which were published in the issue 10 of the collection of *Cahiers de la céramique égyptienne*.

More than 60,000 sherds were studied, nearly 32,000 were counted and classified, and finally 600 were fully documented including a description, a photograph and a drawing of the object.

The chronology (mostly second half of the 4th century - beginning of the 5th century AD) corresponds to the features previously observed in the sector as well as in the adjacent zones where several buildings seem to have functioned and were abandoned at the same time. The very good preservation of the remains with a considerable number of complete pieces provides a unique typology for the region and is therefore of major scientific interest. At the end of this campaign, all the ceramic material of the Byzantine levels around the temple of Ptah has been documented and its publication is in preparation.



Marl clay Jar 179-8471-01. © R. David.

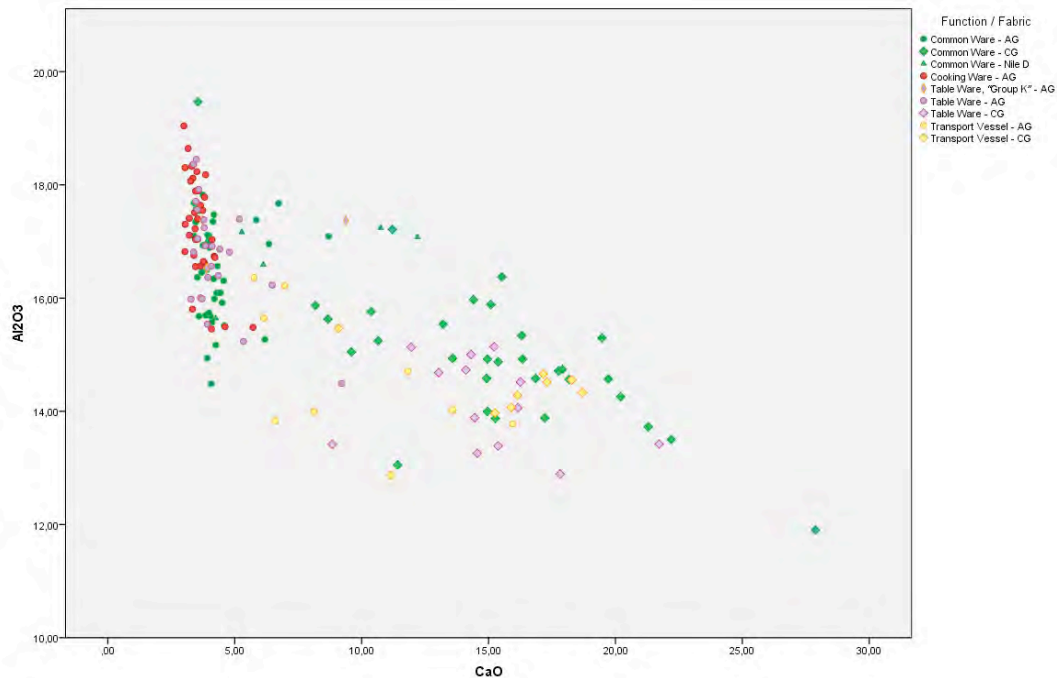
The second purpose of this mission was realized by Lars Heinze from 1 to 16 November 2017. The pottery from a wide range of contexts and chronological periods were investigated within the frame of the *CeramEgypt project* led by the Centre d'Études Alexandrines and the University of Koln.

Each ceramic object previously selected were measured with the project's own Niton XL3t portable ED-XRF spectrometer to better understand the geochemical composition of the objects under study. For this, three points on the sherd's fresh break are targeted by the X-ray beam. By collecting and processing the back-scatter radiation, the software of the device can calculate the content (in ppm) of most of the major and minor elements (Si, Ti, Al, Fe, Mn, Mg, Ca, K, P) as well as a wide range of trace elements (S, V, Cr, Ni, Cu, Zn, Rb, Sr, Y, Zr, Nb, Ba, Pb).

Altogether, 182 ceramic vessels have been analyzed within these days. This set of data will help to define the specific "geochemical fingerprint" of wares consumed and – in parts – potentially produced at Karnak and, furthermore, will show if the chemical profile obtained at Karnak is distinguishable from other sites in the Delta and along the Nile river valley. In addition to this, the data set also enables us to give a closer look at the wares and fabrics common at Karnak itself. The following graph illustrates the

differentiation of the wares and fabrics when plotted according to their aluminum and calcium content. This is not only a good test to check if the macroscopic identification of the calcarious and alluvial groups was done properly, but also allows to point out alluvial fabric groups that are eventually richer in calcium than others.

Many other elements will be able to be highlighted during the processing of the data currently in progress. This work will be the subject of two separate publications scheduled for 2018-2019. They will participate in a better definition of a regional facies and will integrate the Theban region with research previously concentrated in the Delta.



Al-Ca-Plot of the data separated by function and fabric. © L. Heinze.

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### 1.2.3. Conservation of archaeological artefacts (L. Antoine)<sup>11</sup>

#### The coins

- Statement of state

Sixty-five coins have been discovered during the last series of excavations, sixty one are from copper alloy and four, probably compound of lead. All the coins from copper alloy present the same damage. The level of corrosion can be different, unfortunately for sometimes all the metal is attacked. When we observe the different layers of corrosion, we note that some of them are active while the others achieved a chemical stability.

#### Diagnostic

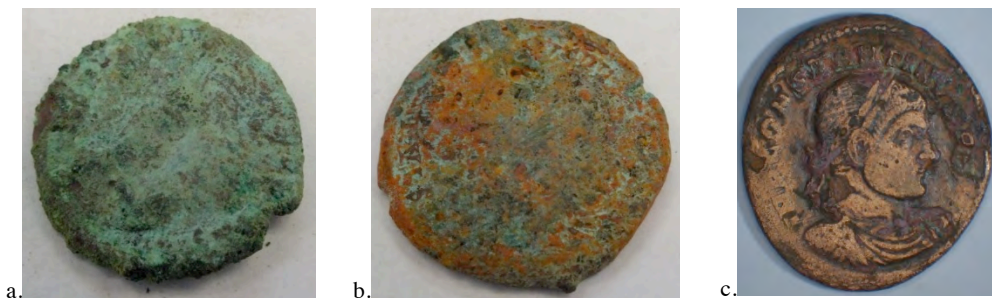
The burial conditions in a damp environment contaminated by salt are the main cause of the decay of the coins. However, they find a certain degree of stability which is broken with the new climatic conditions following their discovery.

- Treatment proposal

The cleaning of the corrosion products should enable the study and the dating of the coin. Prior to applying the cleaning treatments, we selected the coins which present the best state of conservation to undergo the interventions.

- Treatment

First, the selected coins have been mechanically cleaned with scalpels and micro-tours. After that, they have been dipped in a chemical bath of EDTA tétrasodium<sup>12</sup> up to 5 % in demineralized water. This chemical process facilitates the dissolution of the hard corrosion layers. The coins have been dipped several times to achieve a satisfying level of readability for the study. After each bath, the coins were cleaned with water and brushed in order to remove the dissolved corrosion products from their surface. After, they received again a mechanical treatment. The chemical process requires necessarily the use of demineralized water rising during 10 min. Finally, to eliminate any mark of humidity, each coin was dipped in an ethanol bath.



States of cleaning for one coin. © CNRS-CFEETK/L. Antoine.

The consolidations and fixings have been realized with Paraloid B72 up to 15 % in acetone. At the end of the treatment, when all the corrosion products have been eliminated, the coins are covered with the same resin up to 5 % to form a protective film.

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<sup>11</sup> International volunteer (MEAE-CFEETK); with Ashraf Mostafa Ali, Nagwa Abd El-Ghafour, Mahmoud Said Ahmed.

<sup>12</sup> Organic salt of sodium, complexing agent used to capture the metal ions present in the corrosion deposit.

## **The ceramic**

- Statement of state

Two receptacles of important size in terra cotta have been uncovered during this search campaign: a jar decorated with colored coatings and an oval container. These two objects present the same damages, they are broken in several fragments and some parts are missing. However, the oval receptacle is more damaged. We observed some pieces contaminated by salts, the efflorescences were visible on surface. We have also noted some scalings.

- Diagnostic

The main cause of the damages observed on these objects is the burial environment which is humid and contaminated by salts.

- Treatment proposal

The purpose of the intervention is aiming to ensure the conservation of these objects through the reassembly of the fragments and their conservation to be studied.

- Treatment

The fragments which present the salt efflorescences have been desalinated in a bath of water. The water's conductivity was controlled every day and the evolution of the salt content was noted. We also changed the water of the baths every three days to avoid a biological contamination. We stopped the treatment after one month, when the values were stabilized.

The reassembly has been done with an epoxy resin.<sup>13</sup> We choose this adhesive because of its strength required to respond at the stresses peculiar to the objects. For the reversibility of the treatment, the bonding surfaces have been isolated with a protective film, the Paraloid B72 up to 5 %.

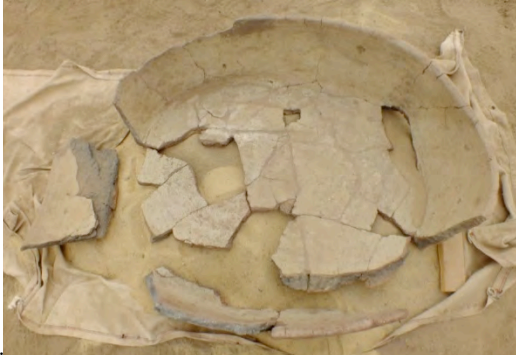
The scalings were consolidated by infiltration of a mix of water and an acrylic adhesive<sup>14</sup> charged with PLM.

Because of the reduced number of contact points, the oval container required some structural pluggings to reinforce the bonding surfaces. We have done two important fillers strengthened with fiber glass sticks fixed with an epoxy resin. This process was necessary to ensure the holding of the fragments. It also reduces the tensions concentrated on the small contact areas, and finely gives a structure for the fillers. The structural pluggings have been realized with a mix of lime and sand (1:2) bound with the same acrylic adhesive, Acril 33, diluted in water.

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<sup>13</sup> Araldite 2015.

<sup>14</sup> Acril 33.



a.



b.



c.

Work in progress. © CNRS-CFEETK/L. Antoine.

### **Small finds**

A lot of small objects and fragments have been uncovered during the excavation. After mechanical cleaning with soft brushes to remove the dirt, the repeated interventions on these various materials were fixing and consolidations.

### 1.3. CULTS AND PLACES OF WORSHIP

#### 1.3.1. The bark-shrine of Philipp Arrhidaeus (Chr. Thiers, A. Tillier)<sup>17</sup>

The work focuses on the final publication of this monument, including facsimiles, hieroglyphic font (JSesh), and photographs. Several loose blocks belonging to the monument were recorded. The volume will be submitted for publication in 2018-2019.

#### 1.3.2. The Central sanctuaries of the *Akh-menu* and “Northern Storerooms” (Chr. Thiers, Chr. Leitz, S. Biston-Moulin)<sup>18</sup>

This epigraphic and conservation (see below) programme is led in partnership with the University of Tübingen (Prof. Chr. Leitz).

During the campaign in November 2017, the central working area was the Botanical Garden of Thutmosis III. The complete drawings of the wall decoration of this room had been finished in Tübingen between October 2016 and October 2017, so we could collate them during our stay in Karnak. We even found some remains of black colour on the southern wall of AKM.JB.1. To check the drawings of the inscriptions on the architraves lying on the southern and northern side of the four columns in the botanical garden, a scaffold had to be erected. And since it only covered a third of the side it had to be moved two times from one part of the architrave to another. As a side product we were able to take overview photographs of the whole working area for the planned publication.

In addition to that, drawings of the decoration of rooms AKM.JB.3 and 4 could be checked during the campaign. All drawings have been done as in the years before by using the photographs kindly provided by the CFEETK as a basis.

The restoration of AKM.SX.1-3, finished in 2016 by the conservation team (see below), made it possible to see a few traces of colours, so we had to examine the drawings of these rooms another time.

Aside from collating the drawings, we took photographs of the column inscriptions. The texts were recorded on the basis of digital photos, as we do with all the other scenes.

We undertook another survey in several rooms for objects that are placed here and supposed to belong originally to these rooms and therefore are part of our documentation. We checked the inscriptions on it, published in the database of the *Karnak project* of the CFEETK, and took overview photographs to be clear about the position of the texts. We also examined the blocks scattered all over the area and found additionally to the material we had so far a decorated lintel belonging probably to the doorway between AKM.JB.3 and AKM.JB.4.

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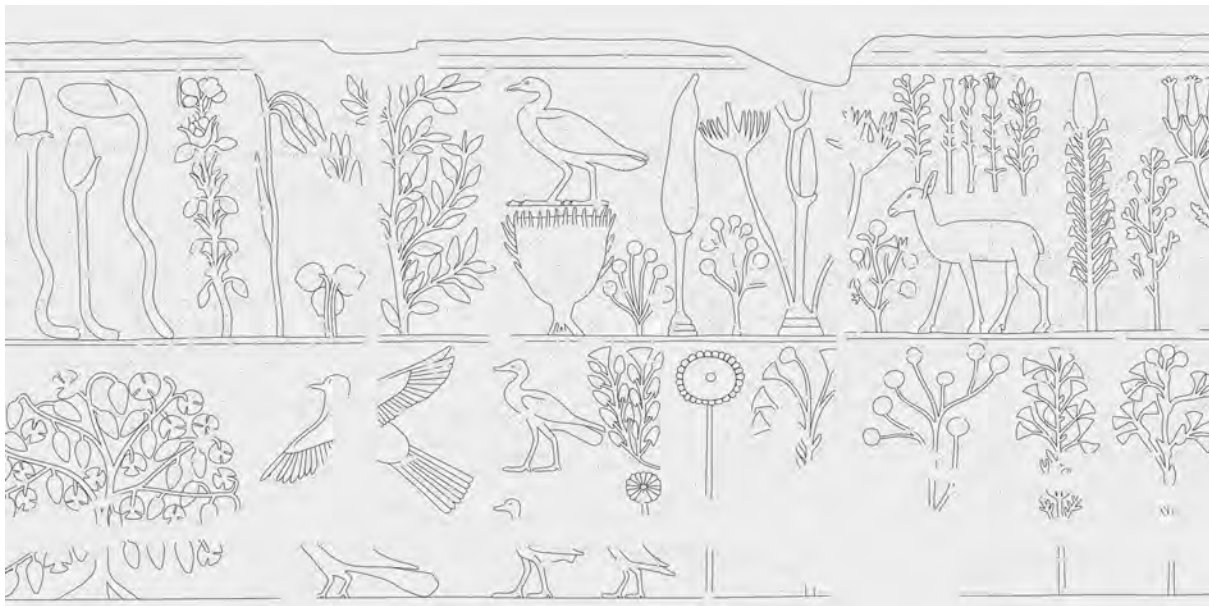
<sup>17</sup> With Fl. Pirou (LabEx Archimède–USR 3172-CFEETK) and Mamduh Abd el-Ghassul (MoA-CFEETK).

<sup>18</sup> With Fl. Pirou (LabEx Archimède–USR 3172-CFEETK), M. Abd el-Ghassul (MoA-CFEETK), D. Mendel, A. Rickert (univ. Tübingen).





Scaffolding used in the Botanical Garden to check the architraves. © D. Mendel, A. Rickert.



Drawing of a wall in AKM.JB.1. © D. Mendel, A. Rickert.

The drawings of the “Northern storerooms” are now completed, and the publication is in preparation.

### 1.3.3. The Edifice of Taharqo by the Sacred Lake (J. Hourdin)<sup>19</sup>

The work of this first season was dedicated to the systematic inventory of the loose blocks belonging to the destroyed parts of the Edifice of Taharqo by the Sacred Lake which are mostly unpublished. Only a few blocks were partially presented in the publication of R.A. Parker, J. Leclant and J.-Cl. Goyon, in 1979.<sup>20</sup>

This preliminary stage for the study of this very large corpus of blocks (several hundred blocks) is partly based on an unfinished survey realized in the 1980's. The blocks are essentially divided between two main areas in Karnak precinct.

- A part is stored upon mastabas east to the Taharqo monument, and because of their accessibility, these blocks will be first studied (photographic and epigraphic survey).

- A second large set of blocks is located on the eastern part of the storage benches between the temple of Khonsu and the temple of Karnak.

- Other blocks have also been identified around the Sacred Lake, among blocks coming from various monuments of Karnak temples.

The epigraphic and architectural study of the blocks is first based on the observations and the hypothesis proposed in the publication of the Edifice of Taharqo. It's already possible to distinguish two types of relief. A first set of decorated blocks comes from the exterior walls of the monument. A second set of blocks is decorated with smaller scenes. They probably come from the walls of one or more rooms which have constituted the upper parts of the Kushite monument now destroyed.



Loose block from the Edifice of Taharqo: the king in front of the god Montu. © J. Hourdin.

### 1.3.4. Graffiti in the court of the 7th Pylon (Ch. Salvador)<sup>21</sup>

The graffiti in the court of the seventh pylon of the Amun temple at Karnak are currently the focus of my doctoral research under the supervision of Elizabeth Froid at the University of Oxford and part of the larger Karnak Graffiti Project led by E. Froid in cooperation with the CFEETK. As a means of self-presentation, graffiti provide alternative information on the people who populated Karnak. The diversity of the graffiti preserved in this courtyard, ranging from purely figurative (the majority) to textual, and spanning mid 2nd millennium BCE to the Christian period, makes it an excellent corpus to test the

<sup>19</sup> LabEx Archimède–USR 3172-CFEETK.

<sup>20</sup> R.A. PARKER, J. LECLANT, J.-Cl. GOYON, *The Edifice of Taharqa by the Sacred Lake*, *BEStud* 7, 1979.

<sup>21</sup> Univ. Oxford.

development of graffiti practice at Karnak and the different level of interaction of people with this sacred space.

The main goal of this short season, which was held between March 20th and April 10th 2017, was to complete the survey that I undertook in 2014-2015 in the framework of the Karnak database project (Projet d'index global des temples de Karnak, now SITH). The first two weeks were spent checking all the walls of the courtyard, especially the west one, which is the one most densely inscribed with graffiti, as opposed to the northern end of the courtyard (south-east end of the hypostyle hall, southern end of the third pylon, and the gate of Ramesses IX), which bears only one. All graffiti were mapped, measured, and photographed and they are currently being plotted in the drawings of the walls' elevation. The results were also compared against Claude Traunecker's notebooks, now housed in the Griffith Institute, Oxford, in which he meticulously recorded all data collected during his extensive survey of the Karnak graffiti.

The second half of the season focused on checking patterns of distribution of graffiti along the southern processional way, so as to gain a better understanding of the corpus in the court of the seventh pylon within its context, as well as its possible relation with other graffiti and/or primary scenes. All data collected during this season will directly feed into my thesis, which is planned to be submitted in Spring 2018.

### **1.3.5. Demotic graffiti (D. Devauchelle, Gh. Widmer)<sup>22</sup>**

The purpose of this mission (19 to 23 February 2017) was the continuation of the study of the demotic graffiti incised on the walls of the various temples of Karnak. We carried on with our work on the identification of these inscriptions, by confronting them with notes taken by Claude Traunecker in the 1970s. The bulk of the graffiti concentrates on four main zones: the temple of Ptah, the court between the 1st and the 2nd Pylons, the area delimited by the 7th and 8th Pylons and one of the two stone gates of the southwest sector. The remaining part is scattered throughout the temple, from the tribune of the quay to the 10th Pylon.

During this mission, our attention was particularly attracted by texts engraved on the internal faces of one of the postern-gates situated in the Southwest sector of the main temple of Amon. These texts, despite their quite limited contents, could indicate that the gates were used as meeting place in the Ptolemaic period. As the second postern-gate is still largely buried, we were not able to check if inscriptions are present there. A project of clearing this area is under preparation.

Finally, we took advantage of this stay to update some records of the CFEETK database and check the proofs of our article to be published in the volume dedicated to the Fiftieth anniversary of the Centre which concerns three pre-Ptolemaic demotic graffiti among which a formula of curse without parallel up to now.

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<sup>22</sup> UMR 8164 HALMA (Lille 3, CNRS, MCC).

### 1.3.6. The Osirian Sanctuaries (L. Coulon, C. Giorgi)

The sixteenth campaign of excavation and restoration of the chapels of Osiris to the north of the Great Hypostyle Hall was undertaken with the support of the CFEETK, the French Institute in Cairo (IFAO), EPHE, INRAP, Orient & Méditerranée - Mondes pharaoniques (Paris-Sorbonne) and HiSoMA (Maison de l'Orient et de la Méditerranée, Lyon), between January, 25th and February, 28th 2017.<sup>23</sup>

#### Excavations (C. Giorgi)

Several soundings were undertaken inside or next to the chapel of Osiris Wennefer Neb Djefau in order to pursue the systematic analysis of the chapel, and its main components.

Four sectors were excavated this year, which allowed to refine the data collected during the previous seasons, concerning the building in the 26th Dynasty, but also for later occupations (Ptolemaic and Roman period). The excavation team consisted of nearly forty workers, two of them being dedicated to the cleaning of artefacts, and five dedicated to sieving.

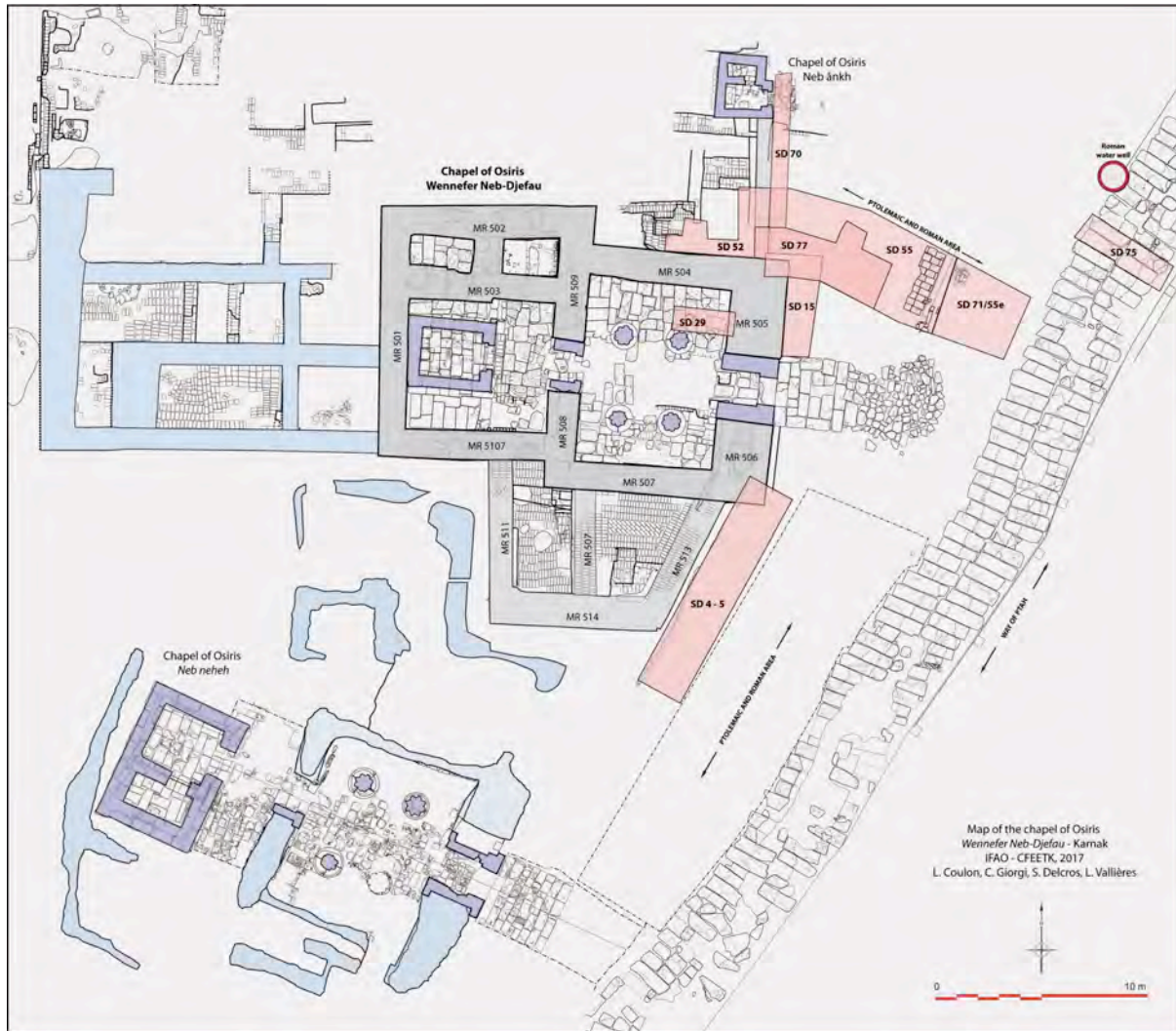


General view of the chapel of Osiris Wennefer Neb Djefau. © C. Giorgi.

<sup>23</sup> The members of the team were Laurent Coulon (egyptologist, EPHE, director of the mission), Cyril Giorgi (archaeologist, INRAP, co-director of the mission), Catherine Defernez (ceramologist, University of Paris IV-CNRS), Stéphanie Boulet (ceramologist), Sylvie Marchand (ceramologist, IFAO), Hassan El-Amir (conservator, IFAO), Ayman Hussein (artist, IFAO), Thomas Faucher (archaeologist, numismat, CNRS), Anna Guillou (archaeologist and egyptologist), Aleksandra Hallmann (egyptologist, Polish Academy of Science, Institute of Mediterranean and Oriental Cultures, Warsaw), Frédéric Payraudeau (egyptologist, University of Paris IV), Alexandre Rabot (archaeologist, HiSoMA, University of Lyon), Laurent Vallières (topograph, INRAP), and Florence Gombert-Meurice (egyptologist, Louvre museum). Nicolas Souchon (graduate student, University of Lyon) has attended a training session in archaeology from January 30th to February 27th, 2017.

The objects were photographed by Émilie Saubestre (USR 3172-CFEETK) and her team (Hélène Bellenger and Ahmed Rubi). The restoration and conservation of the artefacts as well of the site was undertaken by Hassan El-Amir (conservator, IFAO) and his colleague Abd el-Hakim el-Badri (conservator, MoA Karnak). Mr. Abd el-Menem Ahmed, Mr. Yasser Mustafa (excavations), Mr. Abu al-Hassan Ahmed Ibrahim and Mr. Ashraf Gaad (Evergete storeroom) were representing the Ministry of Antiquities under the supervision of Mr. Mohamed Abdel Aziz, Mr. Amin Amar, Mr. Abd al-Sattar Badri, Mr. Abder Rahim Kazafy, Mrs Mona Fathi and Mrs Ghada Ibrahim.





Plan of the chapel of Osiris Wennefer Neb Djefau and the sectors excavated during the season 2017.

- Inside the chapel

Building on the data collected previously concerning the foundations of the first door and the pylon (in the northern part), we reopened several soundings to verify the connection between the northern part of the pylon (MR 505), the first door and the platform of foundation of the hypostyle hall. Furthermore, in addition to providing us with an overall view of the various phases of construction, this operation allowed us to give some details on architecture as well as on chronology. During these operations, additional ceramic material was recovered, which can be ascribed to the same building phase of the chapel (26th Dynasty), but also to earlier phases (Third intermediate period), and Ptolemaic rebuilding phases.



View of the excavation of SD 29 inside the chapel: foundation of mud brick walls. © C. Giorgi.

- Northern part of the Pylon

Last season, on each side of the northern part of the pylon (MR 505), inside and outside the chapel, we had found different phases of restoration and reoccupation, which had destroyed a great part of this one. Inside the chapel we had discovered several ceramic deposits and many spaces restructured and reconstructed, included in a larger project. Outside the chapel, a large platform is composed of mud, floor levels of mud bricks, and some walls forming small spaces. This area dated from the 3rd and 2nd cent. BC was directly connected with the north-eastern corner of the pylon, making it difficult to understand the initial architecture of the pylon.

This year a complementary excavation allowed us to find the actual foundation of the northern part of the pylon, and to determine how the ancient architects designed this part of the building and connected the mudbrick pylon and the enclosure mudbrick walls. Although the pylon had been completely reconstructed during the Ptolemaic period (at least twice), we were able to perceive that the latter came to rely partly on an earlier mudbrick construction of the Third intermediate period, already identified during the various operations carried out on the facade of the chapel. The ceramic study has confirmed the chronology of the different phases of construction, from the Third intermediate period to the 3rd and 2nd century BC, including the Saite Period.



View of the northern part of the pylon (MR 505) with its foundation and different phases of reconstruction. © C. Giorgi.



- A connection with the Chapel of Osiris Ptah neb ankh

During the last seasons (2015 and 2016), we undertook several soundings to distinguish 26th Dynasty and Ptolemaic phases of constructions. In many cases the partition mudbrick walls and enclosure walls have been restructured several times, which radically changed the initial aspect of the first building. As a reminder we found a ceramic deposit, settled under a mudbrick wall considered so far as part of the chapel. The study of the different artefacts enabled us to reconsider the datation of this mudbrick wall (4th and 3rd cent. BC). During this work, we understood that the modification of the enclosure of the chapel during the first part of the Ptolemaic period was intrinsically linked to a larger project including not only the chapel of Osiris Wennefer Neb Djefau, but also the chapel of Osiris Ptah Neb Ankh / pa wesheb iad. A Ptolemaic mudbrick wall included in the masonry of the northern part of the pylon was connected to the enclosure wall of the chapel of Osiris Ptah Neb Ankh / pa wesheb iad. This year we undertook a new excavation in the eastern façade of this wall, in order to achieve a photogrammetric model and to study the foundations. Furthermore we did a section trench directly inside this precinct wall to have a better vision of its construction and identify as many dating elements as possible. The various ceramic artifacts that we found in this area confirm the reoccupation and rebuilding of a part of the chapel during the Ptolemaic period, and probably also during a short phase of the Persian period.



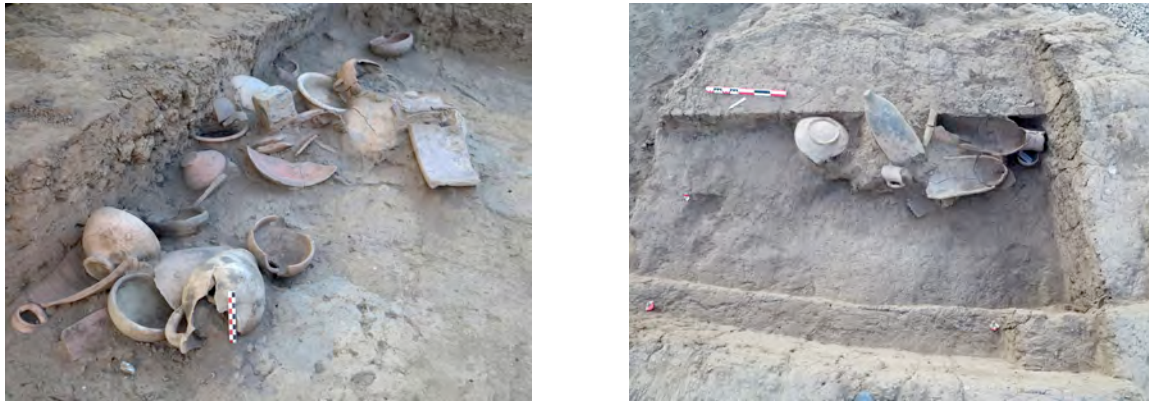
View of the the Ptolemaic mudbrick wall connecting the northern part of the pylon and the chapel of Osiris Ptah Neb ankh / pa wesheb iad. © C. Giorgi.

- North-Eastern area

Outside the chapel, near the northern part of the pylon, the aforementioned large Ptolemaic platform, in which several layers of the Ptolemaic and Roman periods have been found in 2015 and 2016, has been studied further to establish a more precise chronological sequence of these successive occupations. The reading of the stratigraphic layers and construction allowed us to identify the same three different levels of Ptolemaic construction (between the 3th c. BC to the 1st) under the most recent levels (dated from 1<sup>st</sup> and 2nd c. AD).

For the Roman period we continued our work of the last season, and we found the continuity of occupancy levels, in which many and very varied artifacts had been identified (various complete ceramic, ostracon, buffers, sharpeners, figurines, fragments of statues, gold leaf, fragments of coins...). This year, in the same layer, we again found numerous complete ceramic artifacts together with many buffers and sharpeners, coins, beads, miniature pottery, associated with different elements related to cosmetics

artifacts, but also a copper alloy arrow head, small scarabs, a faience amulet of Bes, an ibis-shaped amulet, wedjat-eyes and a copper alloy statuette of Nephthys. We don't know exactly why during the Roman period, the occupants decided to keep as many different objects of different periods in such a small space. The first function of this space was undoubtedly linked to a domestic unit, but it is quite possible, with regard to the quantity of identified artifacts, that the function of this place has evolved towards a more cultic function. The problem we have here in understanding the entirety of the spaces and their functions in Roman times is the poor conservation of the area, partly due to the work of clearing the alley of Ptah and the chapel, during the major restoration work of Karnak temple and hypostyle hall at the beginning of the 19th century.



Ceramic assemblage of the Roman period. © C. Giorgi.



Statuette of Nephthys (copper alloy) found inside the ceramic assemblage of the Roman period. © Fr. Payraudeau.

As for the Ptolemaic period, we continued to record and to distinguish all the different phases of construction. In many cases we have been able to establish that, beyond the three main phases of Ptolemaic occupation, the partition mudbrick walls, enclosure walls and platform have been restructured several times. In some cases, these constructions have been modified in a very short time, according the ceramic artefacts, relative stratigraphy and chronological evidence. During the last season we could determine that Ptolemaic constructions (mainly mudbrick walls) had cut a layer of sandstone blocks and chips of sandstone (considered as a layer related to a phase following the destruction of the chapel), and other ones on which are based the foundation of the first door and the pylon of the chapel of Osiris Wennefer Neb Djefau. This year we continued our excavation mainly to the east part to record the

stairway found in 2016, and to establish the connection between the levels predating the Roman levels, with other evidence of the same periods in other areas of the archaeological site.

Thus, in the center of the large platform between the pylon and the alley of Ptah, we have continued to clear the stairs, which consist of reused blocks, perhaps from doorjambs of the chapel of Osiris Wennefer Neb Djefau. The blocks composing the ten steps of the stairs are not all well preserved, and some of them seem to have been broken before they were put at their place. The two mudbrick walls on either side of the stairs could be dated from the Ptolemaic period, as the embankment covering it. For the time being, we do not have an overall understanding of the use of these stairs. Further excavations would be necessary to relate them to the brick architecture elements to the north of the platform. The blocks were kept in situ, to preserve some of the elements of the Ptolemaic period rebuilding phase, and to integrate them into the project of general conservation of the site.

In the immediate vicinity of this stairway, under the aforementioned Roman levels, several Ptolemaic levels of occupation have been discovered. These levels consisted in a thick layer of mudbrick and mud floor on the top of which three large structures made of mud have been identified, which could be identified as a storage structure. These structures were filled up with a large abandonment layer in which several artifacts seem to have been deposited, such as coins, a complete unguentarium (small perfume vase) and two figurines (identified in structure SI 71009). Just below this layer, numerous coins have been found, and although we have not yet been able to identify all of them, some of them, once restored, have allowed a preliminary numismatic study.

According to the previous data collected in the south-eastern area by Thomas Faucher (see report of season 2016), a similar structure and comparable artefacts have already been observed; this gives us a better vision of the occupation, at least from a spatial point of view, during the 3rd century BC.



View of the stairs made of of reused sandstone blocks, located in the middle of Ptolemaic platform, and the fragment of statue with hieroglyphic inscription (in the foreground). © C. Giorgi.



Structure for storage from the Ptolemaic period. ©. C. Giorgi.



Unguentarium (perfume vase) in US 71008-71009.  
© Fr. Payraudeau.



“Octochalque” of Ptolemy II (US 71008).  
© Fr. Payraudeau.

- South-Eastern area

In 2015, at the south-eastern corner of the precinct wall, additional orthostats were found, which showed that, as had been previously supposed, the alignment continues towards the neighbouring sanctuary (Chapel of Osiris Neb neheh). This year we decided to remove three of these terracotta orthostats (ORTHO 01, 04 and 05) of the “orthostat system” (found in 2009/2010) at the base of the façade of the precinct wall. Even though we already had much information in this place, we have collected a few artefacts to ascertain the chronology (between 26th and 30rd Dynasty). This set seems to be installed on a solid mud brick floor of the 22nd Dynasty, and covered later by many mudbrick walls of the Ptolemaic activity area already studied previously. Just behind the orthostat “ORTHO 01, a faience amulet of Bes was discovered, fixed on the mortar installation. This amulet is probably to be seen as a deposit foundation.



View of the orthostat system in the south-eastern area.  
©. C. Giorgi.



Location of the Bes amulet (faience) found behind the orthostat ORTH 01. © C. Giorgi, Fr. Payraudeau.

- The alley of Ptah

During the previous season of excavation, we removed 4 blocks of the pavement of the alley of Ptah in front of the chapel of Osiris Wennefer Neb Djefau, in order to study its foundation and record all the preparatory levels necessary to build the alley. Last year, we found over twelve stratigraphic layers under the sandstone pavement. It was possible to highlight the levels of preparation and installation of the paved path (in which Ptolemaic and Saite ceramic sherds, have been found), and previous preparatory levels, suggesting the presence of a previous path or alley. Moreover, the presence of clearly identified levels of the Third intermediate period and/or Ramesside period and a mudbrick wall with a north-south



orientation, could suggest the presence of an older axis, with a completely different direction. This mudbrick wall or platform has been put hypothetically in connection with the gate of Ramesses III.

This year, we removed four additional blocks of the pavement, and a new section trench was undertaken further north (near a Roman water well) to compare the data to those collected last season. Under the pavement, over twelve to fifteen stratigraphic layers have been identified. It was again possible to highlight the levels of preparation and installation of the paved path and previous preparatory levels, suggesting the presence of a previous path or alley. Some variations in the first stratigraphic layers lead us to believe that the earlier path could have a different axis from the present alley of Ptah. Moreover, a limited excavation of the circulating levels around the alley allowed us to collect several sherds of ceramic, currently under study. The last stratigraphic layers have confirmed the presence of a mudbrick wall or platform built during the Third intermediate period and/or Ramesside period. Unfortunately, we could not find its limits.



The sector of the paved alley before excavation. © C. Giorgi.



View of the cut section in the alley of Ptah. © C. Giorgi.

Obviously, considering the dimensions of the alley, it is imperative to undertake additional excavations further north and south to better understand this construction and its oldest components. Some artefacts (stone fragments, bones fragments, ceramic sherds) have been found in the various layers. In addition, from the deeper strata layer, a sealing with a winged scarab has been identified.

Due to the poor conservation of the blocks composing the pavement (some had almost turned to sand), we restored some of them and replaced some others, to allow a better conservation of the alley of Ptah.

### **Ceramic studies**

#### **A. Third Intermediate Period and Late Period (C. Defernez and St. Boulet)**

For several years, the study of pottery sherds coming from the investigations of the chapel of Osiris Wennefer Neb Djefau enriches our knowledge about Late Period pottery industry. Thanks to the rigorous archaeological excavations, the discovery of levels dating before and after the construction of the Osirian chapel brings important data about the understanding on the evolution of ceramic industry in the Theban Area. The ceramological researches have been conducted by Catherine Defernez and Stéphanie Boulet from 11th February to the 9th March 2017, for the analysis of the ceramic material from the Third Intermediate Period to the Late Period.

The aim of this mission was to analyse sherds to date the different strata coming from the soundings of current excavations (SD 75 – SD 55 – SD 70).



Fig.1. P4020/75007



Fig.2. P4010/75002

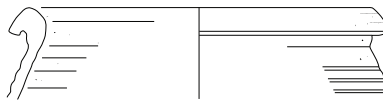


Fig.3. P4008/75001

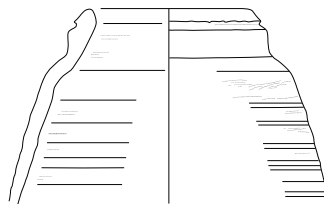


Fig.4. P4027/75007



Fig.5. P4018/75004



#### 25th-26th Dynasty pottery from the sounding in the alley of Ptah.

The major part of the study was concentrated on the sounding located under the way of Ptah (SD 75). Last year, some Ptolemaic sherds have been discovered under the pavement of the way. During this season, the latest sherds seem to be dated only to the beginning of the Late Period, more precisely from the 25th to the beginning of the 26th Dynasty (US75001 - US75012). Among Marl clay production are attested large cups with a thick rim (fig. 1), S-profiled cups (fig. 2), neckless jars with a triangular rim (fig. 3), jars with a short neck and marked rim (fig. 4) and few imported production as Palestinian amphora (fig. 5). In the lowest excavated levels (US 75013 and US 75015), many productions belonging to the New Kingdom – more precisely the Ramesside period – have been documented but are very badly preserved. Diagnostic testimonies are very few but the majority of sherds are represented by elements made in *Nile B2*, *Nile D* and *Nile C*, specific of this period, associated with some particular surface



treatments as polished red slip, few blue painted pottery and orange slip. The presence of *Marl F* production from Lower Egypt supports this dating.

In addition to this work, some preliminary analyses have been made in the sounding SD 55. Under the Ptolemaic levels studied by Sylvie Marchand, some important Late Period layers have been identified. Some of these strata include important elements of the mid-8th century BC. In complement of the strata dating, the identification of this phase is essential because it corresponds to an importance period of changes in the local ceramic industry.

Finally, elements coming from our previous excavations have been studied as some ceramic sets from the mud-brick building located behind the chapel (sector 3). The rigorous study of these levels carried out by Catherine Defernez will highlight important information about the ceramic industry of the Theban area at the end of Late Period.

## B. Ptolemaic and Roman Period (S. Marchand)

The ceramological studies for Graeco-Roman Pottery concerned the North-East sector of the site (Sounding 55 ext. and Sounding 71) and were led by S. Marchand (IFAO) from the 1st February 2017 to 1st March 2017.

### a. The Roman structure (Sounding 55 ext. US 55202)

The excavation of a Roman structure (2nd c. AD), undertaken last year, was finished during this season. An important pottery assemblage of 26 complete vases and 36 broken vases in different states of conservation has been found inside.

The main part of the assemblage consists in domestic table-wares, mainly open forms, with 16 bowls and only one juglet. An archaeological series of 4 convex bowls are Egyptian imitations of *Eastern Sigillata Wares* made in a Theban marl clay. They are very common in Egyptian table ware, mainly in fine Nile clay, from the end of the Hellenistic period until the Roman Period. Only one imported plate of *Eastern Sigillata A* was found with the Egyptian products. The cooking wares (4 cooking pots, 1 cooking bowl and 8 intact lids) are less numerous, one cooking pot is of Aswan production. 3 Egyptian Amphora and one Egyptian table amphora were found, one only was nearly complete. Broken utilitarian and specialized vessels, with 2 very large plates, one storage jar, 4 lids with handles, and one bread plate (dokka) were found.

The pottery “faciès” of the assemblage is completed by two other significant pottery groups: 4 small painted perfume bottles were found, one is nearly complete, and 6 complete miniature vases some with basket handles. If the function of the perfume vases is understandable, for the miniature vases their function remains not clear.

### b. The Ptolemaic Pottery under the Roman levels (Sounding 55, Sounding 71)


Under the Roman levels (2nd c. AD), a substantial stratigraphy of the sector has provided us with an important collection of Ptolemaic pottery. We notice that there is a chronological gap: we immediately reach the 3rd c. BC. The pottery assemblages are homogeneous, with always a high proportion of intrusions of Late Period sherds. The domestic vessel is abundant, with cooking ware, mainly cooking pots and cooking bowls, medium containers with jars, and table wares with convex bowls and plates. Egyptian amphora from the Theban region are common, but only a few sherds of imported ones were to be found. We notice the lack of decorated wares in these levels. The important number of local *unguntaria* found in those Ptolemaic levels is also remarkable.

## Objects studies (F. Payraudeau)

The registering, documentation and study of objects has been led by Frédéric Payraudeau (Paris-Sorbonne University) and Alexandre Rabot (CNRS-Hisoma). 205 artefacts have been recorded from the work field and transferred to the Evergete Magazine. Their documentation has been led to its end (database, photography). 78 objects from earlier seasons have been studied as well, especially unrecorded objects from Seasons 2008 and 2009. All the objects from 2001 up to 2017 have thus been documented during the last seasons, and most of them have been entered in the database. Nearly all the artefacts from seasons 2001-2016 are now sorted by types (beads and amulets, coins, figures, sealings, stone vessels etc). This will allow specialists to undertake a more thorough study during the next seasons.

Among the most interesting objects from this year, one could mention a large series of little coins and a large Ptolemaic coin (octochalk), probably from Ptolemy II (see below Th. Faucher's report). From the deeper strata under the way of Ptah, a sealing with a winged scarab. From the Roman area, north-east of the chapel, a little wooden figure of goddess Hathor with a sistrum on her head and a beautiful bronze statue goddess Nephthys, sister of Osiris. The goddess is shown standing with her winged arms lowered in a gesture of protection. The style seems to indicate a date around Dynasty 25th or 26th.

From the same area came a small faience sphinx, without head, which seems to be a Roman or late Ptolemaic production.

Near the area of reused blocks around the ramp of the chapel, a fragment of statue was found. Carved in dark granodiorite, it preserves only a part of the base of a royal standing statue with the Nine bows under his feet. On the left side of the base, a hieroglyphic inscription gives the names of the enemies  “[the Iuntyu-Beduins] of Khent-hen-nefer (=Nubia), surrounded [...]”. In the lower part, one can find a representation of an Asiatic enemy, presumably part of a larger procession of traditional enemies of Egypt. The statue could date from the New Kingdom up to the Third Intermediate Period. In view of the dimensions of the fragment, it was probably more than 3 meter high.

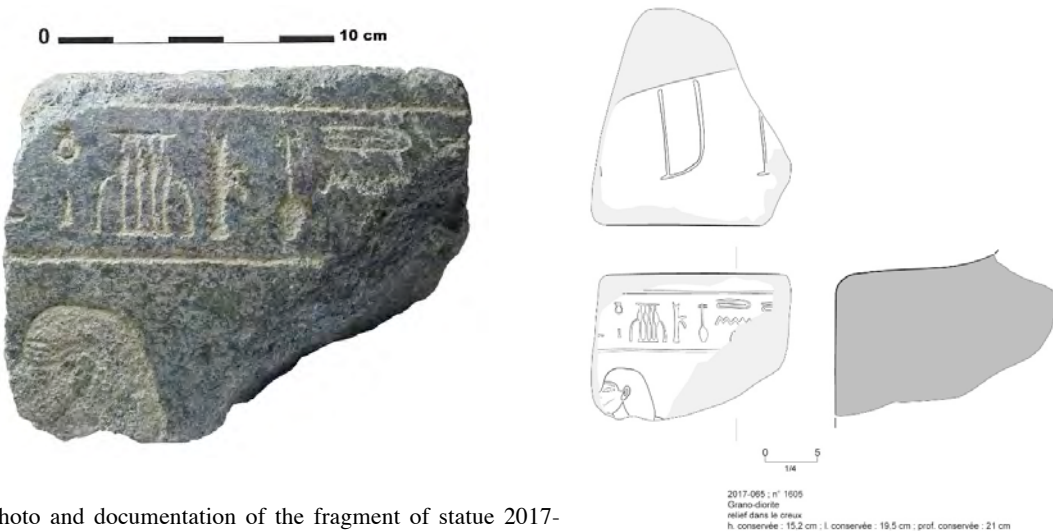


Photo and documentation of the fragment of statue 2017-065/n°1605. © Fr. Payraudeau / drawing A. Guillou.

In the same area, was found a fragment of sandstone inscription with part of a cartouche of a king Thutmosis, most probably Thutmosis III or Thutmosis IV. The cleaning of the terracotta orthostats has led to the discovery of faience amulet of Bes placed under it.

### **Coins (Th. Faucher)**

From 31st January to 2nd February, the study of coins took place in the Evergete storeroom. It consisted mainly in the cross checking of all the coins found by in the excavation from the beginning of the work in 2000. In total, 80 coins were found, and the majority of them have been cleaned. Some left were cleaned during this season and will need to be registered properly during next mission.

In addition to this lot, a large number of coins have been unearthed this season. It is impossible for the moment to know more about it because they all need cleaning and conservation. Nevertheless, one coin of about 100g has been unearthed. Only one coin of this size and weight exists during Greek or Roman times. It was issued during Series 3 and 4 of the Ptolemaic period, therefore between 261 and c. 220 BC. These coins are quite rare and it is the first time one is found in a regular excavation in Karnak.

### **Bronze statues from the Osirian chapels of Karnak (Fl. Gombert-Meurice)**

The aim of our study has consisted in a technical and stylistic analysis of the statues discovered during the previous excavations in the Osirian chapels of Karnak.

It has been possible to see 75 objects presumed to be statues or part of statues; a seal (319), a fragment of a situla (?) (203) and a plate decorated with a naos (155) in copper alloy. 21 objects come from the chapel of Osiris Neb Djefau and around, and two were discovered this year (1551, 1639); 48 artefacts in copper alloy were discovered in the chapel of Osiris-neb-neheh during the cleaning of the pavement in 2007, two were found to the west of the chapel of Osiris-neb-anekh, and two others in the area of the chapel of Osiris-Ptah neb anekh (north of the 9th pylon). Among those statues, 44 are Osiris statues or part of Osiris statues, and 11 more can possibly be part of Osiris statues. Some other god figures are also present with one or two statues or part of statues: Isis (nos 141, 150, and OPNA 01.01), Nephthys (1551, *supra*), child god (198, 149), Khonsu (1072, 1639) and Amun (143).

The smallest figure of Osiris is 2,1 cm high (214.b); conversely an uraeus and a beard might have been part of a statue of the god taller than 80 cm high (871, 216). Most of the complete statues of the god are comprised between 10 cm (142) and 6 cm high. As it was expected, they are of different quality and belong to different types. They can all be related to types observed on the Osiris statues discovered in the temple of Ayn Manawîr in Kharga, devoted to Osiris-*iw*.

On three objects which has not been restored yet, it has been possible to notice some fabric impressions in the corrosion products (210, 425, 923, 203) and sometime to see gold remains (210, 209, 1551, 215.a). From a technological point of view, some statues result from a very poor technique which consists in the print of the wax on one side (Fig. 28); others have been moulded on one side and hand-modeled on the back before the cast; few are in hollow cast (156, 157, 158, 216, 306).

An analysis of the distribution of the statues shows quite coherent groups, like the one found under a reused relief of Nechao II at the entrance of the naos of the chapel of Osiris Neb Djefau and the group found on the pavement of the Osiris-neb-neheh chapel.

The preeminence of Osiris is not a surprise but shows that the statues which sometimes seem to be distributed in a random way have to be studied as a coherent archaeological corpus and to be interpreted according to their successive use.

### **6. Epigraphic studies (L. Coulon, A. Guillou, A. Hallmann, Fr. Payraudeau)**

The preparation of the publication of the chapels of Osiris Wennefer Neb Djefau, Osiris Ptah Neb Ankh and Osiris Neb Ankh has been continued. A. Guillou has completed her work on the palaeography of the chapel of Osiris Wennefer Neb Djefau.



Excerpt from the palaeography of the chapel of Osiris Wennefer Neb Djefau (drawing A. Guillou).

**Iconographical studies (A. Hallmann)**

During the 2017 season, the iconographical study focused on the scattered blocks that are coming from the buildings erected by God’s Wives in Karnak, and that are currently stored in the Cheikh Labib magazine. The study was conducted in the frame of the project “Osirian chapels at Karnak” (IFAO - CFEETK - EPHE - INRAP - HiSoMA - Orient & Méditerranée), directed by Laurent Coulon and Cyril Giorgi. The iconographical survey of the scattered blocks was conducted as a part of the project entitled: “Iconography of God’s Wives: The Association between Image and Idea” that is founded by the National Endowment for Humanities and operated by the American Research Center in Egypt. This project aims at examining the iconographic development of the office of God’s Wives from 23rd to 26th Dynasty, as well as the iconography of each woman, tracing features that could point to their individual identity.

During the study season in the Cheikh Labib magazine, ca. 30 blocks that represented Gods’ Wives and kings from 25th and 26th Dynasties were recorded and photographed. Among them were also blocks (94 CL 1933, 1935, 1939, 1940-43, 1953, 1959, 1964, 1401) that most probably belonged to the chapel of Osiris Ptah Neb-ankh that is located between the precincts of Amun and Mut, to the south of the 10th pylon. (see: L. Coulon, A. Guillou, Fr. Payraudeau, The chapel of Osiris-Ptah Neb-ankh at Karnak, Report - February 2012).

The systematic survey of blocks stored in Sheikh Labib storeroom took place from February 5th until March 1st. Additionally from February 1st to February 4th, iconographical study was undertaken in the chapel of Osiris Heka Djet. The work was conducted with the assistance of the Mr. Mohamed Hatem, the inspector at the Karnak temple, the Ministry of Antiquities.

|    |            |   |  |
|----|------------|---|--|
| 17 | 92 CL 1639 | Block with a king before a goddess sandstone, ca. 18 x 73 x 27 cm |  |
|----|------------|---|--|

One of the blocks recorded in the Sheikh Labib storeroom. © A. Hallmann.



#### 1.4. THE KARNAK PROJECT (S. Biston-Moulin<sup>24</sup>, Chr. Thiers)<sup>25</sup>

Started in January 2013, the *Karnak project* (CNRS, USR 3172 - CFEETK / UMR 5140 - ASM, Team ENiM - Programme “Investissement d’Avenir” ANR-11-LABX-0032-01 LabEx Archimede) aims to collect, organize and make accessible all textual documentation both present and originating from the temples of Karnak.

In 2017, the *Karnak project* reached 5,000 hieroglyphic inscriptions of the Karnak temple accessible online with a permalink system giving access to complete records of documents (hieroglyphic texts, high-resolution photographs, facsimiles, bibliographies, etc.).

Status of the project:



green: online or partially online; orange: completed data entry, documents being finalized for online publication; purple: current data entry.

The *Karnak project* is already at this stage one of the largest corpus of hieroglyphic texts freely accessible on the Internet.

<sup>24</sup> CNRS, UMR 5140-ASM.

<sup>25</sup> This project is supported by LabEx Archimede from “Investissement d’Avenir” programme ANR-11-LABX-0032-01; <http://sith.huma-num.fr/karnak>, <https://karnak.hypotheses.org/>; with Dr. G. Dembitz, Dr. J. Hourdin, Dr. Ch. Labarta, Dr. A. Fernandez Pichel, Fl. Pirou (LabEx Archimede–USR 3172-CFEETK), T. Fignon, M. Gervason, M. Louys, M. Habachy (CNRS trainees).

Just under 10,000 hieroglyphic inscriptions have been integrated into the project to date. These documents are progressively published online after review and validation by project members.

In 2017, the *Karnak project* database was migrated from its original interface at In2p3 to the “Système d’Indexation des Textes Hiéroglyphiques”, hosted by the TGIR Huma-Num.

This new interface was opened to the public on June 12, 2017 after a presentation in Montpellier. New tools are thus proposed to access the project data such as a series of indexes (toponyms, theonyms, titulature element, anthroponymes, general vocabulary) directly integrated into the consultation of hieroglyphic inscriptions.

Example of a *Karnak project* record displayed in the “Système d’Indexation des Textes Hiéroglyphiques”.

Example of a term record in *Karnak’s* inscription index displayed in the “Système d’Indexation des Textes Hiéroglyphiques”.

More than 4,200,000 visitors have viewed the project records online during the first four years of its existence.

The work carried out on the *Karnak project* has also made it possible again this year to identify gaps in the photographic documentation kept at the CFEETK. A photographic survey programme based on the *Karnak project* inventory was established with the CFEETK photographic service. The orthophotographic technique (AgiSoft PhotoScan) allowing in a reasonable time to make the large number of photographs necessary for the advancement of the project and the regular addition of new documents online.

The work of indexing the corpus of Karnak's inscriptions, which is still in the process of being assembled, has led to the publication in June 2017 of a first version of the Glossary of Karnak's inscriptions devoted to vocabulary. This first volume contains just over 1,600 terms representing about 100,000 attestations in the inscriptions processed at this stage. It complements the inventory of monuments, objects, scenes and inscriptions of the Karnak temples published in 2016 and will be regularly enriched as the work of indexing and lexical analysis of the corpus progresses.

This volume is accessible in Pdf format from the websites of the Franco-Egyptian Centre for the Study of Temples of Karnak (MAE/USR 3172 of the CNRS) and the Egyptology team of the University of Montpellier (CNRS, UMR 5140-ASM).

Several articles related to the work of gathering and publishing Karnak's inscriptions in the project were published in Volume 16 of *Cahiers de Karnak* (see below).

#### Bibliography

- S. Biston-Moulin, *Glossaire des inscriptions de Karnak I. Le vocabulaire, Travaux du Centre Franco-Égyptien d'Étude des Temples de Karnak*, Montpellier, 2017.

## 2. RECONSTRUCTION PROGRAMMES (A. Garric)<sup>26</sup>

### 2.1. The walls of the “Cachette Courtyard”

A new reconstruction project has started in September 2016 in Karnak Temple: the reassembly of 250 blocks onto the Cachette Courtyard walls, built by Thutmose III and especially decorated by Ramesses II and Tutankhamun. This anastylosis is based on a research done by Fr. Le Saout (1982) et G. Dembitz (to be published) who produced, from epigraphic survey and old photographs, views of the reassembled stones. These studies were done to document the meaning of the decorated scenes and the hieroglyphic texts.

Even if these documents are scaled, they aren't accurate enough to take measurements on and be used on the field in the reconstruction process, as they only indicate the relative positions of the decorated faces.



Orthophotograph of the west side of the East Wall. © CNRS-CFEETK/A. Garric.

One of the main difficulties of anastylosis, especially when the monument is incomplete, is the first laid courses which cannot be readjusted during the laying of the next ones, and these not only have to connect with the part already assembled but also, in the end, with those of the existing building. Note that each stone weights about 2.5 tons.

The reassembly of all the blocks to their original position on the structures still in place requires a millimetric accuracy.

Each one needs to be carefully surveyed with these specifications to know the dimensions and the precise architectural characteristics as to the course heights, block lengths, and distance between the decorative elements and joints.

As traditional survey techniques are long and tedious (in this case, it would require scaffolding, plumb level, drawing board, etc.), while an image-based approach is an opportunity to accelerate this process.

Therefore, orthophotographs on both sides of each wall have been made with a resolution adapted to the direct needs of the reconstruction work: sufficient enough to record all necessary information, allowing the reading of hieroglyphs, the measurement of decor elements and joint positions, without being overly cumbersome.

Unlike the epigraphic use-case, the visual information derived from the image reconstruction are not as important as their geometric quality. On a 60m long and 8m high east wall, about a hundred images were taken from 3m (Nikon D90). To guarantee this geometric quality, 6 to 10 GCP are set on the wall, associated with close-up pictures indicating their positions (defined on easily identifiable elements such as the end of a line of decoration, the tip of a particular crack, etc.). A 3D model is created, allowing to compute orthophotographs on the vertical side. Inserted into a CAD software, the next step is to integrate all the blocks into the complete orthophotograph of the wall. Two solutions are possible:

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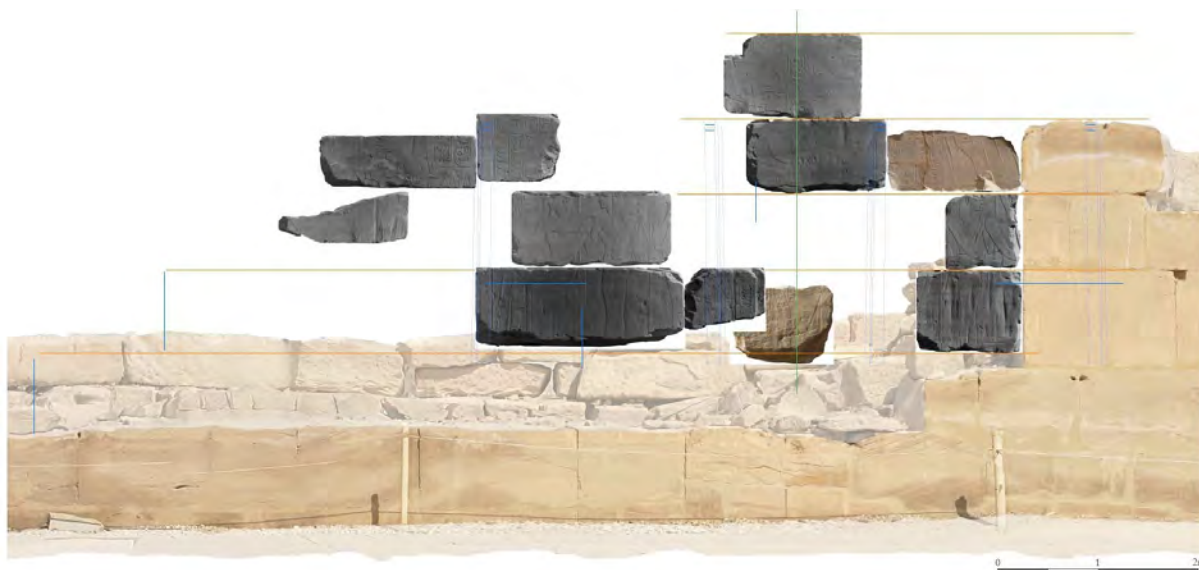
<sup>26</sup> With Ramadan Yassin, Jamal Salem, Hashem Abd El Hamid, Ahmed Youssef, Hamdi Adli, Ashraf Jamal, Samir Ahmed, Mohamed Abd El Sid, Girgis Ernest, Saadi Saadek, Mohamed Khalil, Walid Mohamed, Mohamed Abbadi, Salah Fahim (MoA-CFEETK).



- Using images from the archives if the quality is good enough, although this may not be the best solution.

- Making orthophotographs of each block (limited to 5/6 shots)

In both cases, the distance between two details on each decorated face are measured, and thus all blocks can easily be imported and scaled in the CAD file.



Tutankhamun scenes on east side of the Cachette Courtyard East Wall. Old photographs and ortho-images of all the blocks to be rebuilt have been scaled and accurately preassembled on CAD software (ongoing reconstruction hypothesis). © CNRS-CFEETK/G. Dembitz, A. Garric.

Therefore, it is no longer necessary to make measurements either on the wall or on the blocks as the measurements are all easily accessible in the ortho-image CAD file: widths of the different scenes, height of the text lines, distance between a line and a joint,... all within millimetric accuracy.

With this kind of information, the reconstruction work can easily be done "virtually" and then on the field. For the North Wall top part, which is 12m high and difficult to survey, the position of 16 recently discovered blocks has been confirmed by using this photogrammetric process without even moving them, which is rather practical because some stones weigh more than 4 tons.

This work is carried out in close collaboration with G. Dembitz and will form the material for a further publication on another recent discovery: when we reassembled the first courses of the Tutankhamun scenes, we discovered the existence of a niche decorated in his name and totally unknown on the external side of the East Wall.

All the missing parts are built with modern sandstones. Today, the reconstruction of this side is completed (Tutankhamun scenes, 13 decorated blocks, 5 courses) and the west side of this wall is in progress (Ramses scenes, 14 blocks already set in original position); 4 courses have still to be set in place.



Reconstruction on the west side of East wall still in progress. © CNRS-CFEETK/A. Garric.

### 3. CONSERVATION-RESTORATION PROGRAMMES (L. Antoine)<sup>27</sup>

#### 3.1. “Funeral rooms” of the *Akh-Menu*

This work concerned the conservation of the so-called “funeral rooms” (AKM.CF.1-3) built in the time of Thutmosis III in the *Akh-menu*. They consist of a vestibule and two chapels dedicated to the cult of the king.

Statement of state

Structural alterations

- Granular disintegration especially on the low part of the monument
- Granular disintegration located in the bed of sedimentation on the upper blocks
- Salt-subflorescence of bedrocks
- Stone fragments separated and movable
- Fractures and cracks
- Old mortar with cement

Surface alterations

- Generalized dusting
- Cement mortar overflowing
- Thin layer of cement on bedrocks
- Powdery paint layer
- Ring

#### • Diagnostic

The sandstone is infected by salts coming from the ground. Their migration into the stone can be caused by multiple factors. One of the origins can be the recurring floods of Nile previous to the construction of the Assuan dam in 1965. Besides, the former level of burying, knowing that the actual ground level is 2 to 3 meters lower, is a condition that broadly favored the motion of salts into the stone. Moreover, the actual level of the water table also causes salts migration due to the capillary lift.

The previous interventions carried out with cement coating deteriorate the sandstone even more. This material is forming a waterproof layer and therefore confines the salts in the stone. We can also notice that within time, this coating became unsightly.

#### • Treatment proposal

The work carried on in the funeral rooms of *Akh-menu* is aiming to ensure the conservation of the architectural ensemble through the stabilization of the structural degradations of the stone. Our intervention should also enable the aesthetic value of the site thanks to various interventions such as polychromy consolidation, applying of new coatings and cleaning of the surface of the walls.

#### • Treatment

*Structural interventions*

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<sup>27</sup> The work was supervised by L. Antoine (International volunteer, MEAE-CFEETK) and Abdel Nasser Ahmed, Chief of conservation. Members of the team: Ashraf Mostafa Ali, Nagwa Abd El-Ghafour, Abdelnasser Mahmoud, Mahmoud Said Ahmed, Ghaad Nubi Hussein, Tarek Mohamed Gharib, Mustafa Abdou Mahmoud Qoraïm, Manon Lefèvre (conservator), Corentin Luneau and Clémence Poirier (CNRS trainees). Many thanks to *rais* Mahmud Faruk for his technical assistance.

The first treatment applied was the withdrawal of the modern cement coatings. This intervention allowed us to uncover sandstone blocks masonry sealed with a mortar made out of limewash and brick powder.<sup>28</sup>

We decided to keep this past intervention because of its good condition and also because of the use of safe and stable materials.

The blocks from the bedrock that are in an advanced disintegration condition have been purged then desalted on their surface with the application of clay compresses. This clay has the necessary soaking skills for the withdrawal of salt efflorescences.<sup>29</sup>

### *Consolidation treatment*

The blocks presenting a substantial granular disintegration state have been treated with ethyl silicate.<sup>30</sup> This treatment had also been applied locally, on smaller powdering areas.

The consolidating product should progressively permeate in the sanding area of the stone. Therefore, openings have been made each 15 cm allowing us to inset a drip system. The depth of the openings is adapted to the treated area we are willing to reach.

This intervention is lasting approximately 4 hours to optimize the progressive permeation of the silicate into the stone. The blocks are then wrapped with tarpaulins in order to increase the evaporation time of the solvent and thereby encourage the hydrolysis reaction of the consolidating product. Following this phase, the chemical process needs another 3 weeks but then unwrapped before any other intervention could be applied on the stone.



Consolidation of the upper stones (a and b), the granular disintegration is advanced and the sandstone is reduced like powder (c). © CNRS-CFEETK/L. Antoine.

The areas with superficial cohesion lacks have been consolidated with a nanophasic calcium hydroxyde in dispersion within isopropyl alcohol.<sup>31</sup> This solution has been applied three times with a brush.

<sup>28</sup> Treatment led by Georges Legrain.

<sup>29</sup> Compresses made out of sand and a mix of two kinds of clay with equal proportions: attapulgite (high quality clay free of impurities) and *hiba* (local clay).

<sup>30</sup> Wacker Silres BS OH 100 up to 50 % in ethanol.

<sup>31</sup> Nanorestore®.



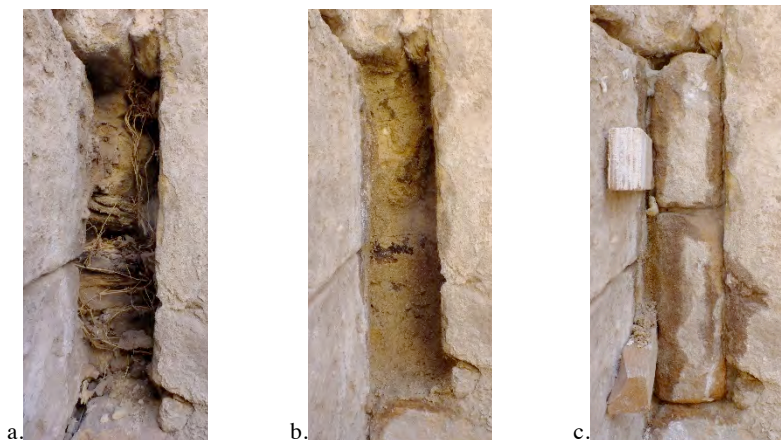
Antique mortars made out of whitewash that have been uncovered and observed in the joints between the blocks, have a powdery texture. They have been consolidated with ammonium oxalate<sup>32</sup> diluted up to 5 % in demineralized water and applied with a syringe.

#### *Stone fragments separated and movable*

After the removal of the modern coating, some fragments that it was maintaining were dissociated from the block. Different treatments have been applied depending on the situation.

The small fragments were fixed with an epoxy resin.<sup>33</sup> Prior to that treatment, a thin layer of thermoplastic acryl resin,<sup>34</sup> Paraloid B72 up to 5 % in acetone, has been applied on the sticking areas in order to make a superficial consolidation and to help the possible reversibility of this intervention.

The “patches” that were dissociated from the structure were again sealed with a mortar from lime and sand. It was all consolidated with whitewash injection.



Stone obturators separated (a), cleaning of the area and new sealing with mortar (sand and lime) and lime injection (b and c).  
© CNRS-CFEETK/L. Antoine.

Some of the blocks with crossing breakings have been dowelled with fiberglass stems that were previously coated with epoxy resin.<sup>35</sup> To ensure the reversibility of the treatment, the openings were previously isolated with whitewash. A fragment located between two blocks with inscription has been unsealed in order to adjust its position.<sup>36</sup> It has been fixed to the block above with epoxy resin.<sup>37</sup> The interspace with the block below had been filled with mortar and sandstone fragments in order to create a good base.

#### *Surface interventions*

##### *Paint layer consolidation*

The interventions focused on the remains of paint layer in the funeral chamber 2 (CF2) were realized by Manon Lefèvre, conservator of paintings.

<sup>32</sup> Salt reacting with calcium carbonate making the consolidation possible.

<sup>33</sup> Araldite 2011 charged with micronized silica.

<sup>34</sup> Paraloid B72 up to 15 % in acetone.

<sup>35</sup> Araldite 2011.

<sup>36</sup> This fragment was probably sealed at the time of Georges Legrain, the mortar is characteristic (limewash and brick powder).

<sup>37</sup> Araldite 2015.

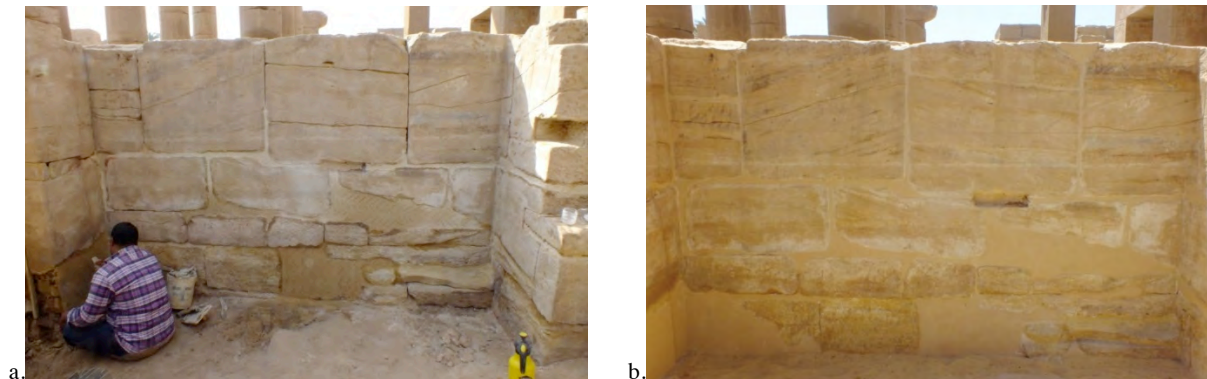
A consolidation located in powdery areas of the antique preparation layer was made with an ammonium oxalate solution up to 5 % applied with a brush.

Prior to any intervention, the paint layer that was also powdery needed a pre-consolidation with a synthetic resin<sup>38</sup>. This step allowed to do the following cleaning treatment without any risk of losses.

A first phase of cleaning was mechanical, with scalpels and smooth brushes removed the widespread dust.

The chemical cleaning is a treatment used to remove the residues inlaid in the original material. After a series of tests, it is a gel from carboxymethylcellulose up to 3 % in demineralized water<sup>39</sup> that has been chosen. It is left on to react with the surface for 5 minutes and then cleaned with cotton and water. The use of water has locally dragged along salt lifts to the surface. They have been removed with compresses of attapulgate which is an absorbing clay.

The consolidation has been finalized with the same resin used for the pre-consolidation but with a higher concentration up to 5 %.



After the withdrawal of the modern cement coatings, application of two layers of plaster rich in lime whitewash and sand, the last one is colored with pigments (b). © CNRS-CFEETK/L. Antoine.

### *Cleaning*

All the walls without any polychrome tracks have been mechanically cleaned with brushes then with moistened absorbing papers applied on the resistant residues of dust.

The floor was covered by gravels, and the chapels are now opened to visitors.

### **3.2. “Sokarian rooms” of the *Akh-menu***

The “Sokarian rooms” belong to the area of the *Akh-menu*. These two rooms (AKM.SK.4 and AKM.SK.5) present the same configuration: the upper rooms show us a space with a paint layer in good state of conservation, the “proto-crypts”<sup>40</sup> are located below.

#### • Statement of state

##### *Structural alterations*

- Missing parts
- Fragmentations and scalings

<sup>38</sup> Klucel G up to 3 % with ethanol.

<sup>39</sup> The gel is applied on absorptive paper to be easier to remove it.

<sup>40</sup> After J.-Fr. Carloti.

- Fractures and cracks
- Granular disintegration of bedrocks
- Subsidence of the south floor

*Surface alterations*

- Loss of cohesion and adhesion of pigments
- Loss of adhesion of the make layer on the support
- Powdering of antique mortar
- Stainings and excrements of bird
- Abrasions, keyings, graffitis and scratches
- Generalized dusting
- Cement mortar overflowing
- Ring and moist area

• Diagnostic

In 1967, the “Sokarian rooms” sustained a floor sag due to turbine trials for the high dam. A restoration campaign followed this event in order to reinforce the foundations and consolidate the whole site.<sup>41</sup> These interventions are the reason for the good conservation of the place. The polychrome remains were cleaned in 1991-92. However, the display of the paint layer to the exterior conditions requires a new treatment for their good conservation.

• Treatment proposal

It is necessary to reduce the granular disintegration process and to add value to the area with different interventions like the withdrawal of the cement coating and the application of new coatings. The paint layer presents a good state of conservation but need to be cleaned and consolidated. The conservation should enable the aesthetic value of the “Sokarian rooms” to open the south area of the *Akh-menu* to the public.

• Treatment

*Structural interventions*

The withdrawal of the modern coatings is essential to apply a new permeable coating, this intervention should enable the migration of the salts to the surface and therefore will reduce the danger of crystallization process inside the stone. The first coating compound of lime and sand (1:3) was applied and recovered by the finishing coating, the same composition but tinted with pigments.

Just a disintegrated space from one bedrock in the south “proto-crypt” (AKM.SK.4) has been purged, a new masonry has been realized with sane sandstones and a mortar compound of lime and sand (1:3).

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<sup>41</sup> J. LAUFFRAY, *Karnak 2 (= Kêmi 19)*, 1969, p. 129.



a. “Proto-crypt” on the south of the AKM.SK.4, after the first mortar (a). Upper area during the withdrawal of the cement (b). © CNRS-CFEETK/L. Antoine.

Some dissociated fragments have been fixed with an epoxy resin charged with micro silica. Prior to that treatment, a thin layer of Paraloid B72 up to 5 % in acetone has been applied on the sticking areas. Different treatments have been applied for the spallings, depending on the situation. The peelings of the surface have been fixed with an injection of Paraloid B72 up to 5 % then up to 15 % in acetone. When the gap was bigger, we decided to inject a solution of PLM.<sup>42</sup> Some cases needed a more resistant structural reinforcement and were therefore consolidated with a liquid epoxy resin.<sup>43</sup>

### *Surface interventions*

#### *Cleaning*

A mechanical cleaning, with scalpels, small chisels and glass fiber sticks, has been realized for the cement mortar overflowing.

We did a cleaning by soft brushes for the entire surface, even paint layer, to apply after that moistened absorbing papers to remove the resistant residues of dust.

#### *Consolidation*

The consolidation interventions cover several supports including the antique mortars present in the joints between the blocks. Because of their powdery texture, they have been consolidated with ammonium oxalate diluted up to 5 % in demineralized water and applied with a syringe.

The antique preparation layer received two kinds of treatment. The gaps between the stone and the preparation layer have been closed by PLM injections, this process enables to find again the mechanical contact of this two materials. Regarding the liftings with a small thickness, we fixed them with an acrylic adhesive.<sup>44</sup>

After the convincing tests realized for the “funeral rooms”, we will consolidate the paint layer with the same synthetic resin, the Klucel G up to 5 % in ethanol. Considering the good state of conservation of the materials, we will not need to do a pre-consolidation before cleaning.

This conservation programme will continue in 2018-2019.

<sup>42</sup> Mortar made of natural limes without efflorescent salts.

<sup>43</sup> Araldite 2011.

<sup>44</sup> Acril 33.





a.



b.



c.



d.

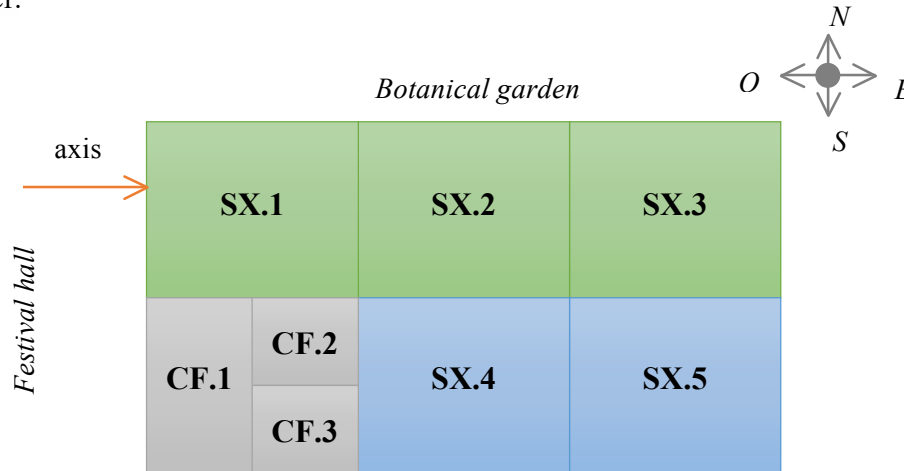
Localized loss of adhesion of the make layer (a), ongoing consolidation by PLM injection (b). Modern mortar overflowing on the stone and the painting (c), test of mechanical cleaning (d). © CNRS-CFEETK/L. Antoine.



One scene and details after restoration.  
© CNRS-CFEETK/G. Muller.

### 3.3. “Axial sanctuaries” of the *Akh-menu* (M. Lefèvre)<sup>45</sup>

They consist of three small rooms, one behind the other, located between the Alexander the Great’s chapel and the “Botanical garden”. The first two chambers (AKM.SX.1 and AKM.SX.2) depict king’s coronation scenes, and the Theban Ennead. The eastern room (AKM.SX.3) is a sanctuary dedicated to Amun-Kamutef.



Localisation sketch, from M. AZIM *et al.*, *Karnak et sa topographie I, Monographie du CRA 19*, Paris, 1998.

In 2015, the vestibule of the chapel of Alexander the Great (AKM.SX.4) has been restored. So the work of restoration follows a logical continuity. Every area has a spatial connection.

#### • Description

The walls have been built in sandstone (height: 1m70). The three rooms have no ceiling. Every threshold of sanctuaries is in pink granite. Originally, a white coating covered all the walls, but today there are only residues. Moreover, there were polychrome. Today, these areas are incomplete.

A mortar of cement was applied during a previous restoration. Different coats compose it: black cement, white cement, red mortar (clay and lime), non-original stones and red bricks.



Different coats of the restoration’s mortar. © CNRS-CFEETK/M. Lefèvre.

<sup>45</sup> This work was carried out from 17th of September to 17th of October 2016; it was supervised by Manon Lefèvre (conservator) and Abdel Nasser Ahmed, Chief of conservation (MoA-CFEETK). The members of the conservation team were Mohammed Gad Ahmed, Salah Salem Sayed et Mostafa Abdo Mahmud and Gaad Nubi Hussein (MoA-CFEETK). MoA inspectors: Ashraf Gadelrab and Emad Abd Elharis. Many thanks to Antoine Garric their technical assistance.

- Statement of state

- Structural degradation

Cracks and salt are visible on the sandstone. The antique coating presents blistering, it losses cohesion (powdered) and adhesion. All these damages led to gaps so a loss of information.

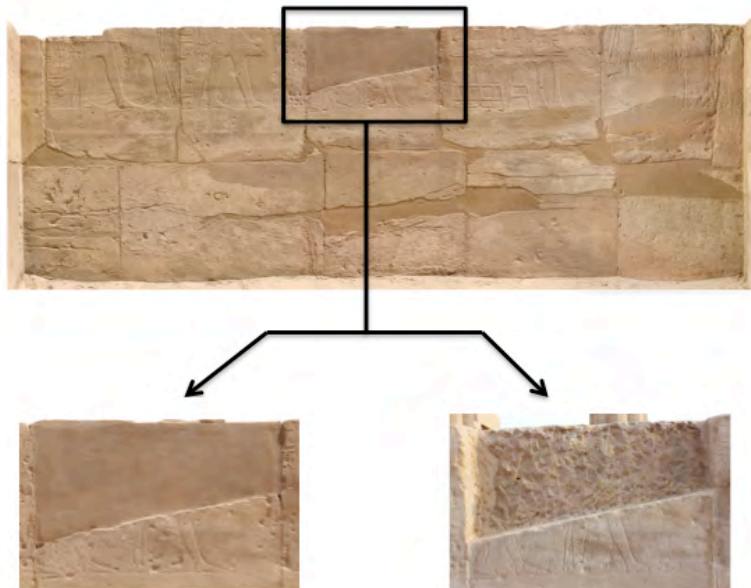
- Degradation of surface

The walls of the axial sanctuaries are covered by animal excrement, splash, graffiti and drip of clay. There is also salt and dust.

- Treatment

The first necessary intervention was to remove the old mortar of restoration (cement). A drill deleted most of the cement and for the smaller part we used hammer and chisel. The cement on the sandstone was removed with brush, scalpel and/or sandpaper.

When the cement was removed, ancient “patches” appeared in the rooms 2 and 3. They were used by ancient builders to fill gaps of stone. But many of them had already disappeared. Some of these gaps still present an antique mortar (white).

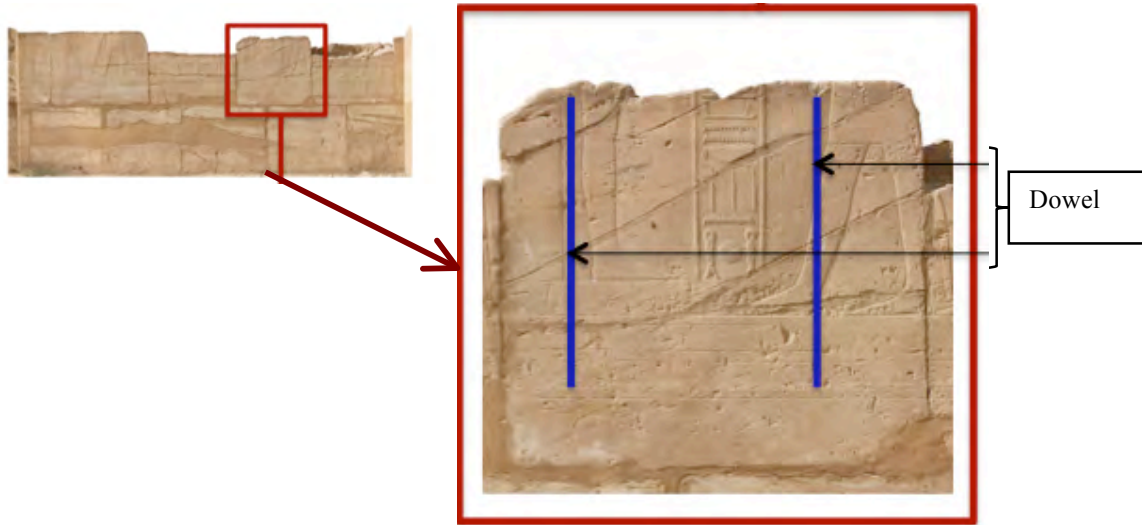


Negative of an ancient “patch”. © CNRS-CFEETK/M. Lefèvre.

- Repositioned of piece: Paraloid B72 (3 % in acetone) was applied (localized spots) then, Araldite 2015 was applied on these points. Paraloid allows making a thin barrier between the sandstone and the Araldite.

- Hanging dowel in a stone block: Sometimes we need a more interventionist consolidation (to the blocks which present total, horizontal and oblique fragmentations). In the axial sanctuaries, we applied this intervention on a block of the south wall of AKM.SX.1 and on a block of the east wall of AKM.SX.3. For it, we worked in association with the restorer Camille Bourse and applied her technique. At first, two holes in the concerned blocks were drilled. After cleaning, some ethanol was put to open the pores of the stone then, the hydraulic lime (thin particle) was slip into these two holes. The lime is like barrier to stop the infiltration of the liquid Araldite in the pores of the sandstone. 24 hours later, liquid Araldite was applied in the holes and dowel fiberglass were pushed slowly. All becomes connected.





Plan to hanging dowel in a stone block of the AKM.SX.1, wall south. © CNRS-CFEETK/M. Lefèvre.

When structural restorations of the walls were finished, the work continued on the walls surface. A first dusting was made with brushes. Then, a desalination to reduce or to eliminate the salt has been done on the walls. So, we put compress of *hiba*-sand and/or *hiba*-Attapulgate.



Mechanical cleaning (before at the left and after at the right). © CNRS-CFEETK/M. Lefèvre.



Desalination with compress of *hiba*-Attapulgate (north wall of AKM.SX.3). © CNRS-CFEETK/M. Lefèvre.

For the surface interventions, a mechanical cleaning and a consolidation were made to restore legibility, cohesion and adhesion.

To consolidate the antique coating, an oxalate of ammonium (Amox) (3 % in demineralized water) seemed appropriate. During the cleaning we discovered paint layer remains. We consolidated it with Klucel G in 3 % in ethanol - demineralized water (50:50). These interventions will protect important information for the Egyptologists. To finalize this restoration, a new mortar (lime and sand) was applied, in three stages:

- First mortar: one part of lime for three parts of sand and stone.
- Second stage: one part of lime and two parts of sand.



- To finish: colored mortar for better integration and visual homogeneity.<sup>46</sup>

The objective of this restoration was to assure the durability of these rooms and to allow a better study of walls for the Egyptologists. The main interventions consisted in removing the cement mortar and consolidating the support. Furthermore, during these different works, the presence of ancient “patches” and also paint layer remains were uncovered. The restoration reached all its objectives. The materials of restoration respect the area and the new information discovered can be useful for the scientists.



General views of walls of AKM.SX.2 and AKM.SX.3 after restoration work. © CNRS-CFEETK/M. Lefèvre.

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<sup>46</sup> Recipe: 3 part of sand, 30mg of yellow, 10mg of brown and 1 part of lime

### 3.3. The screen-walls of Osorkon III (L. Antoine)<sup>47</sup>

This work concerns nine sandstone blocks, uncovered in 1976-77 in the foundation of the colonnade of Khonsu Temple. They belonged to screen-walls of a previous colonnade built in front of Khonsu Temple by Osorkon III. Some of them deal with the Theban ritual for the Confirmation of Royal Power at the New Year, and the celebration of the Festival of Thoth (19th of *Akhet* I).<sup>48</sup>

#### • Statement of state

##### *Structural alterations*

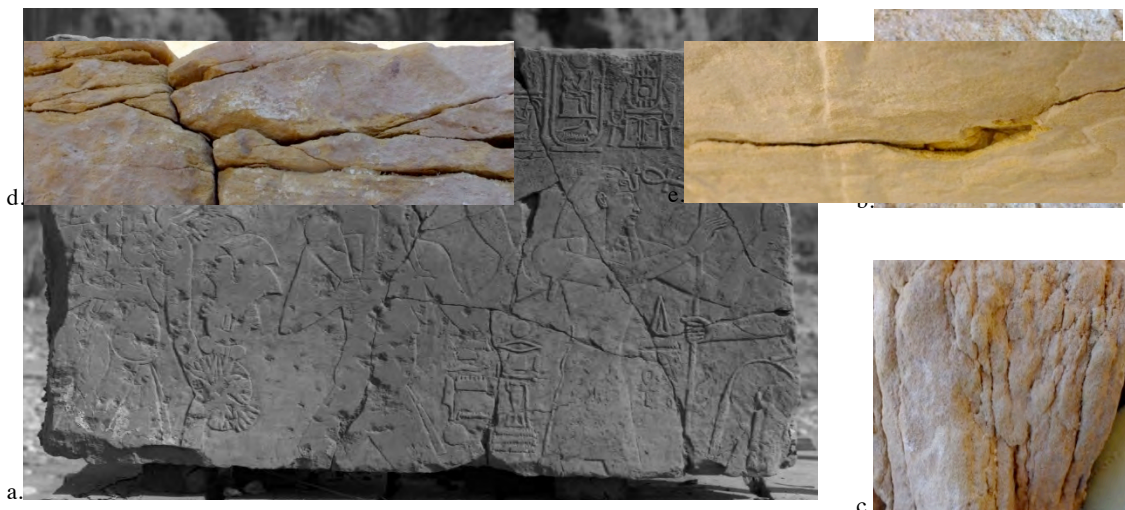
- Important state of granular disintegration: delamination, sanding, scaling and spalling, salt subflorescence
- Missing parts
- Fractures and cracks

##### *Surface alterations*

- Generalized dusting
- Powdery paint layer
- Efflorescences

##### *Modern interventions*

- Bonding with epoxide resin
- Metal staples
- Blocks sealed on an important thickness of reinforced cement



<sup>47</sup> This work was carried out from the 8th March to the 23rd November 2017; it was supervised by Lucie Antoine (International Volunteer conservator, MEAE-CFEETK), and Abdel Nasser Ahmed, Chief of conservation (MoA-CFEETK). The members of the conservation team were Ashraf Mostafa Ali, Nagwa Abd El-Ghafour, Abdelnasser Mahmoud, Mahmoud Said Ahmed, Ghaad Nubi Hussein, Mustafa Abdou Mahmoud Quoraïem, and Clémence Poirier (CNRS trainee). Many thanks to Antoine Garric and Rais Mahmud Faruk for their technical assistance.

<sup>48</sup> J.-Cl. GOYON, in: Chr. Thiers (ed.), *Documents de Théologies Thébaines Tardives* 2, *CENiM* 8, Montpellier, 2013, p. 33-93; *id.*, in: *Documents de Théologies Thébaines Tardives* 3, *CENiM* 13, Montpellier, 2015, pp. 29-89; *id.*, « Le kiosque d'Osorkon III du parvis du temple de Khonsou : vestiges inédits », *Karnak* 16, 2017, pp. 227-252.

Block after the interventions of 1976 (a). Present state of the sandstone: salt efflorescences (b), disintegration by delamination (c) and scaling (d and e). © CNRS-CFEETK/L. Antoine.

- Diagnostic

The different structural alterations could come from the reuse of the screen-walls inside the foundations. Their burying has favored the migration of salts in the stone (close water table). Once the stone is contaminated, it suffers the cycles of dissolution and crystallization of the salts. This process induces pressure into the sandstone and slowly destroys the stone structure. The consequence is the granular disintegration of the stone with, obviously, less mechanical resistance. The interventions that were conducted also contribute to the degradation of the sandstone. As mentioned before, the cement used to reinforce the original support is blocking salts into the stone and therefore creating a waterproof interface at the back of the blocks. Due to this situation the sanding process is accelerated.

Moreover, because of their contact with the cement, the metallic staples are in an advanced oxidation stage and may create tensions. We also observed the damage of the epoxy resin used to fix the fragments, it began brittle as it got older.

- Treatment proposal

These screen-walls offer a fine quality of execution. The intervention is necessary in order to stabilize their granular disintegration stage. This implies an important campaign to remove the old restoration treatments followed by treatments of consolidation and desalination. These conservation treatments will allow the reassembly of the fragmentary blocks as well as the reassembly of screen-walls in order to recover their readability and enable them to be exhibited in the Open Air Museum.

- Treatment

*Withdrawal of the modern cement*

Prior to any intervention it is very important to ensure the protection of the inscriptions with a facing made out of gauze and thermoplastic acryl resin.<sup>49</sup> The blocks were then installed on a sand layer in order to reinforce the protection on the face and also to cushion the vibrations due to the removal of the cement. This intervention has been done with a circular saw following a tight grid then the blocks were taken off with a chisel. This method made it possible to have less vibrations in the altered sandstone.

During this phase we discovered metallic staples used to maintain the fragments together. Some of them were in an advanced oxidation stage.

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<sup>49</sup> Paraloid B72 up to 15% in acetone.





Bad state of statement of one of the blocks. The area of the face reveals many small and sanding fragments with a thin thickness (5 mm). © CNRS-CFEETK/L. Antoine.



Thickness of reinforced cement in red (a and b), the second picture shows also the heterogeneity of the thickness of the stone because of the damage (b). © CNRS-CFEETK/L. Antoine.



Oxidation state of a metal clip (a) and picture of one block during the withdrawal of the modern restorations (b). © CNRS-CFEETK/L. Antoine.



### *Consolidation*

After the mechanical removal of the salt efflorescences and the draining on the back, the blocks were consolidated with ethyl silicate up to 50 % in toluene.<sup>50</sup> The drip system previously explained has been used here for the blocks that were still assembled. The fragments that could be handled were consolidated by capillary lifts in baths.

### *Desalination*

Following a period of one month and a half that is the needed time for the silicate reaction, it was important to proceed to a partial desalination regarding the salts on the back of the most altered blocks. Compresses of clay<sup>51</sup> and cellulose pulp (1:2) have been applied. The amount of absorbed salts for each compress was controlled by measuring the conductivity. Three applications were needed.

### *Assembly of the blocks*

The old stickings that were no longer maintained by the staples or the cement yielded.<sup>52</sup> The reassembly of the fragments needs a better structural resistance and this is why we decided to ensure this procedure by dwelling with fiberglass rods with a diameter of 6 and 8 mm and with epoxy resin.<sup>53</sup> This option is the closest to a minimal intervention and allows an easier handling of the blocks. The small fragments which did not need this kind of structural maintenance were glued with epoxy resin Araldite 2015 after previously protecting the interfaces with a Paraloid B72 layer up to 5 % in acetone.



Assembly of the fragments after the withdrawal of the cement and the treatment of consolidation. © CNRS-CFEETK/L. Antoine, É. Saubestre.

Various consolidation interventions have been lead locally in regard to each situation. The fine peelings of the surface have been fixed with an injection of Paraloid B72 up to 5 % then up to 15 % in

<sup>50</sup> The treatment was realized at the middle of March, when the weather began to be hot. Because of that, it is important to use a solvent with an evaporation rate slower than the ethanol.

<sup>51</sup> Attapulгите.

<sup>52</sup> The Araldite began breaking as it got older. In this situation, the bondings are just here to reinforce the assembly system of metal clips and the concrete slab.

<sup>53</sup> Araldite 2011.

acetone. When the gap was bigger we injected a solution of PLM. Some areas needed a more resistant structural reinforcement and were therefore consolidated with Araldite 2011 in addition with sand.

### *Presentation*

The fillings were made with a lime coating charged with sand and tinted. The front sides were lightly cleaned to remove the dust and achieve homogeneity among the blocks.



The screen-walls in the Open Air Museum. © CNRS-CFEETK/G. Muller.

Regarding their reassembly, the screen-walls from the same scene are dowelled together, and were sealed with a lime mortar on a back pillar. The whole collection was displayed on benches in the Open Air Museum.

## 4. ARCHIVES AND SCIENTIFIC DOCUMENTATION

### 4.1. Scientific archives (S. Biston-Moulin)

#### *Photographic database of the Archives*

The work on the scientific archives of the CFEETK continued in 2017. The Centre's annual photographic production has been integrated into the archives with just over 15,000 documents being added this year. The work on the *Karnak project* (see above) facilitated the reorganization of the existing CFEETK archives and the addition of new documents by linking the scientific information from the project to photographs in the CFEETK scientific archives. The work of inventorying inscriptions in the temple also makes it possible to complete the archives by identifying objects and scenes of monuments for which the photographic documentation kept in the CFEETK archives is insufficient. A programme of photographic surveys based on this inventory was initiated with the CFEETK photographic service in 2014 and continued over the last three years.

Since 2016, the CFEETK's scientific archives have been made available online (<http://www.cfeetk.cnrs.fr/archives/>). This interface combines all of the team's information sources and projects (*Karnak project*, ArcheoGrid Karnak, bibliographic project). It received more than 1,700,000 visitors and the photographs were downloaded a little over 2,600,000 times. The number of high-resolution photographs available is growing rapidly in connection with the online publication of documents in the *Karnak project* and the production of new photographic covers by the Centre's photographic department.

With just over 10,000 full-resolution photographs available at the opening, there are now more than 30,000 full-resolution photographs available for download online.

The interface for consulting the archives is based on a Nakala repository, a service set up by the TGIR Huma-Num (<https://www.nakala.fr/>), to store the digital data of the unit in a secure repository that ensures both accessibility and reliability over time. The Nakala repository offers interoperable access to the photographic metadata, i. e. the possibility of linking them directly to other projects within the unit or to external projects.

#### *CFEETK Library*

The CFEETK library was expanded this year with about 50 new titles. In addition to the members of the French-Egyptian Centre, the library welcomed many inspectors and Master's students from Qena University throughout the year.

#### *Website*

The CFEETK website has welcomed more than 400,000 visitors this year, i.e. more than 2,800,000 visitors since its launch in March 2009.

The website of CFEETK, as all projects of the unit hosted by In2p3, experienced technical difficulties since March 2016. Access to some functions had to be temporarily limited, especially for the English and Arab versions of the website. We study the solutions to solve these problems as soon as possible.



#### 4.2. Photographic department (É. Saubestre)<sup>54</sup>

The photographic department has essentially been focused on finishing the photogrammetric survey in several areas of the temple, in order to grow the *Karnak Project* and to provide high resolution images on ligne.

Therefore, the disparate photographic data available to the Centre for the central area of the temple of Amun-Re have been completed, and both the survey of the “Northern storerooms” and the north rooms of *Akh-menu* have been completed.



Orthophotography of the “Northern storeroom” 2, North wall. © CNRS-CFEETK/É. Saubestre.



Orthophotography of the Thutmosis III's Chapel, Western gate and North wall. © CNRS-CFEETK/É. Saubestre.

The completion of the anastylosis and a final cleaning of the chapel of Thutmosis III in the Open Air Museum enable us to implement a full photogrammetric survey has been done.

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<sup>54</sup> With K. Dowi Abd al-Radi, A. Ruby (MoA-CFEETK), and H. Bellenger (CNRS trainee).



The objects found during the excavation of the temple of Ptah and the chapel of Osiris Wennefer Neb-Djefau have been all photographed in the studio. The re-scanning in high definition of the Centre's film archives is going on.



Oil lamp from Ptah Temple excavation. © CNRS-CFEETK/É. Saubestre.

#### 4.3. Topographical department (P. Mégard)<sup>55</sup>

The surveyor's activity this season was following on from the actions of the last year, in support of the archeologists and egyptologists teams.

The first task was to continue the surveyed with the archeologic's team working on Ptah. The excavations were gathering on the East part of Ptah. Contrary to the last season, the excavations of this year were extensive. Some topographic surveyed and orthophotographs had been done for each step of the excavation to keep in memory the found structures and ceramics. All this documentation has been digitized, classified and included in the Karnak's plan. These actions enabled to advance in the excavation and to make a complete archiving of all the archeological structures and levels. So the archeologists could use these documents to make their analysis and present their results.

The 3D modelling was used for the uncovered objects : millstones, ceramics... It helps the archeologists to present these objects and to get cross sections.

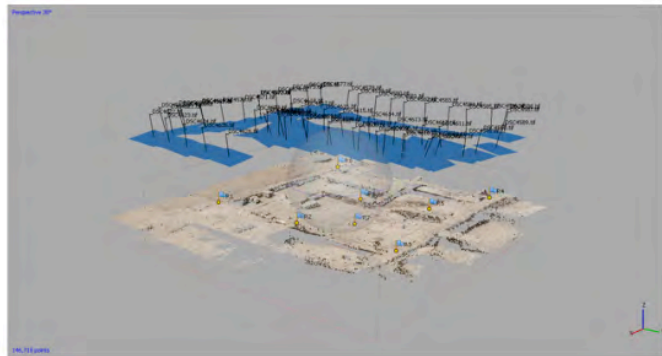
Moreover, the 3D modelling was used to rebuild the sphinx's bases on the Dromos. Indeed, these bases were taken to pieces and the blocks were dispersed around the temple. So a study tries to rebuild these bases. The photogrammetry and the 3D modelling could confirm that the blocks belong to the original bases.

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<sup>55</sup> International Volunteer, MEAE-CFEETK.



1.



2.

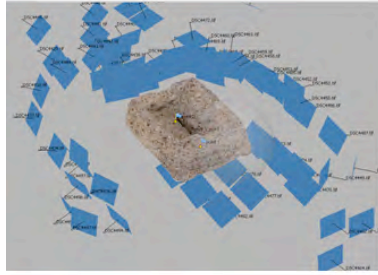


3.



4.

Topographic survey and orthophotograph of the archeological site. Digitalization of the wall and bricks. © CNRS-CFEETK/P. Mégard.



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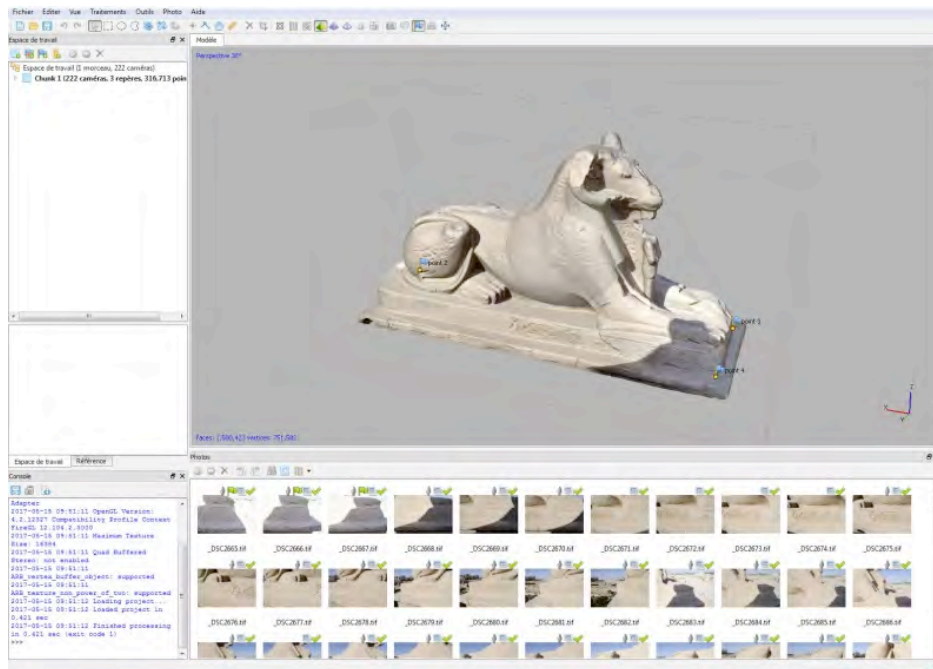


3.



4.

3D modelling of an Olynthian millstone, with a cross section. © CNRS-CFEETK/P. Mégard.



3D modelling of a sphinx. © CNRS-CFEETK/P. Mégard.



Rebuilding of a sphinx's base with loose blocks. © CNRS-CFEETK/P. Mégard.

The other task of the topographic service was to continue the orthophotographs of some temple's walls for the department of the scientific archives. That permits to the department to get good pictures for the epigraphic work and to be able to archive this documentation, and to make it available through the online archives of the Centre. This year, the work focused on the Taharqo's kiosk and the "Sokarian rooms".

Like these last years, a collaboration with the Egyptian colleagues of the CFEETK was set up. A presentation and a training program about the surveyor job had been done regularly for some inspectors of the center. Moreover, a collaboration with an Egyptian surveyor permitted to exchange on the each working method. And so, they could improve and extend their action's field (3D modelling, photogrammetry).

This year, a topographic survey was done on the 2 obelisks to check if they moved or not. The results were compared with the measurements of the last years, and we can conclude that the obelisks did not move.

Finally, the Topographic department was involved in the exhibition celebrating the 50 years of the CFEETK.





Orthophotograph after photogrammetric treatment of the South wall in the "Sokarian room" 5. © CNRS-CFEETK/P. Mégard.

#### **4.4. The scattered blocks survey**

The inventory work of the loose blocks lying upon benches has continued, using the same protocol as in the previous years: numbering on a piece of metal, schematic drawings, photography and incorporation into a database. For the third season, a team of Karnak inspectors (scientific department),<sup>56</sup> using booklets made by S. Biston-Moulin, is currently working on a complete survey of the blocks, statues and stelae present inside Karnak temples. This documentation team successfully made the inventory of all the loose blocks from the *Akh-menu* area. This work will continue next season.

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<sup>56</sup> Hassan El-Tawab, Abdelmenen Ahmed, Amira Fawzy, Rihab Sabri, Marwa Nur el-Din, Sohad Aly (MoA-CFEETK).

## 5. TRAINING PROGRAMMES

Training is provided for shooting and processing images by the photographic department. Trainings to epigraphic survey techniques and digitization software (digitally inked drawings) were provided to the inspectors wishing to acquire these techniques.

MoA inspectors were involved in the Ptah Temple archaeological programme, and trained in different field work.

Similarly, many French trainees (conservators, architects, egyptologists and archaeologists) were welcomed into the CFEETK, to practice fruitful exchanges in joint field programmes and activities.

Access to the library of the Centre used to receive young MoA inspectors preparing Masters (especially from Univ. of Qena). Guidance and assistance to bibliographic research are regularly taught by S. Biston-Moulin (CNRS-CFEETK).

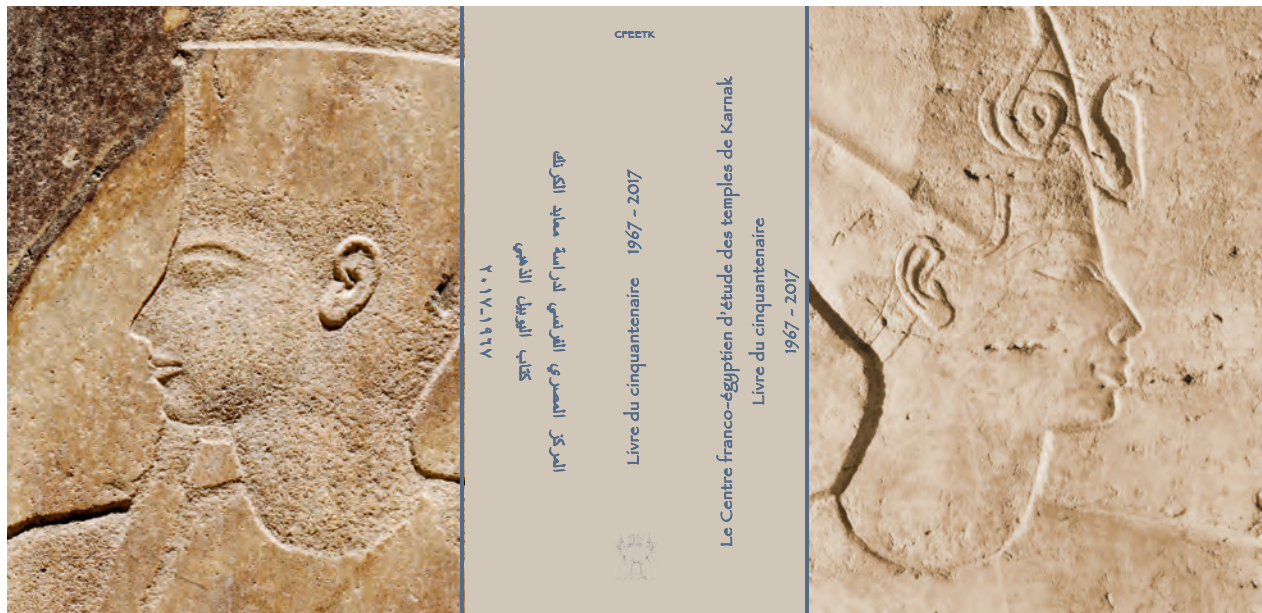
20 MoA inspectors from Karnak, Luxor and Gurna inspectorates participated this season to the French courses provided with the support of the Institut Français (French Cultural Centre in Cairo).

## 6. PUBLICATIONS AND LECTURES

### 6.1. Selected publications of CFEETK members and associated missions (2016)

A short activity report of the CFEETK is published every sixth months in the revue *Egyptian Archaeology* (“Digging Diary”).

- BISTON-MOULIN S., THIERS Chr., *Le Centre franco-égyptien d'étude des temples de Karnak. Livre du cinquantenaire 1967-2017*, TravCFEETK, Luxor, 2017, 278 p. (French and Arabic).

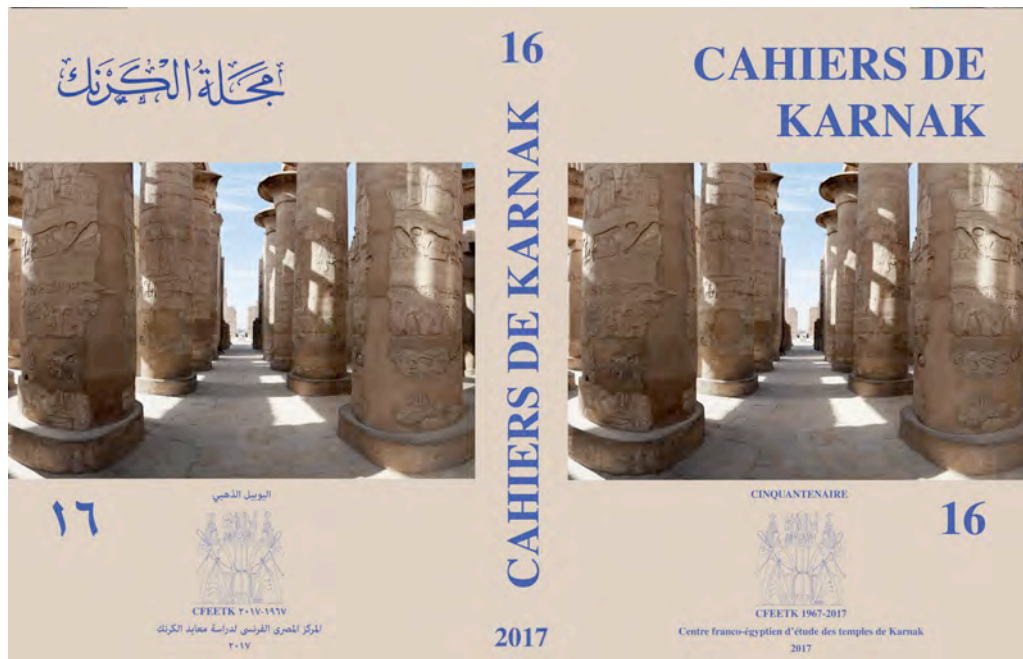


- BISTON-MOULIN S. (dir.), *Glossaire des inscriptions de Karnak I. Le vocabulaire*, Travaux Centre Franco-Égyptien d'Étude des Temples de Karnak, Montpellier, 2017 : <http://sith.humanum.fr/bibliographie/2994>



du

- *Cahiers de Karnak* 16, 2017



*Table of contents*

- ABDEL-RAZIQ A., « Two new fragments of the large stela of Amenhotep II in the temple of Amun-Re at Karnak », p. 1-11.  
 - AL-TAHER A., « Ptolemaic Graffito from the Court of the 3rd Pylon at Karnak », p. 13-26.

- ANDREU G., « L'oeie d'Amon à Deir el-Médina », p. 27-37.
- BISTON-MOULIN S., BORAİK M., « Some observations on the 1955-1958 excavations in the *cachette* court of Karnak », p. 39-51.
- BORAİK M., THIERS Chr., « A few Stone Fragments Found in front of Karnak temple », p. 53-72.
- CASSOR-PFEIFFER S., « Milch und Windeln für das Horuskind. Bemerkungen zur Szene *Opet* I, 133-134 (= KIU 2011) und ihrem rituellen Kontext. *Karnak Varia* (§ 5) », p. 73-91.
- CHARLOUX G., DURAND B., ALI ABADY MAHMOUD M., MOHAMED SAYED ELNASSEH A., « Le domaine du temple de Ptah à Karnak. Nouvelles données de terrain », p. 93-119.
- CHAUVIN B., « Richard Chauvin, « Surveillant européen » à Karnak (... déc. 1899-avril 1901), « Installateur » au Musée du Caire (... juil. 1901-déc. 1903) », p. 121-138.
- CINCOTTI S., « De Karnak au Louvre : les fouilles de Jean-Jacques Rifaud », p. 139-145.
- DAVID R., « Karnak pendant l'Antiquité tardive : inventaire archéologique », p. 147-165.
- DEMBITZ G., « Les inscriptions de Ramsès IV de l'allée processionnelle nord-sud à Karnak révisées. *Karnak Varia* (§ 6) », p. 167-178.
- GABOLDE, « Les marques de carriers mises au jour lors des fouilles des substructures situées à l'est du VI<sup>e</sup> pylône », p. 179-209.
- GOLVIN J.-Cl., « Du projet bubastite au chantier de Nectanébo I<sup>er</sup>. Réflexion relative au secteur du premier pylône de Karnak », p. 211-225.
- GOYON J.-Cl., « Le kiosque d'Osorkon III du parvis du temple de Khonsou. Vestiges inédits », p. 227-252.
- GRASSART-BLÉSÈS A., « Les représentations des déesses dans le programme décoratif de la chapelle rouge d'Hatchepsout à Karnak : le rôle particulier d'Amonet », p. 253-267.
- HOURDIN J., « L'avant-porte du X<sup>e</sup> pylône : une nouvelle mention de Nimlot (C), fils d'Osorkon II à Karnak. *Karnak Varia* (§ 7) », p. 269-277.
- LABARTA Ch., « Un support au nom de Sobekhotep Sékhemrê-Séouadjtaouy. *Karnak Varia* (§ 8) », p. 279-288.
- LAROCHE-TRAUNECKER Fr., « Les colonnades éthiopiennes de Karnak : relevés inédits à partager », p. 289-295.
- PAYRAUDEAU Fr., « Une table d'offrandes de Nitocris et Psammétique I<sup>er</sup> à Karnak... Nord ? », p. 297-301.
- PFEIFFER St., « Die griechischen Inschriften im Podiumtempel von Karnak und der Kaiserkult in Ägypten. Mit einem 3D-Modell von Jan Köster », p. 303-328.
- RAAFAT ABBAS M., « The Town of Yenoam in the Ramesside War Scenes and Texts of Karnak », p. 329-341.
- RONDOT V., « Très-Puissant-Première-Flèche-de-Mout. Le relief de culte à *Aâ-pehety* Cheikh Labib 88CL681+94CL331 », p. 343-350.
- SCHMITT Fr., « Les dépôts de fondation à Karnak, actes rituels de piété et de pouvoir », p. 351-371.
- SERDIUK E., « L'architecture de briques crues d'époque romano-byzantine à Karnak : topographie générale et protocole de restitution par l'image », p. 373-392.
- SOUROUZIAN H., « Une statue de Ramsès II reconstituée au Musée de plein air de Karnak », p. 393-405.
- TILLIER A., « Les grands bandeaux des faces extérieures nord et sud du temple d'Opet. *Karnak Varia* (§ 9) », p. 407-416.
- WIDMER Gh., DEVAUCHELLE D., « Une formule de malédiction et quelques autres graffiti démotiques de Karnak », p. 417-424.



- ZIGNANI P., « Contrôle de la forme architecturale et de la taille de la pierre. À propos du grand appareil en grès », p. 425-449.
- BORAİK M., GABOLDE L., GRAHAM A., « Karnak's Quaysides Evolution of the Embankments from the Eighteenth Dynasty to the Graeco-Roman Period », in H. Willems, J.-M. Dahms (eds.), *The Nile: Natural and Cultural Landscape in Egypt*, Mainz, 2017, p. 97-144.
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- CHARLOUX G., THIERS Chr. *et al.*, « The afterlife of Egyptian statues: a cache of religious objects in the temple of Ptah at Karnak », *Antiquity* 359, 2017, p. 1189-1204.
- COULON L., « La chapelle d'Osiris qui préside aux Occidentaux connue par une série de blocs découverts à Médamoud », in N. Favry *et al.* (eds.), *Du Sinaï au Soudan. Itinéraires d'une égyptologie. Mélanges offerts à Dominique Valbelle, Orient & Méditerranée. Archéologie* 23, Paris, 2017, p. 63-73.
- DAVID R., « Karnak au début de la période byzantine. Caractérisation d'une production locale », dans D. Dixneuf (éd.), *LRCW 5-2 Late Roman coarse wares, cooking wares and amphorae in the Mediterranean Archaeology and archaeometry, ÉtudAlex* 43, 2017, p. 963-974.
- MONCHOT H., CHARLOUX G., « The Opet Temple courtyard excavations: a new zooarchaeological study for Karnak (Luxor, Egypt) », in M. Mashkour, M. Beech (eds.), *Archaeozoology of the Near East 9. In honour of Hans-Peter Uerpmann and François Poplin*, Oxford, 2017, p. 378-387.
- TOURNADRE V., LABARTA Ch., MÉGARD P., GARRIC A., SAUBESTRE É., DURAND B., « Computer Vision in the Temples of Karnak: Past, Present & Future », in *International Archives of Photogrammetry, Remote Sensing and Spatial Information Sciences* 42/5, 2017, p. 357-364.

### **To be published**

- CHARLOUX G., THIERS Chr., *Le temple de Ptah à Karnak III. La favissa*.
- CHARLOUX G., ALI ABADY MAHMOUD M., ANGEVIN R., BISTON-MOULIN S., MOHAMED SAYED ELNASSEH A., MARCHAND S., PFINGSTTAG Fl., PIROU Fl., ROBERSON J., THIERS Chr., ZIGNANI P., "Le temple "primitif" de ptah à karnak", *BIFAO* 117, 2017, forthcoming.
- DAVID R., "Quelques pratiques potières de l'Égypte ptolémaïque d'après la documentation de Karnak", in *Actes du colloque international l'objet égyptien, source de la recherche, École du Louvre, les 17, 18, 19 juin 2015*, forthcoming.
- THIERS Chr., "A Case-Study of a Technique. The So-Called Karnak Technique", in V. Davies, D. Laboury (eds.), *Oxford Handbook of Egyptian Epigraphy and Palaeography*, Oxford, forthcoming.

### **6.2. Colloquium and lectures**

- 18.01.2017, Institut français d'Égypte, Le Caire : Chr. Thiers, « Karnak 1967-2017. Cinquantenaire du Centre franco-égyptien d'étude des temples de Karnak ».
- 17.02.2017, Zamalek, Ministère des Antiquités, remise du Luxor Times Egyptology Award 2017 au CFEETK pour l'ensemble des réalisations (« Ongoing Achievements »).
- 21.05.2017, journée de l'archéologie française en Égypte, IFAO-Institut français d'Égypte, Le Caire : Chr. Thiers, « Le Centre franco-égyptien d'étude des temples de Karnak, bilan 2016 ».

- 21.01.2107, Association égyptologique du Gard, Nîmes : G. Charloux, « Les caches “cultuelles” dans l’Égypte antique à la lumière d’une découverte récente au temple de Ptah à Karnak ».
- 15.06.2017 : Université Montpellier 3, LabEx Archimède : S. Biston-Moulin, « Inauguration de la nouvelle interface du Projet *Karnak* et ouverture des index des inscriptions de Karnak <http://www.cnrs.fr/inshs/recherche/nouvelle-interface-karnak.htm> ».
- 21.09.2017 : *Live Science*, L. Geggel, « Sphinx, Baboon and Cat Statues Found in Ancient Egyptian Burial » : <https://www.livescience.com/60484-egyptian-statues-found-in-pit.html>

### 6.3. PHOTOGRAPHY EXHIBITION

Photography Exhibition inside Karnak Temples, from April 18 to June 23 2017.

<http://www.cfeetk.cnrs.fr/index.php?page=Inauguration-exposition-50-ans>

<http://www.cfeetk.cnrs.fr/index.php?page=exposition-50-ans-vues-des-photos>

<https://www.facebook.com/Centre-Franco-%C3%89gyptien-d%C3%89tude-des-Temples-de-Karnak-CFEETK-217968098322995/>



Views of the photography exhibition. © CNRS-CFEETK/É. Saubestre, H. Bellenger.





Views of the photography exhibition. © CNRS-CFEETK/É. Saubestre, H. Bellenger.



View of the photography exhibition in the Middle Kingdom courtyard. © CNRS-CFEETK/É. Saubestre.

## 7. CFEETK MEMBERS

### *MoA members*

|                                     |   |
|-------------------------------------|---|
| - Dr. Mohamed ABDEL AZIZ            | General director of Luxor and Upper Egypt                                   |
| - Ameen AMMAR                       | General director of Luxor antiquities (since October 1st 2017)              |
| - Mustafa EL-SAGHIR                 | General director of Karnak Temples and Sphinx Avenue<br>(since October 1st) |
| - Abder Raheem KHAZAFI              | Director of Karnak Temples  |
| - Fawzy HELMI                       | Director of Karnak Temples  |
| - Badri ABD AL SATTAR               | Co-Director of the CFEETK   |
| - Adel ARFAN                        | Director of Karnak Temple (since October 1st 2017)                          |
| - Mona FATHI                        | Director of Karnak Temple (till October 1st 2017)                           |
| - Ghada IBRAHIM                     | Chief inspector, in charge of foreign missions                              |
| - Tarek MILAD ZIKRI                 | Chief architect of Upper Egypt  |
| - Ahmed ABDEL NASSER                | Chief conservator   |
| - Abder Radi ABDEL<br>MONEM MOHAMED | Chief conservator   |
| - Mamduh ABD EL GHASSUL             | Draftman  |
| - Magdi LOUIZ                       | Documentation officer   |
| - Karima DOWI ABD AL-RADI           | Photographer  |
| - Ahmed RUBY                        | Assistant photographer  |
| - Mahmud FARUK                      | Raïs  |
| <br>                                |   |
| - Tayeb GHARIB                      | Chief inspector   |
| - Moamen SAHAD                      | Chief inspector   |
| - Salah AL-MASEKH                   | Chief inspector   |
| - Wahid YUSSEF                      | Inspector   |
| - Emad ABDEL HARIH                  | Inspector   |
| - Ashraf GAD EL-RAB                 | Inspector   |
| - Ahmed NASSEH                      | Inspector   |
| - Mona ABADI                        | Inspector   |
| - Yasser MOSTAFA                    | Inspector   |
| - Mohamed BADAWY                    | Inspector   |
| - Salwa NUR ED-DINE                 | Inspector   |
| - Hoda ABD EL-SADEK                 | Inspector   |
| - Hala HASSAN                       | Inspector   |
| - Amira ABD EL-KUDUS                | Inspector   |
| - Peter EL-FADI                     | Inspector   |
| - Asma MUSTAFA                      | Inspector   |
| - Sohad ALI                         | Inspector   |
| - Ali ARAFAT                        | Inspector   |
| - Sadham SADIK                      | Inspector   |
| - Abul Hassan MOHAMED               | Inspector   |



### *CNRS members*

- Dr. Chr. THIERS Director of the USR 3172, co-director of the CFEETK
- Dr. S. BISTON-MOULIN Documentalist-egyptologist (till September 1st 2017)
- K. BENCHABANE Administrator (since September 2017)
- V. PUELLE Administrator (till July 2017)
- A. GARRIC Stone-cutter
- É. SAUBESTRE Photographer
- Dr. B. DURAND Archaeologist

### *Univ. Paul-Valéry Montpellier 3 - LabEx Archimede, programme "Investissement d'avenir", ANR-11-LABX-0032-01*

- Dr. G. DEMBITZ Egyptologist (till February 2017)
- Dr. A. FERNANDEZ PICHEL Egyptologist (since April 2017)
- Dr. J. HOURDIN Egyptologist
- Dr. Ch. LABARTA Egyptologist
- Fl. PIROU Epigraphist

### *International Volunteers MEAE*

- P. MÉGARD Surveyor (till November 2017)
- L. ANTOINE Conservator
- Ch. WOLFF Surveyor (since November 2017)

### *CNRS trainees 2017*

- M. ABACHY Egyptologist
- M. ANTOINE Archaeologist
- A. BELLENGER Photographer
- L. DAUTAIS Archaeologist
- T. FIGNON Egyptologist
- M. GERVASON Egyptologist
- M. LOUYS Egyptologist
- Q. LUNEAU Conservator
- A. MADELPECH Archaeologist
- Cl. POIRIER Conservator
- R. SALEH Archaeologist

## **8. ACADEMIC COLLABORATIONS**

### **France**

- UMR 5140 – Univ. Paul Valéry-Montpellier 3 (LabEx Archimede IA-ANR-11-LABX-0032-01)
- EPHE EA 4519
- UMR 5189 – HiSoma Univ. Lyon 2
- UMR 8164 – Halma Univ. Lille 3
- UMR 8152 – Univ. Paris IV Sorbonne
- USR 3134 – Centre d'études alexandrines (CeAlex)
- Institut français d'archéologie orientale (Ifao)

**Other countries**

- American Research Center in Egypt (ARCE)
- Chicago House (Luxor)
- Univ. of Oxford
- Univ. of Tübingen
- Univ. Libre de Bruxelles