



AERA GRAM

ANCIENT EGYPT RESEARCH ASSOCIATES

Groundbreaking Archaeology

VOL. 12 NO.1

Spring 2011

ISSN 1944-0014

The OK Corral 2

The Luxor Study Field School 6

Bringing an Ancient House Back to Life 16

The Buried Basin and the Town Beyond 10

The OK Corral: Standing Wall Island Mystery, Solved *by Richard Redding*

The enigmatic Standing Wall Island at the south end of our Lost City of the Pyramids site has puzzled us ever since we cleared portions of it in 2004.

The “island” rises high above deep sand-filled and water-logged depressions to the north and south, which we dubbed “Lagoons 1 and 2,” respectively. Fieldstone walls divide the island into two enclosures, ES1 and ES2, and bound them on the north, east, and west. Did Lagoons 1 and 2 exist when this compound was built? Or were they created by erosion that left Standing Wall Island? We did not find the southern end of the western wall, which continued strong under a thick sand overburden. The two enclosures seemed to open south, but we did not know the full extent of the complex.

What did people do inside this double compound? Although in 2004 we found traces of walls within the enclosures, we uncovered no clear signs of function. The Standing Wall Island enclosures resemble Enclosures 1 through 5 west of the Royal Administrative Building (map on facing page), in which we imagine scribes in open areas recorded material coming in and going out of back chambers and magazines.

This season we returned to Standing Wall Island with two questions:

- What was its purpose?
- Where goes the western wall?

The surprise answer to the second question led to the answer of the first. As we removed the heavy blanket of sand, we followed the western wall southward 35 meters (115 feet), where it turned in a broad, rounded curve to run east for 31 meters (102 feet). Another rounded curve sent the wall back north toward Standing Wall Island but angled east of due

north, running 25 meters (82 feet) before disappearing under the modern soccer field, which we cannot excavate, yet. The northeasterly angle and offset to the east creates a gap and corridor between this wall and the eastern side of the double enclosures. With its rounded southeast and southwest corners, the wall rings a large open space—that of Lagoon 2—accessed from the north via the corridor on the eastern side. The external northeast corner of the eastern enclosure is also rounded.

Round Corners: Key to the Mystery

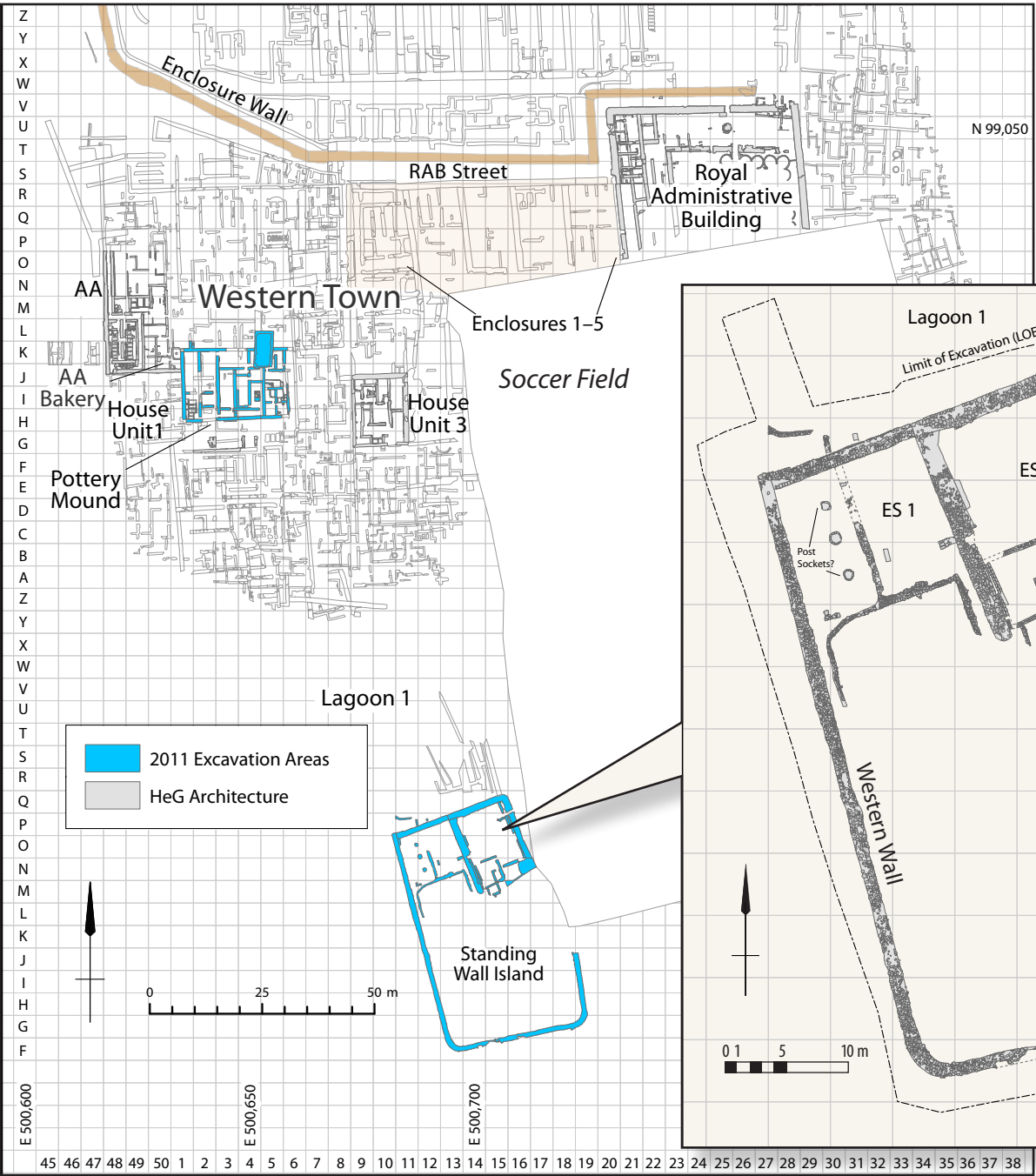
We see rounded corners elsewhere at Giza in the Old Kingdom, such as the enclosure wall around the Khentkawes Monument, and even at the Lost City of the Pyramids—the northwestern corner of the Royal Administrative Building (RAB) and the Enclosure Wall around it, which make a curved RAB Street. But rounded corners are not so common in ancient Egyptian architecture.

Having studied animal husbandry practices in the Middle East since first starting my PhD dissertation research, I knew that round corners are used in livestock enclosures. I realized we may have found the answer to the Standing Wall Island puzzle. The enclosure we found south of Standing Wall Island served as a pen for cattle! We dubbed it the “OK (Old Kingdom) Corral.”

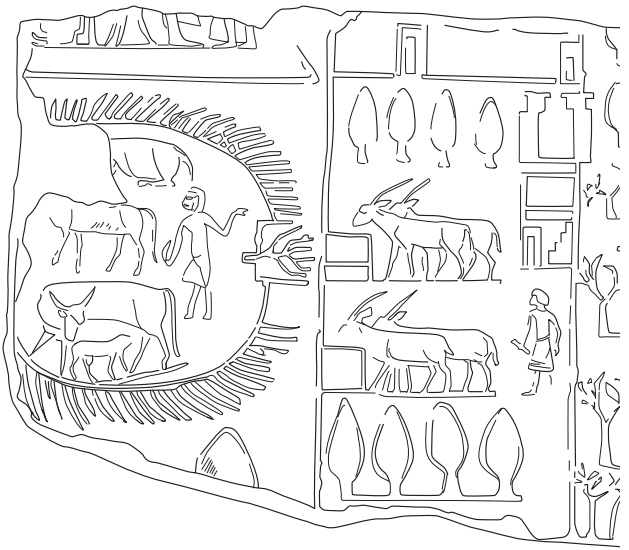
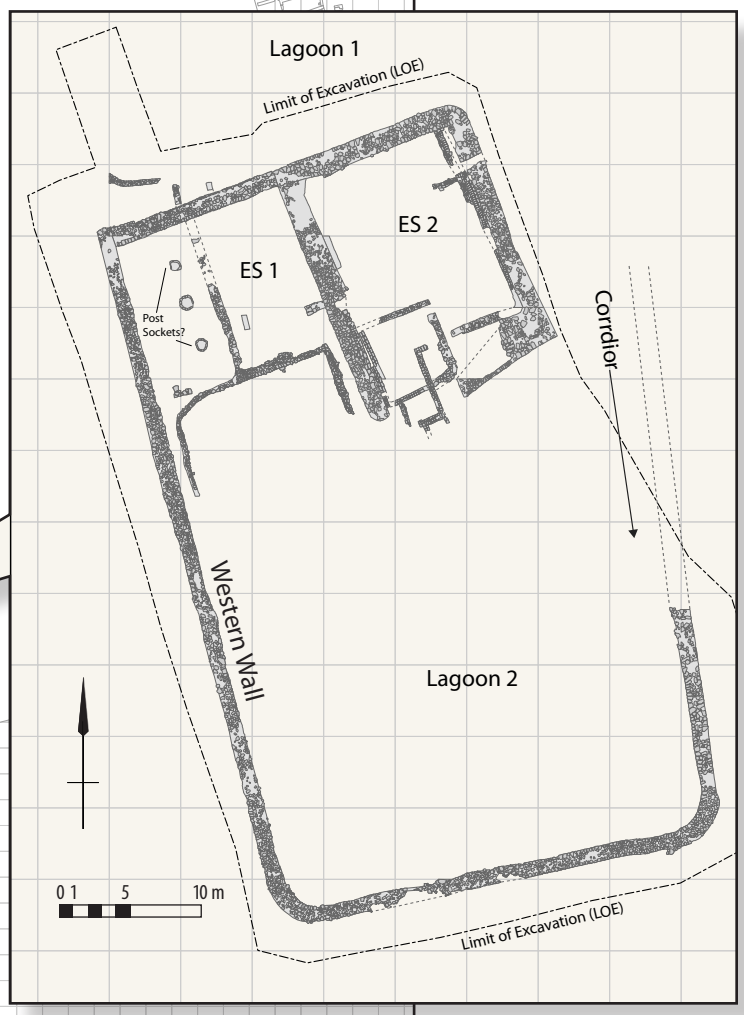
Not all buildings with rounded corners served as cattle pens and corrals, but large empty spaces defined by walls with rounded corners are highly suspect.

Cattle herders and handlers understand very well that an animal facing into a corner will freeze and not move. It is almost impossible to prod it into motion. Hence, modern cattle





Map of the southern end of the Heit el-Ghurab site (HeG), aka Lost City of the Pyramids, showing the 2011 excavation areas. Below: Detail showing Standing Wall Island. Maps prepared by Rebekah Miracle, AERA GIS.



Facing page: View of Standing Wall Island from the south end showing the turn in the western wall. The line of trees on the right stand at the western edge of the soccer field. View to the north. Photo by Richard Redding.

Left: A round cattle pen depicted on a block from Karnak. After P. Anus, 1971, Un domaine the-bain d'epoque "amarnienne." Sur quelques blocs de remploi trouves a Karnak, *Bulletin de l'Institut Francais d'Archeologie Orientale* 69: 69-88.

corrals feature rounded corners. Cattle are very comfortable with rounded corners and will happily follow a rounded wall as long as they can see ahead two or three times their body length.¹

Although the rounded corners are key, I think that two other characteristics are equally telling. The eastern passage forms a natural chute or droveway for herding cattle into the southern open space (which we had called Lagoon 2). This narrow corridor could have easily been gated, facilitating the control and management of cattle, sheep, and goats.

1. Grandin, T. 2007. *Livestock Handling and Transport*. Oxfordshire, UK: CAB International.

The capacity of the Standing Wall Island southern space as a possible corral is also telling. The broad open area inside the walls, about 1,110 square meters (nearly 12,000 square feet), could have held 555 cattle, using the modern standard of about two square meters (21.5 square feet) per animal. But the head count would have been less if animals were kept and fed in this area, which is very likely. For feeding pens, each animal needs about 20 square meters (215 square feet). Applying this standard to our OK Corral would give us about 55 cattle, which is a striking number in terms of feeding people.

I have calculated that 11 cattle and 37 sheep/goats were slaughtered every day to feed the workers at the Lost City, if we assume that cattle, sheep, and goats provided half the daily requirement of 370 grams (13 ounces) of protein per person and that the central authority fed 10,000 individuals.² Using these figures, we find that the corral would hold a five-day supply of cattle.

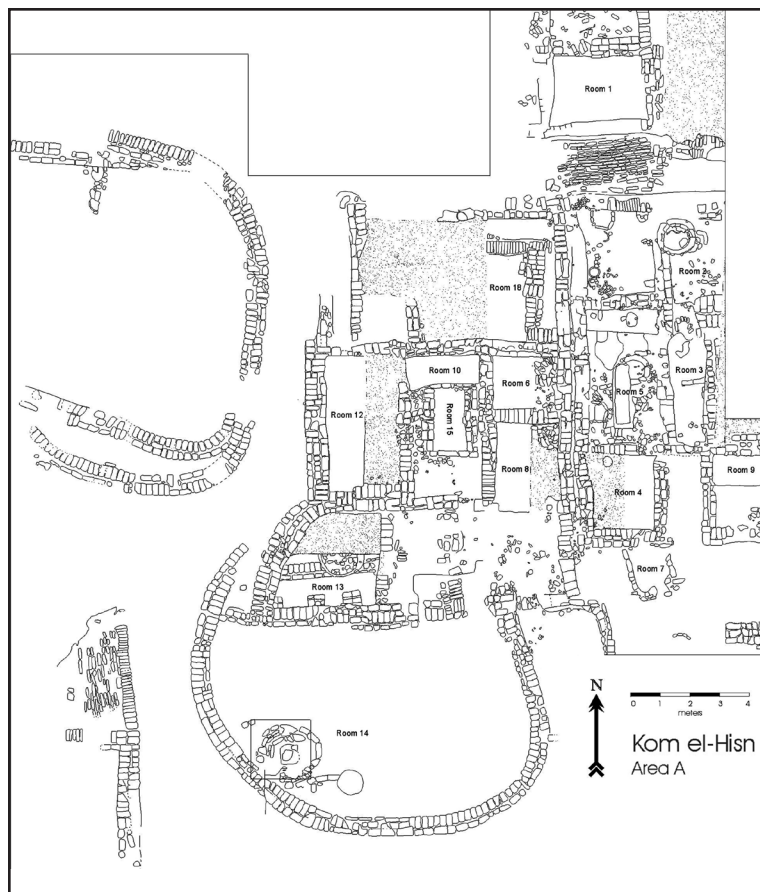
This stocking density is based on modern standards; cattle may have been kept more densely during the Old Kingdom. But these figures provide us with a baseline model to test.

Penchant for Rounded Pens

The importance of rounded corners is also based on a modern, western understanding of animal behavior and handling. Would 4th Dynasty Egyptians have followed such practices?

We know that the round livestock corral is not a unique product of recent Western research. Cattle herders from South Africa to Sudan, and from Somalia to Senegal, use round corrals for their cattle, sheep, and goats. Round corrals or pens have been found in archaeological contexts going back possibly as early as the 13th millennium BC. At a number of Natufian period (12,500–9,500 BC) sites in the Levant, round mudbrick enclosures have been found that were clearly not residences. These may have been pens for holding gazelles.³ From 5,600–2,300 BC, Kazakh herders kept horses for slaughter in circular stockades, the earliest known animal corrals.⁴ Throughout the Middle East researchers have described large stone circles of indeterminate date, which are believed to have anchored brush fences that acted as pens. Circular animal pens that date after 3,300 BC have been found in Iran, Turkey, Israel, Syria, and Nubia.

In Egypt, the earliest known structures that are thought to be pens for cattle, sheep, and goats were found at the Old Kingdom site of Kom el-Hisn.⁵ The 6th Dynasty levels at this



Map of the Kom el-Hisn site, showing round enclosures that were possibly animal pens. Note the blocked access chute on the northwest corner of the most complete pen. From R. Wenke, 2009, *The Ancient Egyptian State: the Origins of Egyptian Culture*, Cambridge: Cambridge University Press, page 119. Courtesy of Robert Wenke. Drawing by Nanette M. Pyne.

west Delta site yielded two pens. Both corrals (shown in the map above) were rounded structures made of mudbrick. The most complete appears to have a narrow access on the northwest corner. Encompassing 10 × 6 meters (32.8 × 19.6 feet), this structure could have held about 25 cattle for short periods of time.

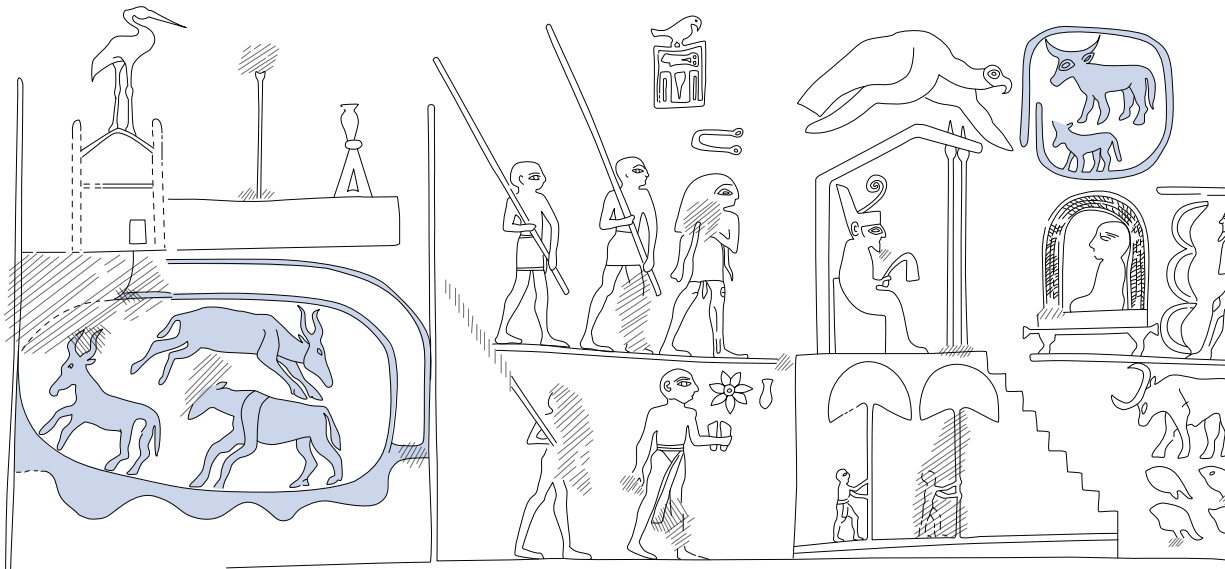
I have found at least two representations of corrals in Pharaonic art. A block in the open-air museum at Karnak shows a round pen for cattle (see page 3). The Narmer Macehead, from the Predynastic period, depicts two corrals (highlighted here in blue). The one in the upper right of the drawing shows a bull and a second animal that may be a goat in a round pen. The pen on the lower left shows three wild bovids, most likely the

2. Redding, R. W., 2011. Why We Excavate Where We Do. *Giza Plateau Mapping Project, Season 2009 Preliminary Report*. Giza Occasional Papers 5, ed. by M. E. Lehner, 105–109. Boston: AERA.

3. Redding, R. W., 2005. Breaking the Mold: a Consideration of Variation in the Evolution of Animal Domestication. In *The First Steps of Animal Domestication*, ed. by J.-D. Vigne, J. Peters, and D. Helmer, 41–48. Oxford: Oxbow.

4. Stiff, A. R., R. C. Capo, J. B. Gardiner, S. L. Olsen, and M. F. Rosenmeier, 2006. Geochemical Evidence of Possible Horse Domestication at the Copper Age Botai Settlement of Krasnyi Yar, Kazakhstan. Geological Society of America, Annual Meeting, 22–25 October, Philadelphia.

5. Wenke, R. J., P. E. Buck, H. A. Hamrourh, M. Kobusiewicz, K. Kroeper, and R. W. Redding, 1988. Kom el-Hisn: Excavation of an Old Kingdom Settlement in the Egyptian Delta. *Journal of the American Research Center in Egypt* 25: 5–34.



A drawing of the scene on the Narmer Macehead. Note the two pens, shaded in blue, and that each has an associated restricted entrance, a chute. Drawing after I. Shaw, ed., 2000, *The Oxford History of Ancient Egypt*. Oxford: Oxford University Press, page 4.

Bubal Hartebeest, in a round corral. Interestingly both have a narrow entrance, or chute, associated with the corral. The one on the upper register resembles very closely the structure at Standing Wall Island.

The Deodorizing Downwind

The location of Standing Wall Island at the southern end of the Lost City site also makes sense for a livestock corral in terms of the prevailing winds from the northwest. Odors and noise would be carried away from the densely settled Western Town just to the north. Interestingly, the only well documented slaughterhouse from the Old Kingdom, one found at Raneferef's pyramid complex at Abusir, is located in the southeastern corner of the complex.⁶

An Abattoir at Standing Wall Island?

If the large, open courtyard at Standing Wall Island is an animal pen for cattle, and perhaps sheep and goat, what was the function of Enclosures ES1 and ES2? Did they serve as an abattoir, where people slaughtered animals? Their location right next to an animal pen would argue that these structures are related to the use and consumption of livestock. As we analyze the material from these structures we will be testing the idea that here people slaughtered and dismembered cattle, sheep, and goats. We will be looking for specific evidence including tethering stones used to restrain animals before slaughter; flint flakes from sharpening the flint knives used for butchering; traces of pillars or columns used to support lines for hanging meat. We found three stone-lined circles in ES1 that might have served as sockets for such posts. When we analyze the bone from the corral we would expect to find specimens reflecting slaughter and especially high frequen-

cies of bone discarded during butchering, including the lower limbs and parts of the head.

A Larger Mystery Solved

The discovery of the OK corral resolves more than the issue of how the Standing Wall Island enclosure was used. It puts to rest a long-standing search for facilities used to handle and process cattle, sheep, and goats. We knew that vast numbers of livestock were slaughtered and consumed at the Lost City site, as attested by the large quantities of animal bone that we have recovered over the years. We were also certain that the settlement, for the most part, was provisioned by a central authority. Indeed, in 2001 we found a large central grain storage facility in the compound we dubbed the Royal Administrative Building. We have also found bakeries throughout the town and possibly a fish processing and drying area. But a facility for livestock has eluded us for years. In 2009 we thought we were on track to finally discover where the town processed meat. We excavated the "Chute," a corridor in the northwestern sector of the site, believing that it could be an animal chute used to shunt cattle, sheep, and goats to a holding yard and slaughterhouse located in the Western Compound, which we also tested.⁷ But the results were inconclusive. Our search for the animal pens and associated slaughter areas continued—until this spring. Finally, we have a large facility that could hold, and probably process, a five-day supply of beef for the town.

Acknowledgements

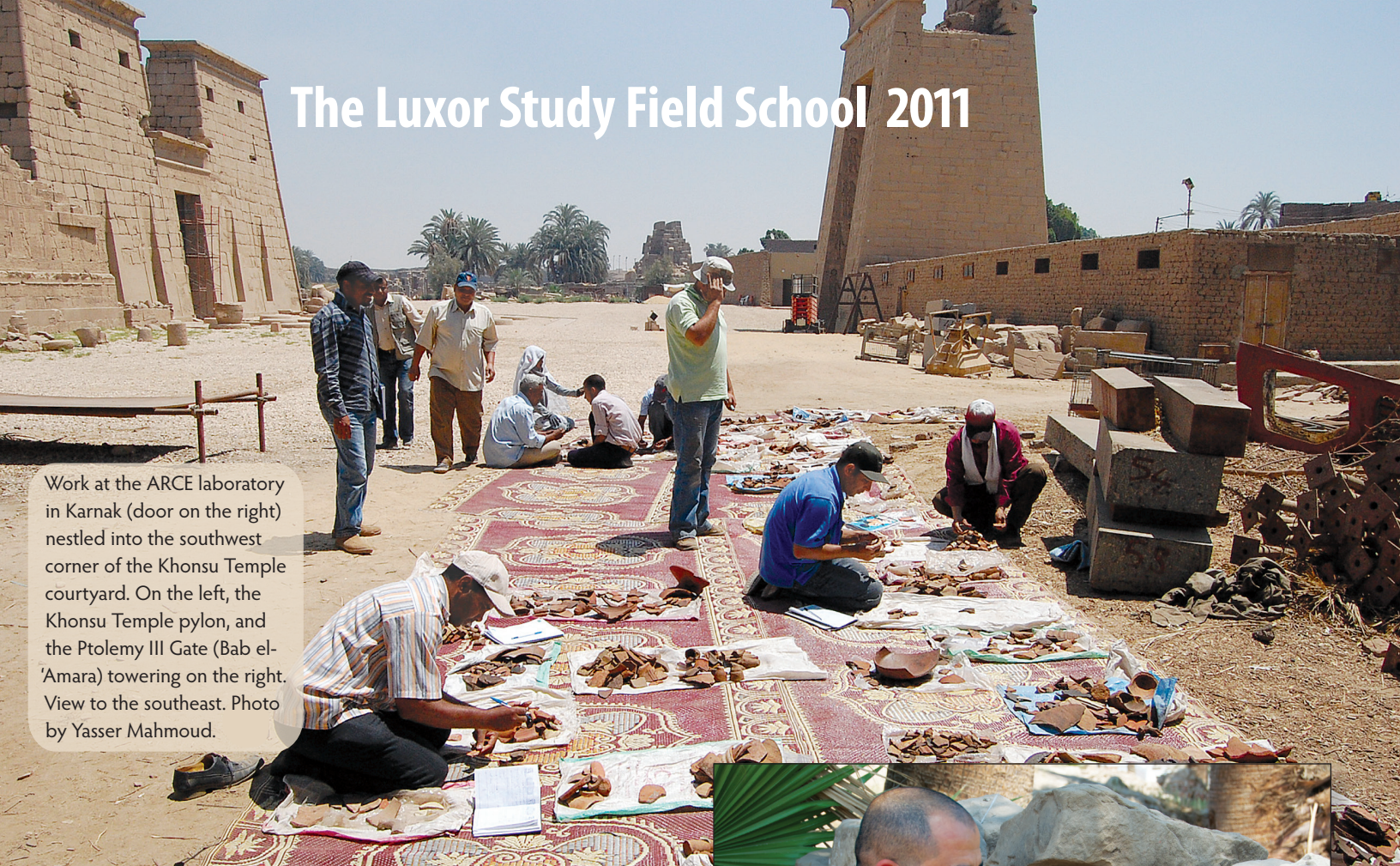
Simon Davis and Nagwan Bahaa el-Hadedi supervised the 2011 excavations of Standing Wall Island.

6. Verner, M., 2006. Pyramid Complex of Raneferef. *Abusir XI*. Prague: Czech Institute of Egyptology.

7. Redding, R. W., 2011. Why We Excavate Where We Do. *Giza Plateau Mapping Project, Season 2009 Preliminary Report*. Giza Occasional Papers 5, ed. by M. E. Lehner, 105–109. Boston: AERA.

The Luxor Study Field School 2011

Work at the ARCE laboratory in Karnak (door on the right) nestled into the southwest corner of the Khonsu Temple courtyard. On the left, the Khonsu Temple pylon, and the Ptolemy III Gate (Bab el-Amara) towering on the right. View to the southeast. Photo by Yasser Mahmoud.



Yasser Mahmoud points to a hieroglyphic inscription on blocks of alabaster and sandstone from shrine and temple walls recovered during the SAFS 2010 excavations. Photo by Mark Lehner.

We had just finished covering our sites at Giza with a protective layer of sand at the end of March in Season 2011 when we launched a field school session in Luxor.

The Luxor Study Field School (LSFS 2011) was AERA's eighth field school since 2005 for inspectors of the Ministry of State for Antiquities (MSA, formerly the Supreme Council of Antiquities), and the third field school in Luxor, following Salvage Archaeology Field Schools (SAFS) along the Avenue of the Sphinxes in 2008 and at the old Luxor Town Mound in 2010.

Since the SAFS 2010 excavations on the remnant of the old Luxor Town Mound between January and March 2010 (*AERAGRAM* 11-1: 2–7),¹ we aimed for a “study season” to analyze material from 2,000 years of stratified settlement. Such analysis is an obligation for archaeologists. Mansour Boreik, Director of Antiquities in Luxor, and John Shearman, Associate Director of the American Research Center in Egypt (ARCE), suggested in March that we should take advantage of the stability and funding and carry out the study field school before summer.

The LSFS 2011 was a first step to a full publication of the site by the field school student team, using the format tried in the Analysis and Publication Field School last year at Giza (*AERAGRAM* 11-1: 14).

The SAFS 2010 team found many items of everyday life left by Luxor residents over the course of two millennia. The

ceramic sequence from Roman to modern times, heretofore poorly known for Upper Egypt, is a major prize. Plus, the SAFS excavators recovered many stone fragments of relief-carved scenes and hieroglyphic texts from ancient Egyptian shrines and temples, including, possibly, from the great Luxor Temple itself. People of old Luxor had reused the stone pieces in the foundations of their mudbrick buildings. These inscribed stones needed to be documented and studied.

So, on short notice, Ana Tavares and Mohsen Kamel, Field School Co-Directors, submitted an application and pulled together a team. They entrusted work on the ground to Yasser Mahmoud and Mohamed Naguib, MSA inspectors who had trained and taught in the field school.

1. All back issues of *AERAGRAM* are available at our website, www.aeraweb.org, for free download.

Ana set up and guided the session in three trips to Luxor, while she, Mohsen, and consultants spread across three continents stayed connected via weekly Skype meetings and a shared server that allowed everyone to work with photos, drawings, and documents. Ceramics specialist Aurélie Masson logged and analyzed pottery drawings and recording forms in Cambridge, England. From his desk, also in Cambridge, William Schenck, experienced draftsman and field school teacher of Archaeological Illustration, provided advice online on how to record particularly difficult pieces. Shaima Montaser and Salah el-Masekh took charge of the objects in Luxor, with Delphine Driaux consulting and carrying out research from Giza. Conservator Lamia el-Hadidi, another field school instructor, treated and packed all the objects for storage. From Beni Suef,

Rabea Eissa, a team leader in the SAFS 2010, prepared groups of archaeological deposits by chronological phase to ensure that the team analyzed and recorded a representative set of pottery data for all the phases and major structures. ARCE photographer Owen Murray uploaded daily photos of artifacts for study onto our shared server. AERA Archivist Emma Johnson did double duty, keeping the LSFS 2011 archive with some shuttling between Luxor and her ongoing archival work in Giza.

On April 9, LSFS 2011 instructors, students, archaeologists, and archivists—30 people altogether—hit the ground running. ARCE provided shelters, open-air classrooms, and the ARCE Laboratory in front of the Khonsu Temple in the southwest corner of the greater Karnak Temple enclosure. Team members retrieved objects from crates stored at Karnak. They re-excavated and moved to Karnak 400 sandbags full of pottery fragments from a pit where the SAFS 2010 team buried them at the base of the Luxor Town Mound for safekeeping. The inscribed stone blocks, stacked in the Luxor Temple precinct, could not be moved, so the team set up a second facility to record the relief carvings and hieroglyphic inscriptions.

The SAFS 2010 excavations turned up a vast range of materials that survived in the relatively high and dry Luxor Town Mound: paper, textile, basketry, cordage, leather, wood, shell, and bone, as well as metal, stone, minerals, glass, faience, and the abundant, ubiquitous ceramics. These materials came in a variety of objects. By the first week, the LSFS 2011 had counted 43 ostraca (limestone or ceramic sherds with texts), 24 lamps, innumerable figurines of bronze and terra-cotta, metal fragments, tools, coins, and 101 decorated stone blocks.

The single human burial excavated from the town mound called for an osteologist. Fortunately, the LSFS 2011 team

included Shereen Ahmed Shawky, an osteology concentration graduate of the ARCE/AERA Advanced Field School who could analyze and document the remains.

Above: Mohamed Naguib, ceramics instructor, describes a pottery type to the ceramics students. Photo by Yasser Mahmoud.

Left: Mohamed Naguib (blue cap) supervises the transport of the 400+ bags of ceramic sherds from last year's work in front of Luxor Temple to the Karnak Temple Lab for study. Photo by Ana Tavares.





Left: Habat Allah Addallah draws a grain measure from the Andreus Pasha Palace.

Right: The drawing team works in the dust-free (and air-conditioned!) ARCE Karnak Laboratory. Photos by Yasser Mahmoud.

The ceramics course, taught by Mohamed Naguib and Mahmoud el-Shafey, gave students an opportunity to work on the major prize of the 2010 excavations, the corpus of ceramics spanning the Roman, Coptic, Byzantine, Islamic, and modern periods. Because the ceramics of these periods are not well known from settlement sites and few have been published, the Old Luxor Town Mound corpus makes a major contribution to Egyptian archaeology. The six ceramics students helped document this important collection as they learned the basics of ceramic processing, recording, and analysis.

The Archaeological Illustration group, headed by Yasser Mahmoud and Hassan Ramadan, assisted by Said Ebrahim el-Assal, played a critical role in documenting the ceramics and other artifacts. As they developed their drawing skills, the six students illustrated objects, ceramics, and decorated blocks, including the inscriptions.

By June 1, the Field School team had achieved its goals. The ceramics group had documented a comprehensive sample of the pottery from each major period. Team members will publish a summary of their work in the *Bulletin de la Céramique Égyptienne*, the major forum for ceramics in Egyptian archaeology. Together the registrars, conservator, illustrators, and photographer documented all the decorated blocks, stabilized their conditions, and reorganized the material for future study. The team documented artifacts with notes, information forms, photos, and illustrations. They packed the objects and stored them at Karnak for future study.

Another Analysis and Study Field School in Luxor will prepare all of the data from the 2008 and 2010 SAFS excavations for final publication.

Acknowledgements

We thank Dr. Zahi Hawass, Minister of State for Antiquities, for his support of the AERA-ARCE field school programs. We could not have carried out the Luxor Study Field School 2011 without the logistical support and encouragement of Mansour Boreik, Director of Antiquities in Luxor, and John Shearman, Associate Director of ARCE. The work in Karnak was under the auspices of the Mr. Ibrahim Soleiman, Director of Karnak, and Amin Amar, Chief Inspector of Karnak. Mohamed Bakhit served as the MSA Inspector for the ARCE Laboratory work. The epigraphic work in the Luxor Temple precinct was carried out with the support of Sultan Eid, Director of Luxor Temple. Wafaa Kamal Fouad served as the MSA Inspector for work in the Luxor Temple precinct. We are grateful for all their help.



USAID
FROM THE AMERICAN PEOPLE

EGYPT

The AERA-ARCE Luxor Study Field School 2011 was made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents of this article are the responsibility of



AERA and do not necessarily reflect the views of USAID or the United States Government. Funding was provided through the American Research Center in Egypt (ARCE) USAID grant (No. 263-A-00-04-00018-00).

NGO Status in Egypt, Official!

On April 11, 2011, a letter from the Egyptian Ministry of Solidarity to AERA culminated a two-year process to register AERA as a foreign NGO (Non-Governmental Organization) in Egypt.

Our agreement with the Egyptian government allows AERA to continue archaeological research and to function as a center of training for Egyptian archaeologists in excavation, survey, conservation, and site management in order to preserve and protect Egyptian monuments and archaeological sites. The agreement allows such work by AERA anywhere in Egypt as permitted by the

Ministry of State for Antiquities.

Official recognition as an NGO solidifies AERA's mission and raises the profile of our organization in Egypt. AERA can now own property in Egypt. Our purchase of the AERA villa property is now on record in the Egypt Registry and Documentation Office, where we have begun the processes of transferring title to AERA's name.

With our official status, all of us at AERA look forward to the growth of our relationship with the people of Egypt toward protecting and promoting their cultural heritage.



Join AERA! Your membership will help support research, excavation, publication, and education aimed at advancing our knowledge of ancient Egypt and preserving Egypt's past. Membership includes two issues of our *AERAGRAM* newsletter per year.

Request AERA's E-Bulletin

Keep up with AERA by signing up for our E-Bulletin, sent out periodically. Please e-mail: jschnare@aeraweb.org. In the subject line type: "E-Bulletin."

Visit AERA's Website

<http://www.aeraweb.org>

Follow AERA on Twitter



Volume 12 Number 1, Spring 2011

Science & Arts Editor: Dr. Wilma Wetterstrom
Managing Editor: Alexandra Witsell

AERAGRAM is published by **AERA**, Ancient Egypt Research Associates, Inc., a 501(c) (3), tax-exempt, non-profit organization.

Ancient Egypt Research Associates
26 Lincoln St. Ste. 5, Boston, MA 02135

E-mail: jschnare@aeraweb.org
Website: <http://www.aeraweb.org>

AERA Board Members

President: Dr. Mark Lehner
Vice President & Treasurer: Matthew McCauley
Assistant Treasurer: Dr. John Nolan
Secretary: Glen Dash
Dr. James Allen
Ed Fries
Jon Jerde
Bruce Ludwig
Ann Lurie
Peter Norton
Dr. Richard Redding

© Ancient Egypt Research Associates 2011

Please use this form or join online at AERA's website: <http://www.aeraweb.org/>.

MEMBERSHIPS:

Basic: \$55 Student/Senior: \$30 Non-US: \$65
Egyptian National: LE100 Supporting: \$250

Name _____

Address _____

Phone _____

E-mail _____

Or charge your membership to a credit card:

Name on card _____

Card type & number _____

Expiration date _____

Signature _____

Please make check payable to AERA and send with application to AERA at 26 Lincoln St. Ste. 5, Boston, MA 02135.

KKT-E+: The Buried Basin and the Town Beyond

Between 2007 and 2009 we discovered a monumental lower approach ascending to the threshold of the causeway leading to the pyramid-like stone monument of Queen Khentkawes. The causeway runs straight through the “leg” of the L-shaped town belonging to Khentkawes. First, in 2007, we discovered why the town turns to the south. Its eastern edge runs flush with the vertical bedrock face of a deep quarry. Then, we began to excavate mudbrick ramps and stairs ascending from a lower terrace around a deep basin, possibly a harbor. A corridor bounded by the thick northern enclosure wall ran east, disappearing under the immense sand burden. At the end of our Season 2009 we stood back to wonder: Where goes this corridor, so straight and narrow? And the deep basin alongside, did it serve as a harbor, filling at least seasonally with water from the Nile, which flowed a kilometer, maybe two, to the east? Would we find a connecting canal?

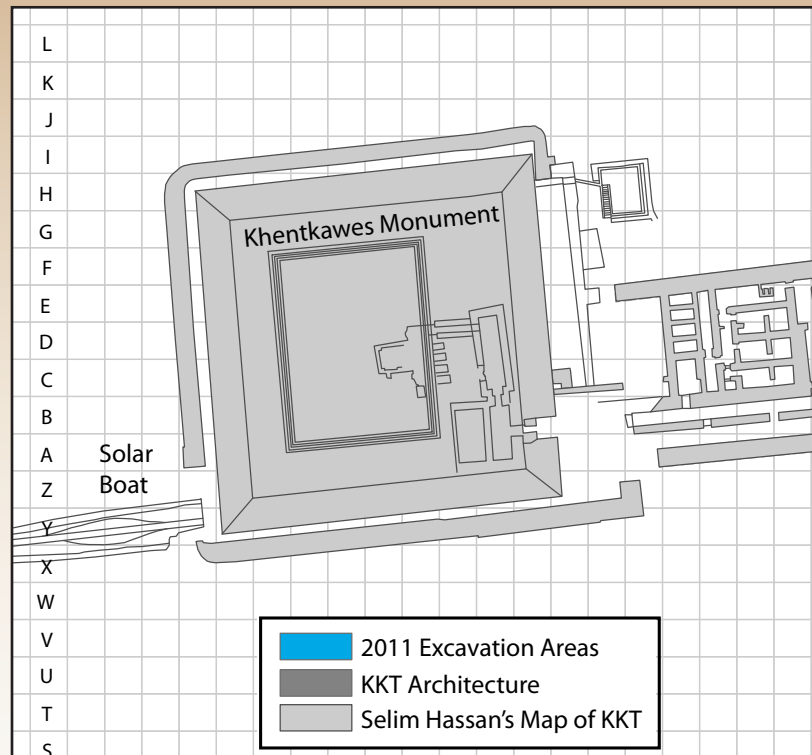
Nine weeks of excavation during Season 2011 delivered up the northern end of the eastern bank of the basin, and the full extent of its northern side. At the end of the corridor, beyond the basin, we brought to light for the first time in 4,500 years a complex with silos, courts, and small chambers—perhaps a distribution center (see front cover). The town continues.

A Basin Defined

For punching east into an overburden of sand standing up to 8 meters (26 feet), Co-Field Director Mohsen Kamel brought in, along with 40 workers, a large mechanical excavator, two loaders, and two trucks. Mohsen and Overseer Sayed Salah carefully guided the operator and the machine blade as it scooped sand, avoiding contact with archaeological remains.

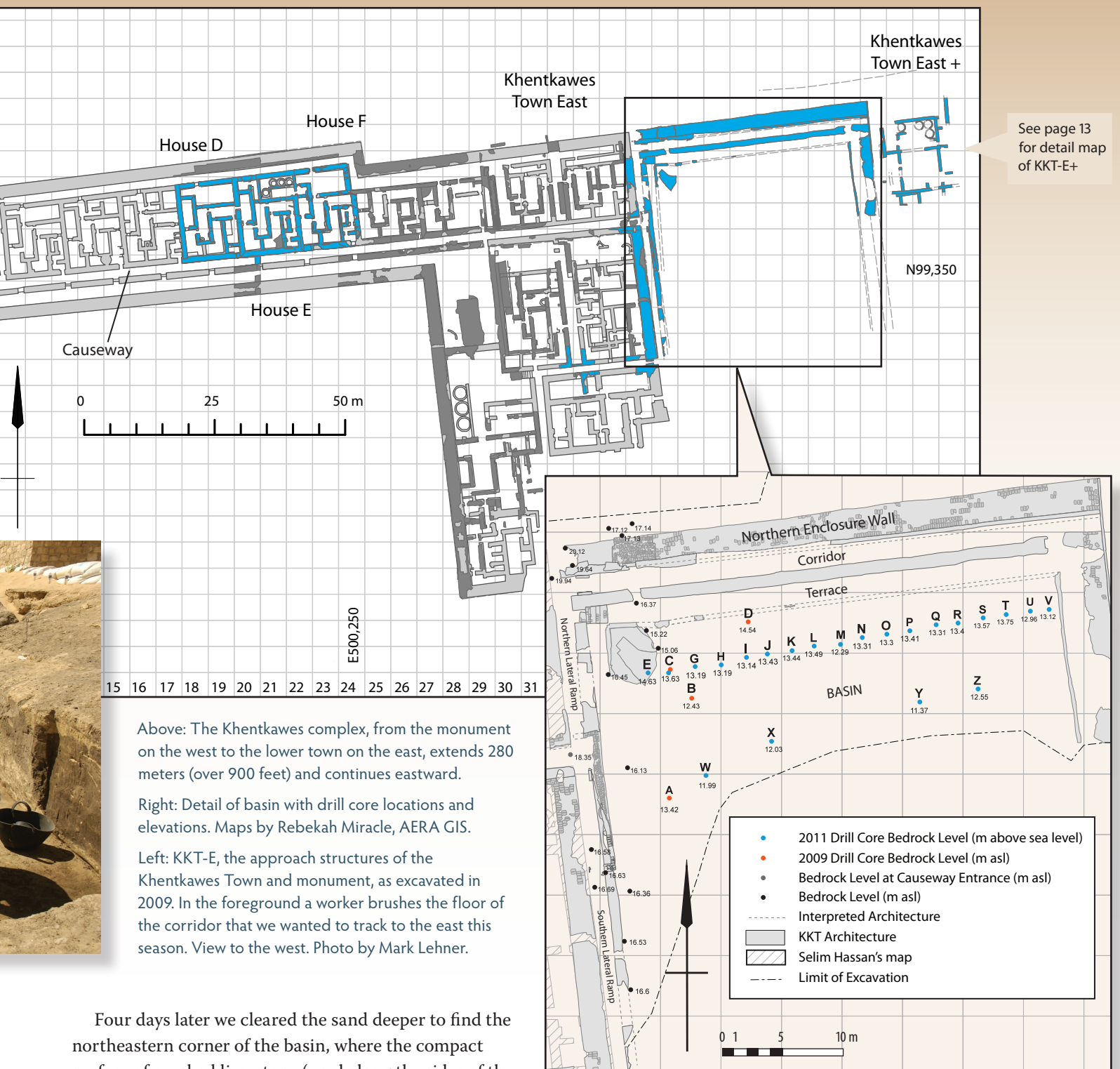
The team started on the west end of the basin, first clearing backfill from our 2009 season. They pushed east cutting through the sand a canyon, 60 meters (197 feet) long and 27 meters (89 feet) wide. A gravel road around the modern Muslim cemetery, much used by horse and camel riders, constrained us on the south. Old Kingdom rock-cut tombs bound our path on the north.

Meanwhile, Dan Jones and Kasia Olchowska, who had excavated the approach structures east of the Khentkawes Town (Area KKT-E) in 2009, carried out detailed dissections of those structures. As we cleared eastward, Kasia mapped the surface of the ruins freshly exposed. We could see the lines of the thick, northern enclosure wall and the corridor wall, ever so faint, in a very compact surface, and we followed these subtle indications to the east. Erosion reduced these once massive walls to ankle level, if not to the last centimeters. We found the walls in the far northwestern corner of KKT-E standing so much higher because there the mudbrick material from



the collapse of the higher-based enclosure walls forming the northeastern corner of the upper town (κκτ) protected them in the deep corner quarried into the limestone bedrock.

We tracked the northern enclosure wall, the corridor wall, and the edge of the deep basin, all running parallel, to the east. On February 17, we found where the corridor ends at the faint traces of a small compartment. At 1.20 meters (3.9 feet) wide, the compartment is narrower than the corridor, 1.60 (5.2 feet) meters wide in its final phase. Perhaps it served as a kind of porter’s room to the right of an access up into the corridor from the lower northern edge of the basin. As we scraped the surface to the north and south of the compartment, we saw faintly the outer, northeast corner of the northern enclosure wall, and then its run to the south marked by the marl plaster line of its exterior, eastern face.



See page 13 for detail map of KKT-E+

Above: The Khentkawes complex, from the monument on the west to the lower town on the east, extends 280 meters (over 900 feet) and continues eastward.

Right: Detail of basin with drill core locations and elevations. Maps by Rebekah Miracle, AERA GIS.

Left: KKT-E, the approach structures of the Khentkawes Town and monument, as excavated in 2009. In the foreground a worker brushes the floor of the corridor that we wanted to track to the east this season. View to the west. Photo by Mark Lehner.

Four days later we cleared the sand deeper to find the northeastern corner of the basin, where the compact surface of crushed limestone (used along the sides of the basin) turns south—the eastern shore of the basin! With the full length of the northern side, we could begin to measure the overall east-west width: 37.20 meters (71 ancient Egyptian cubits, 122 feet). Along the eastern edge of the basin, we saw the scant remains of a thick mudbrick retaining wall, a continuation of the one we found in the northwest corner of the basin in 2009.

Plumbing the Depths

We were keen to plumb the depths lower than elevation 14.70 meters above sea level (asl), where we had to stop removing

sand because of the ground water. In 2009, Dan Jones logged the bedrock bottom in one of four drill holes at 12.43 meters asl, our best estimate for the level of the Nile Valley flood-plain in the 4th Dynasty, the time when people created this basin for Khentkawes. This season Ana Tavares, Dan, and Mohsen augured 22 additional holes, with 17 (E through V) on a line across the northern side of the basin (see detail map above). The team found the lowest value, 11.37 meters asl, in one of the three drill holes located as far south as they could go against the immense section of uncleared sand. This is

more than a meter deeper than our best estimates for the Old Kingdom floodplain.

Does the basin bottom step down even lower into a trough farther south? We had thought that the basin might be T-shaped with a channel running to the east, on line with the Khentkawes causeway. But we found no evidence of any opening in the enclosure wall on the east. Perhaps a channel opens farther south beyond our limits of excavation. But for now, we do not know if the basin was connected to a channel running east.

Once we had the eastern end of the basin, we thought that the corridor would also turn and follow along the edge, as it does on the northern and western sides. But only the terrace adjacent to the corridor makes the turn and continues along the side of the basin. Erosion has scoured the terrace into a bare slope in the limestone debris the builders used to form this side of the basin. People walking east through the corridor might have been able to turn at the eastern end and descend to the terrace through an access in the corridor wall. Here we found only a ragged erosion channel.

Dockside Downtown?

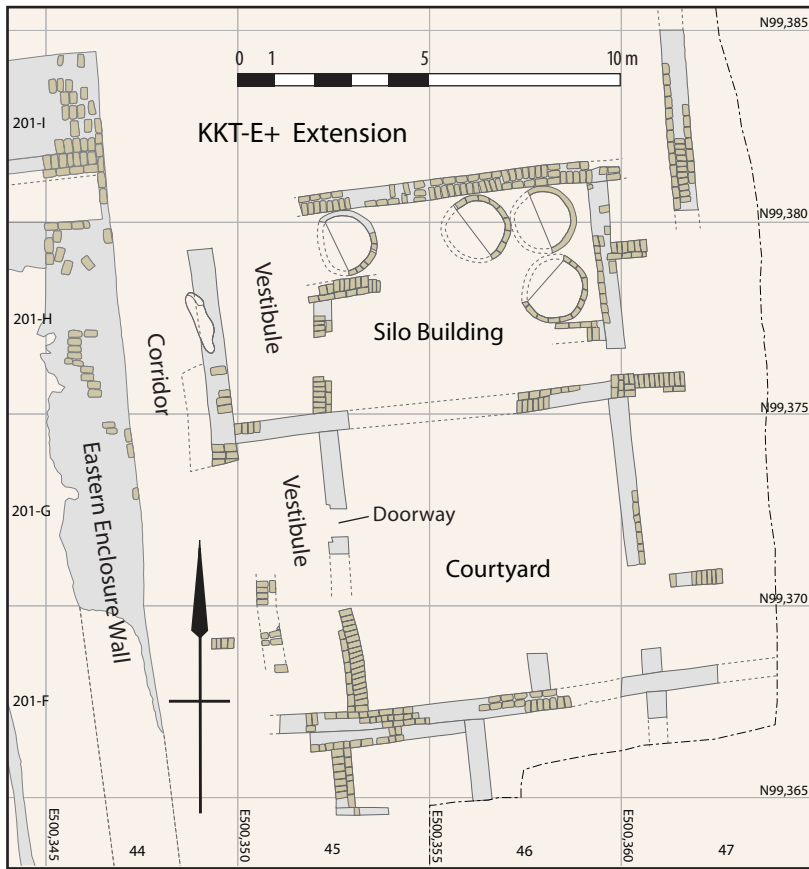
East of the basin we came upon a complex of mudbrick buildings never before seen. This lower, dockside extension

of the Khentkawes Town first announced itself in the silty surface of the settlement ruins as a mudbrick wall running east, then turning south, and then as dark ashy fill outlining two semi-circles pressed into this corner. When we carefully scraped and cleaned the surface, we could make out at least four circles, with interior diameters of about 1.4 meters (4.6 feet)—no doubt granaries—in the eastern end of a long rectangular building. Within a couple of weeks, we had mapped in the ruin surface over an area roughly 20 meters (66 feet) by 25 meters (82 feet) the outlines of a courtyard, small chambers, corridors, a building with four silos, and segments of walls that continued east and south beyond our limit of clearing. A fieldstone retaining wall of limestone pieces set against a bank of limestone debris forms a northern boundary for these buildings. Quarry workers and tomb builders may have built the limestone wall, which continues west, running about 4 meters (13 feet) north of the northern enclosure wall of KKT-E, to hold back debris that they generated as they made tombs for officials of the 5th Dynasty.

We were fortunate that Hanan Mahmoud, Rabea Eissa, and Mohamed Naguib, veteran students and instructors in our AERA-ARCE Field Schools, joined our team shortly after Egypt's January 25 Revolution and mapped the settlement structures of this lower town.



Kasia Olchowska maps the newly uncovered enclosure wall at the eastern end of the Khentkawes basin. The deep basin lies partially exposed after we pushed back the massive sand overburden, seen on the left. At the west end of the basin (top of photo), ramps and stairs ascend to the Khentkawes Town on the sloping plateau above. To the right, a corridor and the northern enclosure wall run east–west along the north edge of the basin. View to the west. Photo by Mark Lehner.



Above: Map of the newly discovered complex, dubbed KKT-E+, that bounds the eastern end of the basin. See map on page 11 for location within the Khentkawes complex. Map by Rebekah Miracle, AERA GIS.

Storehouse of Khentkawes?

The Silo Building housed four, possibly five, silos. Workers probably filled them with grain from the top and tapped the supplies via a hatch at the bottom, accessed from an open area on the south. During our 2009 excavations at Khentkawes Town, we found the remains of similar, but slightly smaller, silos in House E, a priest's house (*AERAGRAM* 10-2: 10-13, and this issue, page 16). As in House E, the space between the silos was packed with ash, perhaps to ward off pests.

A door on the southern end of the east side opened into a corridor leading to open space in front of the silos. Another doorway opened into this space from a vestibule on the south. Because we could not trace the walls in the ruin surface at the northwest corner of the Silo Building, nor at the center of the southern side of the building, we do not know if other entrances were located here as well.

The Silo Building, a courtyard on the south, and the possibility of magazine chambers to the east and south of the courtyard suggest that in this ensemble off the eastern edge of the Khentkawes (harbor?) basin people stored, accounted, and distributed grain and other goods. Access to the court was through a doorway on the west that could be closed from the outside. Like doorways in the Khentkawes Town, it was 70 centimeters (about 28 inches) wide. The doorway opened to the courtyard from a vestibule that could be accessed from a corridor running along the enclosure wall beside the basin.

Below: Circles emerge in the eastern end of the Silo Building in KKT-E+ defined on the north by black ash. Hanan Mahmoud (in red) studies and maps traces of mudbrick walls. Worker Hussein articulates mudbrick wall lines and other patterns by carefully scraping with trowels and cleaning with brushes. View to the southeast. Photo by Mark Lehner.



King-Sized Complex for a Queen

When we began our research program at the Khentkawes Town in 2005, we set out to salvage information 73 years after Selim Hassan excavated here. We wanted to assess this town—allegedly built for the queen's priests—along with the settlement within the adjacent Menkaure Valley Temple and the Lost City of the Pyramids across the wadi, as part of a greater urban context during the Old Kingdom. If we could shed some light on the layout and history of the town, we would have accomplished our goals.

We discovered far more than we ever expected. We now know that the tomb and town dedicated to Queen Khentkawes belong to an upper level of a much larger complex. The architecture that we have captured between 2007 and 2011 adds another 70 meters (230 feet) to the Khentkawes tomb and town, for a total length of 280 meters (919 feet). But we still do not know the full extent of the grand complex, as the walls in the lower settlement continue on beyond our 2011 excavations.

Archaeology Through the Magnifying Glass

Laboratory Stories

Our Giza Field Laboratory bristles with microscopes and scientists analyzing stones and bones, pigments and potsherds. From such artifacts they pry stories about life in the Lost City of the Pyramids and develop hypotheses, which we test with the results of all our work. Richard Redding, AERA Chief Research Officer, and Mary Anne Murray, AERA's Director of Archaeological Science, tell two such tales, of felines and floods.

The Telltale Tooth by Richard Redding

In *AERAGRAM* 8-2 I reported on the finds from "Pottery Mound" in an article titled, "Treasures from a High Class Dump." This dump provided some interesting pieces of the puzzle that is the Lost City of the Pyramids. The dump was filled with the bones of very young cattle, less than one year old, and most of the bones were from the hind limbs. I concluded that the faunal remains were the leftovers from the slaughter of young cattle for offerings and for the diet of high status people who lived in the largest houses on the Lost City site, directly next to Pottery Mound. An additional rare and telling find from Pottery Mound was two leopard teeth.

This season in the Giza Field Lab I began identifying and analyzing the bone

from House 1, located in the Western Town district immediately north of Pottery Mound (see map on page 3). Some team members have argued that Pottery Mound post-dated House 1, while others have proposed that the two were contemporary. We may now have an answer.

Young cattle dominate the faunal remains in House 1, as in Pottery Mound. After a few days of work on the bone, I commented to the excavators that the fauna from House 1 looked exactly like the fauna from the Pottery Mound. A few days later my student, Rasha Nasr Abd el-Mageed, excitedly discovered a leopard tooth from one of the House 1 samples. She has since identified a second leopard tooth from House 1, making a total of four. We proposed an operating hypothesis: Pottery Mound was a dump for the activities in House 1.

The complete absence of any other leopard bones suggests that we are only dealing with one or more leopard skulls, perhaps attached to a skin. Such leopard skins are mentioned in Old Kingdom biographies as a key component in the high-level trade between Egypt and Nubia during this period. Leopard skins as garments are reserved primarily for the king and members of his family during the 4th Dynasty. The king himself is often described as being dressed in a

Detail of a relief from the north wall of the tomb of Kaninisut at Giza (G 2155). The tomb owner wears a leopard-skin garment, which were often worn by *sem*-priests. Drawing by Dr. Peter Der Manuelian, used with permission.

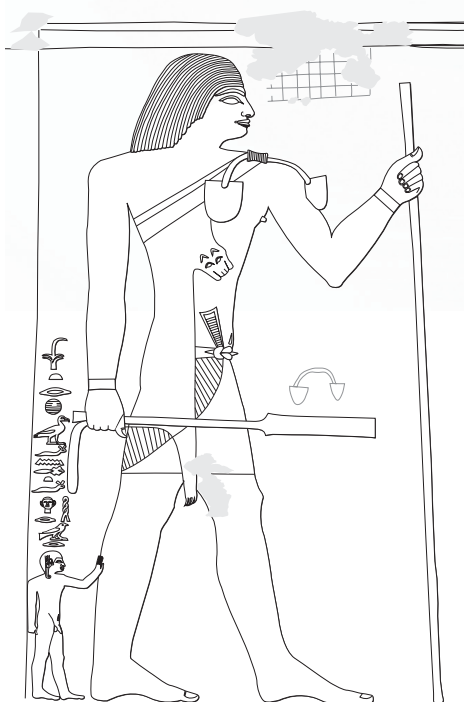


Leopard tooth from House 1 under lens.

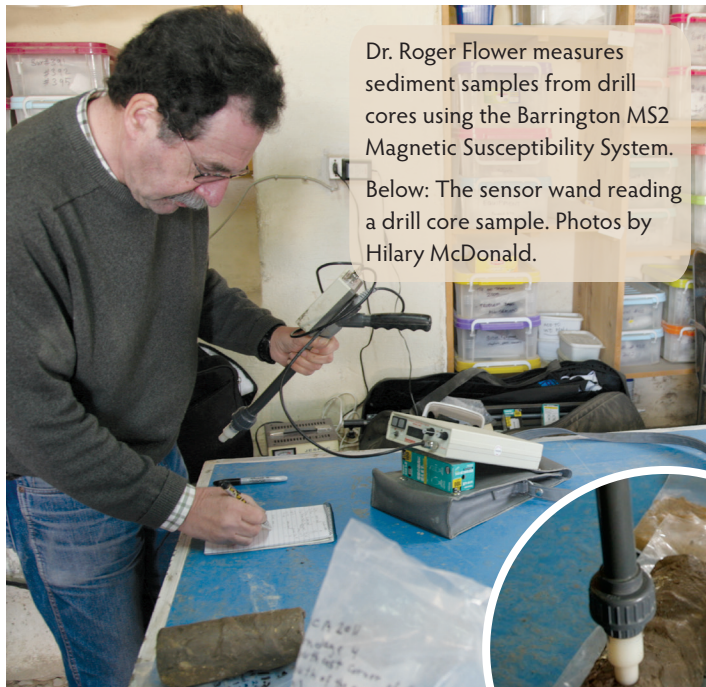
leopard skin in the Pyramid Texts, while the king's eldest son frequently appears wearing a leopard skin fulfilling the functions of the highest priest (called the *sem*-priest) in the royal mortuary cult. The leopard teeth discovered in House Unit 1 and Pottery Mound are clear evidence that these priests had a close connection to our Lost City site.

Up until this field season, John Nolan and Ali Witsell, our sealings team, had registered just 26 sealings from the House Unit 1 excavations. But the connections of House Unit 1 with Pottery Mound were clear, since two of the fragments already matched two of the seals heavily used on the sealings from Pottery Mound. However, as Ali prepared the backlogged sealing material for registration, she discovered that of a total of 1,079 new sealings yet to be registered, 610 came from House Unit 1. A quick, informal survey of those sealings indicated that many also bear impressions from the Pottery Mound seals.

As we attempt to answer the big questions about the socio-economic infrastructure of the Old Kingdom, we have to start with the excavated material, our palimpsest of the past. We develop ideas and test them with the archaeological data. Some victories are big and some are small. Some turn on large buildings, while some turn on a single seal impression or a leopard tooth. Sometimes it is the small things that make archaeology so enjoyable.



The Curious Case of the Basin Sediments by Mary Anne Murray



Dr. Roger Flower measures sediment samples from drill cores using the Barrington MS2 Magnetic Susceptibility System.

Below: The sensor wand reading a drill core sample. Photos by Hilary McDonald.

Dr. Roger Flower, of University College London, visited the Giza Field Lab in March to assess the potential value of areas in and around the sites of the Lost City (aka Heit el-Ghurab [HeG]) and the Khentkawes Town (κκΤ) for discovering evidence of environmental conditions and climate during the Old Kingdom. In so doing he offered a direct test of our hypothesis that the basin in Khentkawes Town East (κκΤ-Ε) functioned as a harbor and took in Nile water (see page 10).

Roger examined soil samples, including the 27 cores from our 2011 auguring of the sand filling the κκΤ-Ε basin, to detect Nile silts lain down from flood deposits. Signs of Nile waters include remains of micro-fauna, such as ostracods and diatoms (siliceous micro-algae and plant spores) that are indicative of former lakes, pools, or wetland areas.

If Nile water filled the basin, we would expect to find traces of these silty sediments in the archaeological deposits. Presumably, they would have settled to the basin bottom and we might find them in the deep drill core samples.

Roger also tested the relative magnetic susceptibility of the samples. Because of its magnetic mineral content, Nile alluvium has a relatively high magnetic susceptibility (MS). Consequently, MS measurements can help both to characterize sediment properties and provide clues to their waterborne origins.

Roger examined sediments not only from a transect across the κκΤ-Ε basin, but also from the Central Wadi that runs between the κκΤ and HeG sites. We have samples from drill cores and trenches from the areas north of the Wall of the Crow, where any canal or inlet connecting the κκΤ-Ε basin

with the floodplain would have to cross. And we have samples from drill cores and actual Nile alluvial layers in the northeastern part of the HeG site, the result of high floodwater reaching this far west from Graeco-Roman to modern times.

Roger found ample evidence from his MS readings that the Nile silty layers in the northeastern part of HeG derive from Nile floods, which we had already surmised. We might take these samples as a kind of control. However, Roger found no evidence in any of the samples of aquatic micro-fauna indicative of wet habitats, and although this is curious, it could be the result of poor preservation.

Even more curious is that Roger found very little or no evidence for Nile-borne sediments, neither microfauna nor magnetic susceptibility, from the lowest sediments in the drill cores of the κκΤ-Ε basin. Some of the cores gave a hint of enhanced magnetic mineral content, but the deposits are not extensive enough to be definitive proof of Nile sediments. Those same drill cores hit an impenetrable surface, probably bedrock, at a level that was likely as low or lower than the floodplain in the 4th Dynasty. Why would Khentkawes' builders have created such a large and deep basin if they did not flood it, at least seasonally, with water from the Nile?

True, the floodplain lay a kilometer to the east, and the Nile itself could have been no closer than two or three kilometers. Did Khentkawes' engineers fail to make such a long connection, arduous to dredge, between the floodplain and this basin at the foot of her town? Did the Nile shift and the floods fail after they created this basin; making it just too much of a challenge to connect to Nile waters? Could the Nile water have flooded the basin for a time and simply not left behind any silt? This seems unlikely. Or, was this deep basin always meant only as a symbolic harbor, which some of our colleagues¹ believe about other artificial basins and deep enclosures that front other valley temples—like that of Unas at Saqqara, or Sahure at Abusir—precisely because they have found no obvious evidence of Nile silt in sediments from the fill of these low areas.

Roger's visit and preliminary analysis contribute to a narrative of climate change—drier times and a Nile on the move—or to a story of an engineering failure, or one of major expense for non-functioning, purely symbolic monumental structures. His results certainly raise intriguing questions. Future studies and an expanded program of drill cores will provide a spatial framework with which to further our understanding of these past environmental changes.

1. Casey, I., 1999. Settlements at South Saqqara. *Egyptian Archaeology* 15: 24–25. Jeffreys, D., 2001. High and Dry? Survey of the Memphite Escarpment. *Egyptian Archaeology* 19: 15–17.



Bringing an Ancient House Back to Life *by Ana Tavares*

Given all the unusual challenges of Season 2011, it is rather amazing that we made it through the excavations to the end of March, achieving most of our goals, and to late April, when I started a new project with architect Günter Heindl and archaeologist Ashraf Abd el-Aziz to restore House E, one of the priests' houses in the Khentkawes Town (KKT). Our restoration of the lower part of House E is, hopefully, the beginning of a restoration of much more of the town.

In the spring of 2009, Lisa Yeomans and Hanan Mahmoud excavated what was left of House E (AERAGRAM 10-2: 10-13), after the house lay exposed and the walls had dwindled greatly over the 77 years following Selim Hassan's excavation of the KKT in 1932. House E is one of a series of seven similar houses along the northern side of the Khentkawes causeway. With what remained, Lisa and Hanan unraveled much about the foundation, organization, and later modifications.

The town builders laid out the town on a bedrock plane left from the 4th Dynasty quarrymen stripping blocks off one of the natural, softer, more clay-like limestone beds. This hard surface slopes around 6° from northwest to southeast. They first laid down two thick walls common to all the houses in this series, running east-west, and forming the northern and southern walls of the buildings. The slope results in a 1.2-meter (4-foot) difference in elevation between the higher northern and the lower southern wall. Then the builders partitioned the elongated space with north-south walls allocating an area of 12 × 15.7 meters (39 × 52 feet) for each house, including the shared cross walls. To accommodate the slope while maintaining level



Map of House E rotated to the same orientation as the photo above with north to the bottom. Map prepared by Rebekah Miracle, AERA GIS.



Facing page: Team members pose in the House E reconstruction at the end of the season. View to the south. Photo by Hilary McDonald.

This page, top: Workers prepare the mud mortar on site for reconstructing House E. View to the east.

Below: Sayed Talbeah points the mudbricks on a completed wall of the House E reconstruction. View to the north. Photos by Ashraf Abd el-Aziz.

decided to bury the ETH and build a replica in the same location and use bricks, mortar, and plasters as close as possible to those used anciently. We met two goals: protecting what remains of the ancient structure and presenting it for viewing and study.

Recording and Resurrecting House E

Prior to the reconstruction, the 2011 Illustration group, Yasser Mahmoud, Hassan Ramadan, and Said el-Assal, completed many section and profile drawings through the house, while the surveyor (Mohamed Abd el-Aziz) and photographer (Hilary McDonald) recorded each wall meticulously. We also made video recordings with the excavators, Lisa and Hanan, explaining each room and the overall flow of space through the house. Through March, Ashraf supervised mudbrick production. Günter joined the team in April. We took on a crew of experienced mudbrick builders, and the project began in earnest.

Our 2011 House E project included experimental archaeology, conservation, and reconstruction. Ashraf experimented by making mudbricks (or as he prefers to call them, sun-dried bricks) with different methods, sizes, and compositions (see page 19). We conserved the ancient structure by thoroughly mapping and documenting its features, encasing each wall with mudbrick and then by filling the rooms with sand and laying down a mudbrick surface. We built a replica of the lower part of the walls and floors above the buried remains.

Unlike ETH, House E is not threatened by fluctuations in the water table. The house is built at a much higher elevation on the sloping bedrock surface of the plateau. Therefore, we saw no need or possibility to bury it deeply in sand to avoid humidity and temperature fluctuations. We did however have to tackle that marked slope, more than 1.2 meters (3.9 feet) from the northwestern to the southeastern corner.

Building on a Slope

Günter supervised the workers who built new internal walls directly above originals, but with the weight distributed onto the modern skin-walls. Finally we plastered the floor and the inner walls of the house. We left the brick courses exposed on the outer walls of the house to show the building technique. The builders laid the first courses of the outer eastern and western walls on the slope. Then, like their ancient counterparts, they laid level courses, compensating for the slope by extending successive brick courses northward as they built up.

courses of brick, they built the cross walls from the south, with each successive course extending further north. The houses began with very similar internal layouts, with distinct elongated rooms common at Giza in this period. But over time rooms were swapped and doorways blocked between adjacent houses (*AERAGRAM* 10-2: 10–13).

Rebuilding Ancient Architecture

Archaeologists don't just excavate to get and record information about the past; they use that information to reconstruct what happened, to get a glimpse of the past and bring it alive with drawings, photographs, and video, or digitally with 3D models. Reconstructing, even partially, an ancient building in real bricks and mortar generates many new insights and understandings, as well as further questions.

In 2005 and 2006 we carried out a pilot conservation program on the small Eastern Town House (ETH) in the Lost City site, funded by the Antiquities Endowment Fund of the American Research Center in Egypt (*AERAGRAM* 8-1: 8–9). We first studied mudbrick conservation methods in Egypt and around the world. The best solution was reburial in a thick sand layer. This of course would not allow for display or research, so we



Left: The team discusses how to lay level courses, compensating for the slope by extending successive brick courses northwards as they build up. Note the steep slope of the floor from north (foreground) to south. The floor is covered with brick to protect the original surface and will later be finished with plaster. View to the south. Right: Günter Heindl in the small zigzag rooms that provided a secluded entrance to House E. View to the southeast. Photos by Mark Lehner.

By numbering brick courses we could see that while 7 is the highest course at the low southeastern corner, the northwestern corner rises to course 12. Next season we would like to complete internal details, such as door sockets, thresholds, and fine plaster.

Living on a Slope

Building a partial replica of House E brought up many questions about the shape and use of the ancient house. Perhaps the most puzzling feature was the slope of the floors within rooms. Archaeologists have found houses whose floors slope up from front to back in other sites and periods. Our reconstruction brings out that the floor of the zigzag entrance (Rooms 76, 77, 80), which adds to the security of the interior, has an even greater slope than the rest of the house.

But the degree of slope to the floors of House E, accentuated by our reconstruction, is somewhat disturbing to our modern minds. We see that the floors of individual rooms in other KKT houses were raised on a spread of crushed limestone debris, which may have also leveled the slope to some degree. If the floors of each room were leveled, it would effect a stepping up from front to back. The evidence from House E and other houses is that, for the most part, inhabitants simply lived on the slope. This might have been less impractical for everyday activities, which, for the most part, took place on the floor, than for modern furniture like four-legged tables and chairs. Pottery jars and bowls were

mostly round-bottomed. Set into a socket that was cut into the dirt floor or a cylindrical ceramic stand, they could be tilted against the slope, so that the rim of the vessel stayed level.

How did air and light flow in a building with no lateral windows west and east (where House E was flanked by House D and F)? Perhaps high clerestory windows allowed in light and air over the central rooms. Did the inhabitants install wind catchers, wooden hoods known as *malqaf* in Arabic, above the bedrooms as shown in New Kingdom representations? Models of ancient houses show tiny windows set up high on the walls, intended to allow some light and air, while keeping out the heat and bright light. Perhaps we should expect only one or two of these on the southern façade of the building, while the open courtyard on the north would catch the cooler breeze.

The use and flow of space is also intriguing. Why does the southern (main?) entrance have such restricted access, with a zigzag series of small spaces and four doorways, while the northern (back?) entrance provides a direct sight line from the street into the “reception” niched room (Room 71)?

When reconstructing the past we inevitably taint it with our perception of the present. The pragmatic task of making bricks and building walls has brought to life the reality of this structure as a house. It made us look at our own use of space and wonder about how ancient people really lived.

Indeed, we turn our imagination to attempting a complete rebuild of House E, off-site, to experiment with windows, roofs, as well as cooking, roasting, baking, visiting, eating, and sleeping on a slope.



A brickmaker forms mudbricks in a wooden mold, lining them up along the ground to dry. Up slope, piles of Nile sediments and bags of straw are ready to be mixed for bricks in a mixing pit far in the background. Photo on left by Hilary McDonald, large photo by Ashraf Abd el-Aziz.

Trying It Their Way: Brick Basics

Experimental archaeology by definition entails much uncertainty. We do not know initially the outcome of our short-term experiments with pre-modern tools, techniques, operations, and buildings that our ancient counterparts took for granted and used for many generations.

Mudbrick was the main building material in the Lost City site, the Khentkawes Town, and at most ancient Egyptian settlements, but the bricks can differ widely. In 2004, Ashraf Abd el-Aziz began a typology of mudbricks based on size and composition. This proved such a useful tool for the excavation team that Ashraf extended his work to the rest of the Giza Plateau, and later to other sites in the Memphite area, Delta, Fayum, and Upper Egypt. He also began to study mudbrick using the methods of ethno-archaeology, the attempt to understand cultural practices long gone by observing similar practices in traditional contemporary cultures. Ashraf visited old riverside brick factories, interviewed old brickmakers and recorded adobe houses in Ayat, his hometown south of Giza, and elsewhere.

Building in sun-dried bricks is becoming a lost art, as the main component, Nile silt, can no longer be used. In the 1980s the Egyptian government, in an effort to preserve the silt for cultivation, declared it illegal to make bricks from Nile silt for most modern building. Burnt bricks, now made from desert marl clay, have inexorably been replacing sun-dried silt bricks.

For the ETH project we experimented by making bricks similar to those used in the original. These were fairly small (22 x 18 x 8 centimeters [8.7 x 7.1 x 3.1 inches]) and tempered with sand rather than organic material. This season we had a quite different challenge: the bricks used to build House E (and much of the Khentkawes Town) were much larger (34 to 41 cm long, 16 to 20 cm wide, 9 to 12 cm thick [13.4 to 16.1 inches, 6.3 to 7.9 inches, 2.4 to 4.7 inches thick]) and straw-tempered. We tried different teams of brickmakers and different techniques with varying results. One team produced good bricks, but too slowly. The faster team produced uneven bricks. Another team used a mixture with too much fine silt (clay) and not enough straw temper, so when the bricks dried they cracked badly. Yet another team placed the bricks directly on the ground to dry, so they acquired a thick crust of sand that was very hard to remove prior to use.

As in all experimental archaeology, the devil lurked in details. When the brickmakers dropped from their wooden molds a brick formed of a mixture that was too wet, the bricks slumped and sagged, altering their final dimensions. These deviations in the bricks, and caked sand, greatly irritated the masons. Misshapen bricks would not fit straight and true into a course of the wall. So the masons ended up trimming them with trowel blades and even hand saws, slowing their work.

By mid-April we had 6,000+ bricks and could begin building!

A King-Sized Complex for a Queen

On this panoramic cover (front and back) we show the full extent of the Queen Khentkawes complex as seen at the end of our 2011 field season. It extends from her tomb and town on an upper level, across a lower terrace with a deep basin, to newly discovered architecture on the east. Altogether it spans 280 meters, or over 900 feet. View to the west. Photo by Mark Lehner.





JOIN AERA TODAY

Be Part of our Global Past, Present, and Future

Your membership directly supports the main pillars of our mission at [Ancient Egypt Research Associates](#): archaeological excavation, analysis, publication, and educational outreach.

Donors who contribute at the level of basic member (\$55) or senior/student member (\$30) receive our AERAGRAM newsletter twice a year and the AERA Annual Report hot off the presses, months before we post these publications to our website. Donors also receive invitations to special events and regional lectures, as well as firsthand updates on research from the field.

By contributing to AERA, you'll receive the benefit of knowing that you've made a valuable investment in us all, helping to broaden our knowledge of the past, make an impact in the education of our students, and strengthen the future of our global community.

Please join or contribute online at: <http://www.aeraweb.org/support>. Or send your check to the address below. AERA is a 501(c)(3) tax exempt, nonprofit organization. Your membership or donation is tax deductible.

MEMBERSHIPS:

Basic: \$55 Student/Senior: \$30 Non-US: \$65
Egyptian National: LE100 Supporting \$250

Name _____

Address _____

_____ Zip _____ Country _____

Phone _____

Email address _____

Please make check payable to AERA.

Or charge your membership to a credit card:

Name on card _____

Card number _____

Verification Security number (on back) _____

Expiration date _____

Signature _____

Please send application with payment to AERA at:
26 Lincoln Street, Suite 5, Boston MA, 02135 USA

