



AERA GRAM

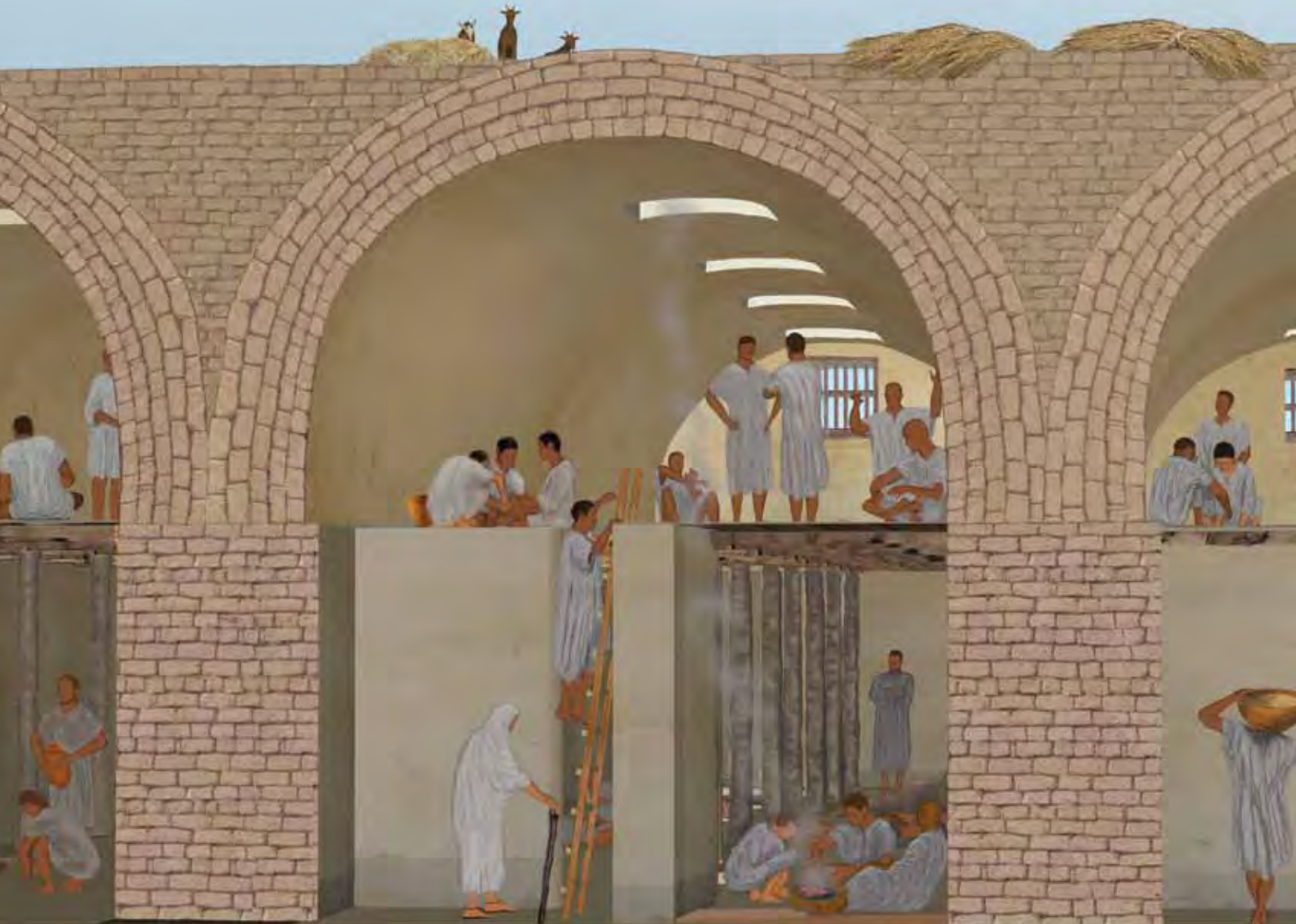
ANCIENT EGYPT RESEARCH ASSOCIATES

Groundbreaking Archaeology

VOL. 11 NO.2

Winter 2011

ISSN 1944-0014



Double-Decker Dorms

The galleries of the Lost City of the Pyramids may have been covered with great barrel vaults. Here, in this reconstruction, the front wall is stripped away to show the galleries with lofts nestled under the vaults. The workers relax on two levels. Read inside about how Günter Heindl developed the vault hypothesis. See the back cover for a view of the rear of the gallery.

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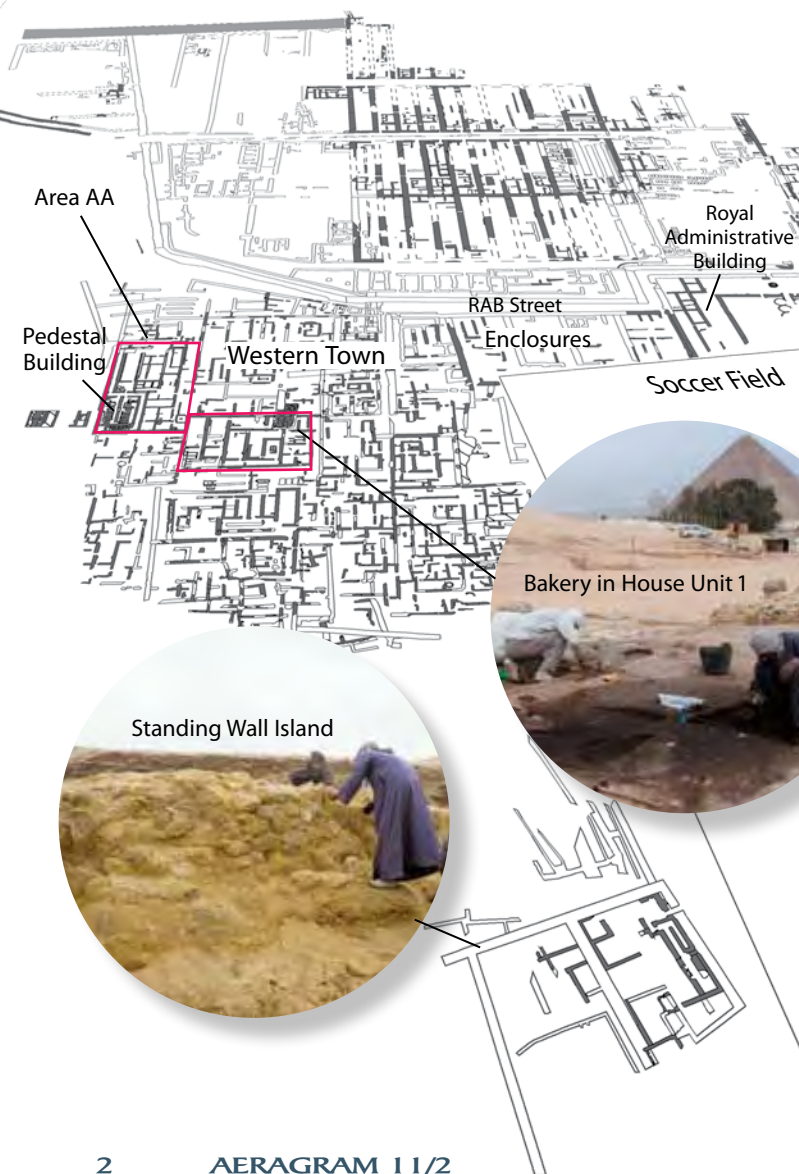
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Season 2011: Digging Again

Last year we took a break from excavation to devote our time to studies and analysis in our Giza Field Laboratory and to the Analysis and Publication Field School (see AERAGRAM 11-1'). This season we are back in the field again. On January 15 we opened our new season with excavations at the Lost City of the Pyramids site and nearby at the Menkaure Valley Temple and Khentkawes Town. As we write, our excavation and lab teams are at work, and the next issue of AERAGRAM will report their findings. Here's what we hope to accomplish ...

Map of the Lost City site showing the locations of House Unit 1 and Standing Wall Island.



The Lost City of the Pyramids: The Mystery of Standing Wall Island

In 2004, at the southern edge of the site, we discovered the “standing wall,” so-called because we found this fieldstone wall rising unusually about five feet above the ruin surface. Standing Wall forms the northern end of ES1 and ES2, two large enclosures of stone walls flanked on two sides by deep sand-filled depressions that sink more than three feet below the floor level of the Western Town district immediately to the north. The depressions leave the enclosures standing like an island.

During the 2004 season we did not find the southern end of the western wall of Standing Wall Island. It continued south under a thick overburden of sand beyond the limits of our excavation. The Standing Wall Island enclosures resemble Enclosures 1 through 5 to the west of the Royal Administrative Building with doorways opening north into RAB Street. We believe that in these enclosures, with their wide open space and back chambers and magazines, scribes might have stored and logged material coming in and going out. But the enclosures of Standing Wall Island, isolated and far from the rest of the settlement, share an orientation turned much more northwest to southeast and they appear to open south.

This season our intensive excavations are revealing internal features that should shed light on the function of the enclosure. We are following the west wall to its southern end and the southern boundary of this complex. We also plan to explore the deep depressions around Standing Wall Island. We hope to resolve whether Standing Wall Island is the southern boundary of the Lost City.

House Unit 1: Bakery and Brewery?

Located in the Western Town, House Unit 1 is the largest residence so far seen at the Lost City site. Over several field seasons we found 20 rooms, including a large reception hall and a “master” bedroom with a unique two-person sleeping platform, well-laid floors, and walls plastered and painted red and black. On the other hand, chambers in the eastern end of the building are filled with ash. During our 2009 field season we uncovered in these chambers hearths, vats, and bins, which suggested the complex was a bakery and possibly also a brewery, but we were unable to complete the excavations.

This season we resume work here with the goal of excavating to the earliest levels. We are particularly eager to find additional evidence that will definitively link this complex with beer-brewing. Even after more than 20 years of excavating the Lost City site, we still have not identified a bona fide brewery, despite the fact that beer was the major beverage of ancient Egypt and beer jars are one of the most common types of ceramics here.

The Khentkawes Town

Even though the Khentkawes Town site was excavated by Selim Hassan in 1932, it still holds secrets that we have been revealing since we began working here in 2005. In 2007 we discovered that the four or five houses or administrative buildings at the eastern end of the town belonged to a previously unknown early phase. People worked and lived here before the rest of the houses were built, presumably for the priests of the Khentkawes shrine.

1. Back issues of AERAGRAM are available for download free at <http://www.aeraweb.org/publications/aeragram-newsletter/>.



Building E Conservation

This season we plan to begin restoring the Khentkawes Town. As a pilot project, we begin with Building E. In 2009 we excavated what remained of this building after the 1932 excavations (*AERAGRAM* 10-2). This is one of a series of houses built along the northern side of the Khentkawes causeway, probably to house one of the priestly families dedicated to the service of the Khentkawes shrine. As we did with the Eastern Town House on the Lost City site (*AERAGRAM* 8-1), we will construct an exact replica of Building E on top of a protective covering over the original walls, and in the exact place of those walls, with bricks to match the ancient bricks. Researchers and visitors will still be able to see the layout and brick masonry of Building E in our reconstruction.

Our most remarkable discovery at the Khentkawes Town: a valley complex, previously unexcavated, off the eastern end of the community (*AERAGRAM* 10-2). Against a bedrock cliff, the queen's builders created an approach of mudbrick ramps, stairs, terraces, and corridors leading up to the entrance of her causeway from a large basin carved even deeper into the bedrock, possibly a harbor. Our drill cores hit bedrock bottom at about the same level as the Nile flood plain during 4th Dynasty times, 4,500 years ago, even though this basin is located almost a kilometer west into the desert from the nearest possible location of the Nile or its floodplain. We wondered: would we find a canal connecting this deep basin to the Nile?

This season we are back at Khentkawes Town using targeted excavations to gain a better understanding of the early community and the valley complex. We also plan to take additional drill corings in the basin to establish if it was a harbor. In addition, we will explore farther east beyond last season's limit, where no excavator has gone before. We want to see where the northern corridor of the queen's valley complex leads to the east and whether indeed a canal connects the basin to the floodplain.

Menkaure Valley Settlements

Like the Khentkawes Town, the Menkaure Valley Temple just to the south was also investigated in the early 20th century, by George Reisner between 1908 and 1910. Our work here since 2005 has been uncovering important new information. We have been examining the "interface" between the temple and the Khentkawes Town, particularly a broad ramp running between them up to the Giza Necropolis. We have also investigated the Ante-town, an annex with a vestibule, court, and small domestic structures built onto the front of the temple. We seek to establish the relationships between the temple, the ramp, and the Khentkawes Town.

We do not know exactly how long Menkaure reigned, but it is well established that he did not live to see his valley temple completed. His son Shepseskaf, the last 4th Dynasty king, finished it for him in mudbrick. Based on evidence from past seasons, we now suspect that Shepseskaf may have completed the temple, built the broad ramp, and finished the Khentkawes Monument and Town all at the same time as one major undertaking.

We return this season to the Menkaure Valley Temple. We will investigate the eastern wall and front door. We will check out the relationship between the temple completed by Shepseskaf and what Reisner saw as a second temple, built over the ruins of the first, at some point late in the Old Kingdom after a flash flood down the desert wadi devastated the first temple, causing people to abandon town and temple for some time.

Archaeological Science

In the Giza Field Lab, specialists in material culture analyses will put under the lens ceramics, artifacts, clay sealings, animal bone, plant remains, chipped stone, pigments, and wood charcoal from Area AA, with its mysterious Pedestal Building as the centerpiece (*AERAGRAM* 8-2). With archaeology continuing under the microscope, we hope to find clues to people's business in what seems to have been a storage and production facility.

We will assess the potential for residue analyses, seeking remains of the organic materials in pottery vessels and plastered floors and walls, which could shed light on food production. We will also look for evidence of ancient climate change, for example, by testing the sediments in drill cores for Nile silt, microfauna, and other materials reflecting the ancient environment.

Please watch for the next issue of *AERAGRAM* for the results of the 2011 field season.

Seeds and Skeletons: Training an Archaeobotanist and Archaeozoologist

In 2010 we launched our first **AERA-ARCE Analysis and Publication Field School** (AERAGRAM 11-1). Our goal was to train inspectors from the Supreme Council of Antiquities (SCA) in the skills they need to analyze archaeological data/materials and prepare publications.

Among the programs we offered was training in archaeobotany and archaeozoology, the study of plant and animal remains, respectively. These specialties have been critical for understanding our sites. For example, through our analysis of floral and faunal remains we discovered that the Lost City site was provisioned with grains and livestock.

SCA inspector Rabab el-Sayed el-Gandy (right), from Kafr el-Sheikh in the Delta, trained in archaeobotany with Dr. Mary Anne Murray, AERA archaeobotanist and Director of Archaeological Science. SCA inspector Rasha Nasr Abd el-Mageed (facing page), from Saqqara, studied archaeozoology with Dr. Richard Redding, AERA archaeozoologist and Chief Research Officer.



Above: Rabab el-Sayed el-Gandy works at the microscope learning archaeobotany. Below: Sorting a flotation sample under the microscope. Photos by Mary Anne Murray.

Training an Archaeobotanist by Mary Anne Murray

Rabab el-Sayed el-Gandy, a graduate of the Department of Archaeology at Tanta University, joined our field school program with no background in archaeological plant remains, but she was eager to learn. We began Rabab's course with a PowerPoint introduction to the study of ancient Egyptian plants and then moved on to the microscope, where archaeobotanists spend most of their time. Rabab quickly learned that samples recovered through flotation (described in the sidebar) consist mostly of cereal grains and chaff, weed seeds, and other plant parts, all charred. Without a low-power binocular microscope it would be impossible to sort these out and identify and count them.

Rabab began with a fabricated "training sample" that included fifteen of the most common species and plant parts that she is likely to encounter. It is always interesting to see the expression on a student's face when they first peer down a microscope into the black abyss of charred plant remains. Most look very dubious. But Rabab did not even glance up; she started sorting—the first inkling that she had much potential.

Soon she was working with real flotation samples collected during our 2009 excavations at the Khentkawes Town site. From the beginning, Rabab was keenly interested and showed a talent for sorting and recognizing the various species.

In order to master the material, Rabab drew detailed illustrations of most plant species we find at Giza and wrote descriptions of each—the two best ways to learn the plants and to distinguish them from each other.

I regularly challenged Rabab by testing her on very fragmented elements of the species she already knew, since so



much of the material in our samples is broken bits—and she did well.

Throughout the course, Rabab read assignments in the evening, kept a daily journal of the material she learned, and compiled a glossary of terms.

On a field trip to the Agricultural Museum in Dokki, Rabab saw how ancient dessicated (or dried) plant remains compared to our charred material.

In order to understand the archaeological context of Rabab's samples, we visited Khentkawes Town. Although the site was backfilled with sand to protect it, Rabab could still see where Building E, the source of her samples, stood in relation to other components of the settlement and area. She also studied the excavation report on Building E, focusing especially on the context of the plant remains. In order to derive all the information and insights that plant samples can yield, the archaeobotanist has to understand the archaeology on the ground. For example, plant remains might offer clues to the use of a space, but if we do not understand that space, we cannot offer an interpretation.

Since there was no concurrent excavation during the field school, Rabab did not get to collect samples for flotation in the field. However, she still learned to use the Giza flotation machine (shown in the sidebar). Together with our experienced flotation expert, Abdel Latif, she processed a sample of made-up fill spiked with modern burnt plants.

Rabab also had the opportunity to learn from other specialists. Several archaeobotanists working in Egypt visited and discussed many issues of the field with her. Although most were from foreign missions, Dr. Ahmed G. Fahmy, from the Department of Botany and Microbiology at the University of Helwan, also dropped in. One of the few Egyptians doing archaeobotanical work in Egypt, he is part of the new generation of archaeological scientists.

To round out her training, Rabab carried out a small ethnoarchaeology project. Ethnoarchaeology is the study of present-day or recently abandoned communities to gain insights into ancient ones. At her home village Rabab collected wheat just before harvest time. She was especially interested in the weeds that grow with wheat and provide information about cereal fields and agricultural practices, such as the height at which the cereal is cut. She also took samples from the traditional ovens to examine the fuels and the remains they leave behind.

At the end of the course, Rabab had a firm handle on all the basics of archaeobotanical analysis. In the process of learning, she completed a valuable research project that contributed to the overall goals of AERA's work. In all, she identified 14,101 plant items from Building E, including 43 different plant types. One important finding was that the plant remains were more diverse than at the Lost City site, indicating that the residents had access to a greater variety of foods.

During the final week of the field school, Rabab presented her findings from Khentkawes Town at a conference for students in the Analysis and Publication Field School. She also helped write a substantial final report on the results.

It was a great journey for both student and teacher. And now Rabab is ready to make valuable contributions to other excavations in Egypt as an archaeobotanist.

Training an Archaeozoologist by Richard Redding

A graduate of the Cairo University Faculty of Archaeology, Rasha Nasr Abd el-Mageed came to our program with experience in identifying animal bone. During her first year working as an inspector at Saqqara, she ended up excavating dog burials. With the aid of a book, she taught herself the bones of the dog skeleton. However, she did not know what to do with the information after identifying the bones. Then she heard about our field school program.

Having mastered the dog skeletons on her own, Rasha was ready for a challenge. The first day of the field school, I set her to work sorting large bags of fragmentary animal bone from our Lost City site. Our excavators bag any bone they encounter while digging. These are usually fragmented scraps, discarded during butchering, cooking, or eating. Bits of pig, cattle, fish, birds, sheep, and goats may all be jumbled together. As Rasha worked through the piles of bone, she learned to differentiate



Rabab el-Sayed el-Gandy learns to use the flotation tank (set up at the AERA-Egypt Center) to extract plant remains from archaeological sediments.

Mary Anne Murray

Floating Seeds

At the Lost City, like most settlement sites, the plants that people processed and used for food, fuel, fodder, etc. decayed in the moist soil. The only traces left are seeds and other plant parts that charred in hearths, ovens, and room fires. Small and fragile, these remains are recovered through a technique called flotation, which, by the use of water, easily separates charred plants from deposits sampled during excavation. Soil samples are poured into a tub of water. Light and porous, the plant fragments bob on the surface. They are quickly whisked away in a continuously running stream of water through a sluice and down into a fine screen. After the remains dry, they are ready to go under the microscope.

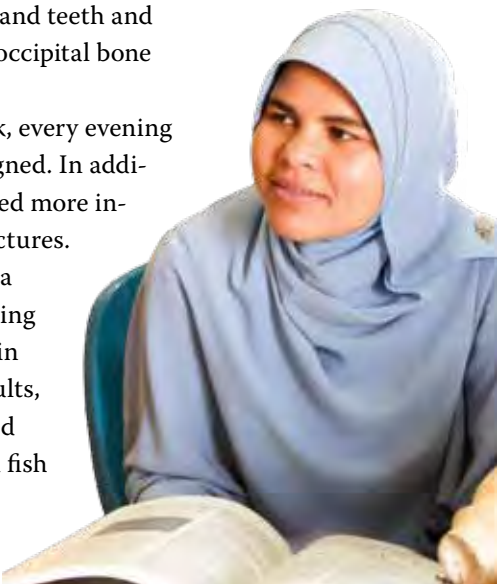
Some remains, such as large legumes, are dense and may sink instead of floating. This heavy fraction is collected in a fine mesh suspended in the tank (in the photo attached with clips) and later rinsed and then sorted. The soil, the heaviest material, sinks to the bottom of the tub and is eventually discarded.

between the gross categories of fish, reptile, bird, and mammal with their distinctively different types of bone. Then she quickly moved on to identifying the body part and species of each fragment, working with our collection of modern specimens as a guide. She also learned to determine the age of death for some limb bones and teeth and to assign sex to pelvic and occipital bone fragments.

To augment her lab work, every evening Rasha read materials I assigned. In addition, I occasionally presented more information in one-to-one lectures.

Archaeozoologists need a more complete understanding of fauna beyond the bones in order to interpret their results, so Rasha's training extended outside the lab. At the Giza fish

Rasha Nasr Abd el-Mageed, who trained with Richard Redding, may be Egypt's first archaeozoologist. Photo by Jason Quinlan.





Above: Rasha Nasr Abd el-Mageed de-fleashes a fish to prepare it for her reference collection. Right: Richard Redding teaches Rasha to distinguish the bones of different mammal species using modern reference specimens. Below: Animal bone fragments from the Lost City site. Photos by Richard Redding, except for photo on the right by Jason Quinlan.



market we learned the local names of fish species and their relative economic importance. We asked about fishing techniques and where the fish were caught. Rasha recorded the price per kilogram of all of the fish taxa she was finding archaeologically, which gave her an estimate of their relative desirability. This was her first exposure to ethno-archaeology.

Since an archaeozoologist needs a comparative collection, we purchased fish and Rasha de-fleshed them and prepared the skeletons for her own collection. We also managed to procure a sheep.

At Saqqara we looked at animal representations in Old

Kingdom tombs. We studied the fish illustrations and the various methods shown for catching and preparing fish, as well as cattle slaughter scenes. Here Rasha learned to identify some of the wild taxa shown as offerings.

After developing her identification skills, Rasha began work on her own project. She examined 10,342 fragments of bone from the AA Bakery in an industrial complex on the west side of the Lost City site. Although the bone was badly fragmented,

she managed to identify 109 of 309 fish bones and 397 of 9,908 mammal bones to taxon. Next she compared the species ratios and age/sex information for the AA Bakery to other areas of the Workers' Town. The final result was a very respectable paper that could be published in a site report. She also presented her work at the Analysis and Publication Field School conference.

Rasha is now ready to do identifications of animal bone from any site in Egypt on her own. At the AERA library, she will continue to have access to the books she needs while building her own collection of comparative material. Rasha will only improve with practice. She is continuing her studies at Saqqara and intends to complete a master's degree focusing on archaeozoology.



Acknowledgements

The AERA-ARCE Analysis and Publication Field School 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. EAC-23-2009).



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FROM THE AMERICAN PEOPLE

Double-Decker Dorm? Reconstructing the Galleries

Much of the footprint of the Lost City site is taken up with the Gallery Complex, four large blocks of very long, narrow halls or galleries, lined up side by side. In 2002 the AERA team excavated one of these, Gallery III.4 (the fourth hall in the third set of galleries), and proposed that the galleries served as barracks.

The walls of Gallery III.4, like others throughout the Lost City, were mostly gone except for stubs no more than knee-

high. With so little left of the structure, we do not know how high it stood or how it was roofed. Until recently we had assumed that the galleries were a single story with a flat roof. But Günter Heindl, an architect and archaeologist with many years of experience working in Egypt, believes they were covered with great vaulted barrel arches and that they had a second story.

A Two-Story Gallery

When Günter looked at the Lost City gallery system for the first time, he saw parallels with other monuments from Egypt's past. Although no upper walls or ceilings survived, Günter saw clues to "rebuild" the gallery. First, the width of the walls, 1.57 meters (almost exactly three Egyptian cubits) (over 5 feet thick) was certainly not necessary to hold up a simple flat roof. Surely the walls must have been built to support something more massive. Second, the front part of the gallery could not have been covered with a flat roof. The large open area, about 4.7 meters (15.4 feet) across is too wide for an ancient Egyptian timbered roof, which was generally restricted to 3.5 meters



The map of the Lost City site shows the Gallery Complex (lightly shaded), consisting of long halls massed together in four sets. Gallery III.4 (right) was intensively excavated in 2002. Excavation supervisor Ashraf Abd el-Aziz (right) stands next to a small residence that occupies the south end, seen in the foreground. Günter Heindl, above, believes the galleries were covered with vaulted arches, based on a careful study of vaulting in ancient Egyptian and contemporary Nubian mudbrick architecture. Photos by Mark Lehner.

(11.5 feet). A row of columns that run the length of the space might have supported a roof, but these were only about 23 centimeters in diameter (9 inches), which we know from diameters of holes where the columns rose from stone bases through low benches or curbs—too thin to support timbers covered in reeds and mud. Based on his familiarity with centuries of Egyptian architecture, Günter envisioned an imposing two-story structure capped with long vaults of mudbrick.

Ancient Egyptian Vaulting

According to Günter, vaulting—

on the wall as a guide for construction.

Barrel vaults were used in royal monuments even before the reign of Menkaure, when the Lost City of the Pyramids was in full swing. Günter worked with a German team that discovered evidence for barrel vaulting in the Northern Pyramid Mortuary Temple at Dahshur. Built by Sneferu, Menkaure's great-grandfather, the temple was in poor condition with just one or two courses of brick preserved. Still it was clear that the cult chamber had been constructed in two phases. The walls, originally 65 centimeters (26 inches) thick, had been reinforced on the inside to a thickness of 1.05 meters (41 inches). While the original

mortuary temples with valley temples. In the 1920s, when Gustave Jéquier cleared the causeway for Shepseskaf's burial monument at South Saqqara, he found parts of the causeway preserved nearly intact with a vaulted roof. Recently the Germans also exposed barrel vaulting in the lower causeway of the Bent Pyramid.

Barrel vaulting was a common feature in many non-royal tombs as well, such as the mastabas of Kanofer and Irty at Giza in the cemetery west of the Great Pyramid.

Perhaps the structure that most closely resembles the Lost City galleries is the Ramesseum, the mortuary temple

Right: The barrel vaults of the warehouses at the Ramesseum dating from the 19th Dynasty. The upper right photo shows the four courses of mudbricks that make up the arches. The lower right photo shows the side wall of the vault with the leaning bricks revealed where the plaster has eroded. The lower, horizontal bricks are part of the side wall on which the vault stands. Photos by Günter Heindl.



Far right: The lower causeway of the Bent Pyramid at Dashur was excavated by the German Institute/Free University of Berlin mission during spring 2010. Photo by Mark Lehner.

especially a type called “leaning barrel vaulting”—has been used in Egyptian tomb architecture since the late Predynastic Period (about 3100 BC). Leaning barrel vaults are made out of arches of mudbrick, usually one to five courses of bricks. The arches lean against an upright end wall or arch. The most common form for the arch, the parabola, was probably inscribed

dimensions could have easily borne a flat roof, the walls must have been widened to support a greater mass. Günter thinks they were augmented to accommodate a barrel vault. A similar vaulted room may have been part of the mortuary temple of Sneferu's second pyramid, the famous Bent Pyramid.

Barrel vaults were also sometimes used in the causeways that connected

of Ramses II, a 19th Dynasty king, located on the west bank at Luxor. The most striking similarity is in the thickness of the long side walls. The Ramesseum walls are nearly the same width as those of Gallery Set III, about 1.55 meters. The long walls each support two leaning barrel vaults consisting of four courses of bricks—about 80 centimeters (31 inches) thick—one in each direction. Although

the galleries at the Ramesseum are typically only 3.70 meters (12.4 feet) wide, whereas those in the Lost City are 4.70 meters (15.4 feet) wide, the huge vaults nonetheless demanded substantial supporting walls.

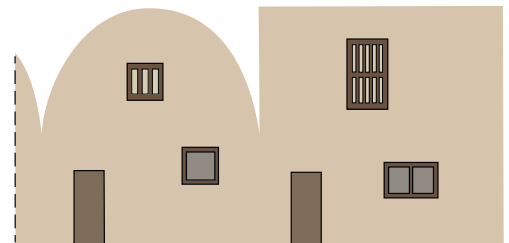
Galleries Reconstructed

Back at the Giza Gallery Complex, Günter envisioned double-springing arches resting on the thick side walls, with a high barrel vault rising over the galleries. Inside, a suspended ceiling covered a portion of the gallery, creating a loft (see front cover).

We will never know how high the vaults originally stood, but ex-

holes may have been covered with roof hoods (like those so well-known in the Islamic period) to facilitate air flow. Günter also envisions two windows on the front face of the gallery: one at the ground level and one up in the loft. The four galleries, with their thick walls spaced every 4.7 meters (15.4 feet), made for very dense, massive blocks of architecture. With vaults, the mass was even greater. Günter estimates that the four gallery sets with barrel vaults would have required over five million mudbricks!

As in many barrel-vaulted structures in ancient Egypt, the v-shaped spaces between the arches in the Giza galleries



The drawing shows options for the way the galleries might have been finished. The barrel vaults could have been covered with a flat roof or left as vaults. We have no evidence of windows, nor of the material used to cover them, but Günter Heindl suggests that the windows could have been secured with single or double leaf shutters on wooden pivot pins. On the upper level the windows might have been covered with wooden grills. The drawing shows a few possibilities based on ancient Egyptian architecture. Figure adapted from a drawing by Heindl.



trapolating from the canons of ancient Egyptian architecture, Günter concluded that the total height was probably almost 7 meters (nearly 23 feet!).

Openings were probably cut into the tops of the vaults for ventilation. Distributed along the length of the arch, they would have allowed air to flow through and smoke from cooking and heating fires inside to escape. The

might have been filled in and the whole covered with a flat roof. If all the galleries were vaulted and roofed, the Gallery Complex would have supported a vast, open terrace nearly 150 meters long and almost 75 meters wide (shaded area on the map on page 7), broken only by two streets running east-west.

If the galleries had been topped with a flat roof, the residents would probably

have used it as outdoor living space, just as Egyptians use their roofs today (see back cover). The gallery rooftop could have been used to keep ducks, geese, and goats, as well as fuel and other supplies. During cooler months it would have been well-ventilated space and nicely lit for work. In the summer during the evening, it would have been a good place to escape the heat, especially for sleeping.

Günter's vision is a hypothesis built upon a few clues and a lifetime spent working in Egypt. It is important to remember that each gallery—from what we know so far—was unique in its layout and the way it might have functioned. Some details of Heindl's reconstruction of Gallery III.4 will not work for other

galleries in the Lost City, but it helps us imagine the collective, completed form, and it helps us pull together scattered clues to use in creating a model of life in the Old Kingdom.

We hope to test Günter's hypothesis in the future by building a replica of Gallery III.4 capped with a vaulted arch.

~ John S. Nolan and Günter Heindl

On the Cusp of a New Dynasty: Khentkawes and Userkaf

For 15 years AERA's excavators worked comfortably in the 4th Dynasty at the Lost City of the Pyramids. The pottery looked as if it were taken right out of a textbook on the 4th Dynasty. The royal names on the seal impressions found at the site all belonged to the 4th Dynasty kings Khafre and Menkaure. We were quite certain that we were excavating our way through material deposited during the last 50 or so years of the 4th Dynasty.

Then, this all changed as our excavations expanded into the realm of a new and interesting period of Old Kingdom history, the transition from the 4th to the 5th Dynasty. First, in

2005 AERA teams began working on the Khentkawes Town (κκτ) located on the southeastern edge of the Giza Plateau a few hundred meters northwest of the Lost City. Ostensibly established in the 4th Dynasty, the town was attached to a tomb built for Khentkawes, an enigmatic queen born in the 4th Dynasty. But the settlement continued on into the 5th Dynasty with a possible reoccupation in the 6th.

Then, in 2010 our sealings team encountered the name of Userkaf, the first

king of the 5th Dynasty, on seal impressions from long-completed excavations in the Royal Administrative Building, giving us the first inkling of 5th Dynasty material at the Lost City site. (See "Five Clay Fragments ..." on page 12.)

The story of Egypt's transformation from the 4th Dynasty into the 5th is shrouded in uncertainty and the subject of many, often contradictory academic arguments. There is just too little solid evidence to build a consensus. However, the recent work of AERA's team in Khentkawes Town is focused on the most important archaeological site from this period, and its results are redefining the terms of this important historical debate.



The only surviving depiction of Queen Khentkawes is on the battered granite false door from her mortuary monument at Giza. Photo by Mark Lehner.

A Time of Change

Both Queen Khentkawes and Userkaf happen to be key personalities from the period of the transition from the 4th to the 5th Dynasty, a time of radical changes masked by an outward appearance of continuity. On the surface the 5th Dynasty does not appear to be much different from the 4th. Pyramids continued to be built, tomb inscriptions continued to incorporate many of the same titles from the 4th Dynasty, and many officials appear to have served

from the 4th into the 5th Dynasty without interruption.

However, upon closer examination, it is clear that different forces are at work in the 5th Dynasty. For instance, 5th Dynasty pyramids are often meager reflections of the massive, well-constructed 4th Dynasty monuments. Almost as if to compensate for these smaller pyramids, many of the 5th Dynasty kings built separate, elaborately decorated temple complexes dedicated to the sun god Re. Furthermore, the paintings and carvings on the walls of nobles' tombs expanded upon the basic texts and motifs of the simpler 4th Dynasty mastabas, taking them to unprecedented levels. Overall, one gets the impression that the power of the king was reduced and divided whereas the prestige of the magistrates and priests who served him was on the rise. Even the sons of the king, who had controlled every aspect of the 4th Dynasty state, performed only ritual and ceremonial duties in the 5th Dynasty. The real work of governing was done by a growing number of trained officials, who staffed the newly formed government bureaus.¹

This transformation of the state—which we think started in the reign of Menkaure and lasted through the reign of Userkaf—may have taken about a decade to implement, according to our current notions of Egyptian history.

Both Userkaf and Khentkawes may have played major roles in the reordering

The unusual mastaba tomb of Queen Khentkawes, flanked by the Khafre (left) and Khufu pyramids in the background. View to the northwest. Photo by Yukinori Kawae.






Three examples of possible scenarios (but not the only ones) proposed for Khentkawes' place in the ruling family at the cusp of the 4th–5th Dynasty.

of Egyptian administration and society. Userkaf's significance in this period is clear. He was the first king in the new order, succeeding Shepseskaf, Menkaure's successor and the last ruler of the 4th Dynasty. While his personal history remains unclear, Userkaf was the first king to build a separate temple dedicated to the sun god Re as well as dedicate large tracts of land to Re. Some researchers have suggested that Userkaf's reverence for the sun god might indicate an earlier career as High Priest of Re in Heliopolis prior to ascending the throne, but this is merely speculation. In any case, Userkaf built his pyramid—located at the old royal cemetery of Saqqara—on a much smaller scale and with a different layout than his 4th Dynasty predecessors. A few scraps of wall carvings found in the pyramid of his queen suggest that his successor on the throne, Sahure, was probably his son. Userkaf was the father of a new dynastic line.

Queen Khentkawes

Very little is known about Queen Khentkawes and her life. What is known comes from the remains of her mortuary monument at Giza. This “monument” is unique in the Old Kingdom. It resembles a large square mastaba (or tomb) topped by a smaller oblong mastaba. The idea of constructing massive royal tombs in the shape of mastabas is seen most clearly in the Mastaba'at el-Farun, the resting place of Shepseskaf at South Saqqara. The similarity of these monuments suggests that they were very nearly contemporary.

Only a few hieroglyphic texts from the Khentkawes monument have survived the ages. Carved into the broken granite doorjambs at the entrance and again on one of the two large granite false doors in the cult chamber is the ambiguous title . The hieroglyphs in this title could conceivably be translated as “King of Upper and Lower Egypt *and* Mother of a King of Upper and Lower Egypt,” perhaps indicating that Khentkawes might have ruled Egypt in her own right. But other evidence renders it unlikely that she did so. Instead, the more likely translation of these hieroglyphs is “Mother of Two Kings of Upper and Lower Egypt.” However, nowhere in her monument are either of these two royal sons named.

The identity of these two kings is crucial for our understanding of the political and dynastic history of this period. The overall importance of Khentkawes in the eyes of her contemporaries however remains beyond doubt. Khentkawes' monument lies in the center of the 4th Dynasty quarries, made from a large block of bedrock that had been reserved over decades of quarrying (*AERAGRAM* 9-2). Khentkawes' prominence was such that she could claim this massif for her final resting place. But her role in the changes that took place at the end of the 4th Dynasty and her connection to the kings of the 5th Dynasty rests on the identity of her sons.

Scholars have advanced several, often conflicting, theories about Khentkawes' place in the ruling family, shown in the chart above: 1) Khentkawes was a daughter of Menkaure who married her (half-) brother Shepseskaf and gave birth to Userkaf, Sahure, and Neferirkare; 2) she was Userkaf's wife and gave birth to Sahure and Neferirkare, who may have been twins; and 3) Menkaure was her father, Shepseskaf her brother, and she married Userkaf and gave birth to Sahure and Neferirkare, thus connecting the ruling family of the 4th Dynasty and the new ruling family of the 5th Dynasty.

These theories are all based on indirect, often ambiguous evidence, the meaning of which seems to change with each new discovery. This swirling sandstorm of arguments has come to be called the “Khentkawes Problem” in the academic literature.

However, the painstaking work of Mark Lehner and his team at the Khentkawes Town site is leading to discoveries that may help to solve the “Khentkawes Problem” one day.²

Perhaps the most important hypothesis of Lehner and his team is that the monument and town of Khentkawes were planned and built together as a piece and that Khentkawes' monument was built in one unified phase of construction. Furthermore, the AERA team's detailed clearing and mapping of the eroded remains of the town have shown that it incorporated earlier architecture that was likely built as an administrative center for the harbor in front of it. The ultimate layout of this expanded town—and even the bricks used to build it—suggests that the town was built in tandem with the comple-

(continued on page 12)

1. J. S. Nolan. 2010. *Mud Sealings and Fourth Dynasty Administration at Giza*. PhD dissertation. University of Chicago.
 2. M. Lehner, D. Jones, L. Yeomans, H. Mahmoud, and K. Olchowska. Forthcoming. Re-examining the Khentkawes Town. In *Old Kingdom Art and Archaeology: Proceedings of the Conference Held in Cambridge, England. May 21, 2009*, ed. by N. Strudwick.

Five Clay Fragments and Another King

During four field seasons at the Lost City settlement we carried on intensive excavations in a large enclosure dubbed “The Royal Administrative Building” (RAB). Defined by double walls, it consists of an expansive courtyard with large grain silos on one side and small domestic/workshop structures along the other. It appears to have been used for production and storage of crafts and food.

Each excavation season here, as elsewhere at the Lost City, we recovered fragments of sealings. These bits of clay, often impressed by a cylinder seal, were used to secure pots, boxes, bags, doors, and papyrus rolls. When the sealed object was opened, the clay seal was broken and discarded.

The bits of clay fragments do not look like much, but to the specialist—the epigrapher—they can speak volumes. The cylinder seals used on the clay often included the title of an official and the king under whom he served. Sealing fragments with hieroglyphs of the king’s name are invaluable for dating. They mark the earliest possible date for the deposit in which they are found, i.e., the reign of the named king. However, since cylinder seals sometimes continued to be used into the reign of the next king, they do not give a final date for the deposits.

The RAB sealings for the most part confirmed the dates that we have seen elsewhere across the settlement. In the earliest lev-



Sealing 1772 from the Royal Administrative Building displays most of Userkaf’s Horus name. Photo by Jason Quinlan.

els, the only king’s name is that of Khafre. In later phases, Khafre’s name still occurs along with sealings bearing the name of Menkaure, the second from the last king of the 4th Dynasty.

The RAB was squarely in the 4th Dynasty. Or so we thought, until the sealings team discovered five sealing fragments that bore the Horus name of Userkaf, the first king of the 5th Dynasty. These were the first instances of sealings from a period other than the 4th Dynasty at the Lost City site, so they are particularly interesting.

Since all of these sealings are most likely from the final phases of demolition and abandonment of the RAB, they were probably deposited from the Eastern Town. This village-like area of our site is next to the RAB and may have still been occupied into the 5th Dynasty after the royal structures were abandoned.

These five Userkaf sealings highlight the complex development of the Lost City. Although the evidence from the Western Town and the Gallery Complex clearly indicates that some of the site was intentionally dismantled and abandoned at the end of the 4th Dynasty, the sealings are our first clear evidence that the Lost City did not die out with the 4th Dynasty. The Eastern Town may have continued to function into the 5th Dynasty and may have even expanded into the ruins of the Royal Administrative Building.

We owe the discovery of these sealings in part to our intensive recovery method: wet sieving most of the deposits. The sealing fragments, small and the color of dirt, are easily missed during excavation and are hard to see in the screens that archaeologists use to dry sieve the fill for potsherds, stone tools, etc. In wet sieving, the material left behind in the dry sieve is rinsed in water, making the items easier to identify, especially the clay sealing fragments. The process is labor-intensive, but look at the payoff!



Mark Lehner

The Royal Administrative Building during excavations. The double walls show prominently in the foreground. The small domestic/workshop structures lie just beyond, adjacent to the inner wall. View to the southeast.

On the Cusp of a New Dynasty (continued from page 11)

tion of the Menkaure Valley Temple as well as the Menkaure Pyramid Temple and the three queens’ pyramid chapels. The construction of these other temples have long been dated to the reign of Shepseskaf. If this is true, then not only was the Khentkawes Town built during the same reign, it is also almost certain that Khentkawes’ monument was completed during the same construction project.

While Lehner and his team stop short of drawing out the historical ramifications of their discoveries, their impact will radically transform our view of Khentkawes in the 4th Dynasty.

If she was recognized as the “Mother of Two Kings of Upper and Lower Egypt” as early as the reign of Shepseskaf, then it seems likely that Shepseskaf may have been the second of these kings. In any case, he can only be the latest possible candidate. While only future work at the KKT site can verify these conclusions, AERA’s research so far has brought Khentkawes back firmly into the 4th Dynasty.

~ John S. Nolan
AERA Associate Director and
Senior Epigrapher

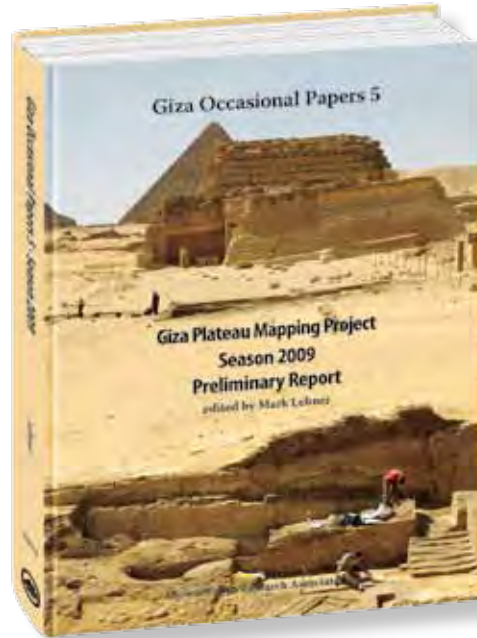
Preliminary Report on Season 2009 Published

This spring AERA published the fifth volume in our Giza Occasional Papers series, *Giza Plateau Mapping Project, Season 2009 Preliminary Report (GOP5)*. The volume includes papers on work carried out at the Heit el-Ghurab site (aka Lost City of the Pyramids) and at Khentkawes Town.

The contributions summarize the results of excavations at Khentkawes Town in the valley complex, Building E, and the interface between the town and the Menkaure Valley Temple; and at Heit el-Ghurab in the Western Compound, the Chute, and House Unit 1. Other reports cover human and canine burials, ceramics, and analysis of materials from the 2001–2005 Royal Administrative Building excavations.

GOP5 is hardbound and well illustrated with abundant maps, black and white photographs, and color plates. In addition, large foldout maps and isometric drawings illustrate the Khentkawes valley complex and the interface between the Khentkawes Town and the Menkaure Valley Temple.

Our *Giza Plateau Mapping Project, Season 2009 Preliminary Report* can be purchased from David Brown



Book Company at their website: <http://www.oxbowbooks.com/bookinfo.cfm/ID/158552>.

GOP5 will be available later this year for free download on AERA's website: <http://www.aeraweb.org>. All of the earlier volumes in the Giza Occasional Papers series are posted on the website for download.

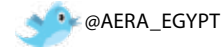
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AERAGRAM

Volume 11 Number 2, Winter 2011

Editor: Dr. Wilma Wetterstrom
Assistant: Alexandra Witsell

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

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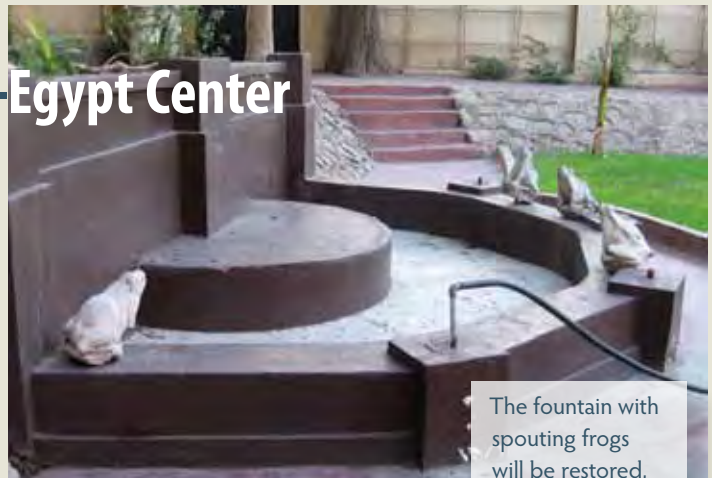
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Planning for the Future: The AERA-Egypt Center

After 20 years of renting dig houses and flats, in 2009 AERA purchased a villa to serve as a year-round home and base of operations. We are grateful to Ted Waitt, Ann Lurie, Peter Norton, Charles Simonyi, David Koch, Marjorie Fisher, and the Urban Land Institute tour members on behalf of Bruce Ludwig for making possible an AERA home base at the very foot of the Giza Plateau.

The team enjoyed its first field season here last year, using research, teaching, and dining facilities. But the villa was crowded and most rooms had to serve multiple functions. In addition, nearly all of the team lived in rented flats. When AERA bought the property, we planned to renovate and build over several years to create a center that would meet all of



The fountain with spouting frogs will be restored, including a lion head mounted at the center back wall. Photo by Alexandra Witsell.

our needs. Here Richard Redding, AERA Chief Research Officer and board member, describes our plans.

The future of the AERA-Egypt Center is taking shape. While living and working at the AERA-Egypt Center since renovating it, we have been assessing our needs and examining the possible ways to meet them. Thanks to the Jerde Partnership architectural firm, we now have a working plan for a center designed by Jon Jerde and John Simones. The watercolor sketch on the facing page, generously prepared by the Jerde team, renders a first draft.

The design blends Old Kingdom Egypt with modern, functional, Egyptian vernacular architecture. Two entrances—one for pedestrians off the street and a main gate off the driveway—take their architectural cues from Saqqara. Rooftop garden areas add to the greenery.

Developing a Plan: The Five Frogs Fountain

After we moved into the villa in 2009 and began to conserve and develop the old landscape, we quickly realized the value of the large, old trees and aimed to preserve as many as possible. These mangos, acacias, and palms help cool the property in warm weather and muffle noise. In addition, we plan to restore the old fountain, with its central lion head spout and basin surrounded by five frogs, a symbol of regeneration in ancient Egypt.

The first draft design shows six new buildings, but for now we plan to build only four of them. At the back of the property, the largest building, a dormitory, contains sixteen double rooms. A second building along the northwest side of the property includes a director's suite and five single rooms for senior staff and visiting scholars. A third building, bordering the long driveway, houses a new kitchen, dining room, and workrooms, as well as the main entrance to the AERA-Egypt Center.



A round lecture hall seating about 100 people forms the new centerpiece of the property, at the convergence of walkways from the entrances and through the garden. We will use the lecture hall for field school classes and public lectures. The pedestrian entrance, shown in the sketch passing through a building, will instead open unto two short stairways on either side of the fountain.

In another effort to preserve the landscape, we will reorient some of the proposed buildings shown in the sketch to avoid removing additional mature mango trees. Our four trees now standing in front of the area proposed for the dormitory will screen these private rooms from the lecture hall, as well as provide shade. A lawn in front of the dormitory will keep the grounds green and regenerative, fulfilling the promise of the Five Frogs Fountain.

Following traditional Egyptian practice, rooftops will be accessible via stairways and partially covered, and, based on our use of the property last year during the Analysis and Publication Field School, these roof terraces will see much use. When we constructed a support building along the street wall (not shown in the sketch), the rooftop, fitted with a tile floor, lattice canopy, lighting, and electrical outlets, became a popular place for small groups to work and relax. Intimate, inviting areas for work groups is a must when we run a full excavation season and field school. Almost 70 people converge on the property during the day.

The Jerde sketch plan shows the existing villa unchanged on the outside. But inside, we will devote all spaces to research. Once we build the dormitories, the villa rooms now used as bedrooms will become dedicated workrooms. The largest of these will contain map cases and several large tables for excavators to lay out drawings and maps. We will move the GIS (Geographical Information System) operation into one of these rooms, allowing the current computer/GIS room to



Watercolor sketch of the first draft plan for the AERA-Egypt Center. The plan was generously designed by the Jerde Partnership, a visionary architecture and urban planning firm based in Los Angeles.



Jason Quimlan

Field School students working at the AERA-Egypt Center in 2010.



Mark Lehner

Saqqara, the inspiration for the new gates in the Center plan.

become a dedicated computer facility. When the new lecture hall is ready, the library and archive will no longer have to double as a lecture space and will be able to accommodate more bookcases. The kitchen will be repurposed as a manager's office, and the dining room will become a workroom, a function it now serves between meals.

Implementing the Plan

Putting up the support building last year gave us a chance to learn the ins and outs of construction in Cairo, while creating rooms for our house staff and a rooftop work area and classroom. We experimented with techniques and materials and successfully completed it in 75 days at a cost of \$30 per square foot. In the table I give estimates for the cost of building new structures without the help of a general contractor. Costs would be higher with a contractor.

We plan to carry out the proposed construction project in phases, starting with the dormitory. Our highest priority, it will allow us to bring together in one place the entire crew. Next on our list is the senior staff house, followed by the building along the driveway, the new entrances, and an addition to the surrounding wall that would raise it to four meters (13 feet) for security.

The AERA-Egypt Center, two blocks from the Giza Plateau, already serves with excellence as home base for AERA, the focus of an archaeological community that actively uses the library, archives, and computers. The proposed building program will enlarge facilities and empower the members of this community, the AERA team, field school students, and Egyptian archaeologists at the front lines of the Egyptian government's antiquities authority.

~ Richard Redding,
AERA Chief Research Officer
and Board Member

Preliminary Estimates for Building Costs

Dormitory*	\$150,000
Director's house*	\$50,000
New kitchen*	\$150,000
Pedestrian entrance & higher wall.....	\$10,000
Lecture hall*.....	\$60,000
Total.....	\$420,000

*Build and furnish

Thanks to Our Benefactors

We are grateful to generous donors whose major gifts made it possible for us to establish the AERA-Egypt Center: the Waitt Family Foundation, the Ann and Robert H. Lurie Foundation, the Peter Norton Family Foundation, the Charles Simonyi Fund for Arts and Sciences, the David H. Koch Foundation, Dr. Marjorie Fisher, and the Urban Land Institute tour members on behalf of Bruce Ludwig. We thank the Jerde Partnership for the concept design of the new center.



... Back

Double-Decker Dorms

Barrel-vaulted galleries of the Lost City of the Pyramids, proposed by Günter Heindl, with the back wall cut away to reveal the southern chambers, where we found hearths, scorched walls, and ash from cooking, roasting, or baking. We show these possible kitchen rooms open to the sky, but the vaulting may have covered them. If the vaults were covered with a flat roof, here the gallery residents could have processed food, stored fuel, kept small livestock, and slept under the stars on hot summer evenings. Drawing by Wilma Wetterstrom.