



## Enigma of the Pedestals: 2006–2007 Field Season

**E**ver since our marathon of fieldwork from 1999 until 2002, big discoveries jumped from the pages of each newsletter. Every season we added hectares, new neighborhoods, and major structures to the map of this pyramid city. We now have the broad outlines of the settlement and hypotheses about the people who lived here and how they used their buildings, courtyards, and roadways. But some of the features still remain mysterious. During the last three seasons we have refocused on the mysteries of elementary structures, trying to answer the more basic questions of daily life at our site.

Perhaps the most puzzling structures are the curious pedestals we encountered during our very first field season. These squat rectangular bases of clay and fieldstone, about 60 centimeters high, stood in two rows in the center of a structure that we came to call the “Pedestal Building” (photo below). In subsequent field seasons, pedestals turned up in other areas across the site, both in long rows as well as in sets of two to four in small chambers within houses. Like the first ones

we found, nearly all of them were badly eroded on top. However, in 1991 in the southern corridor of the Pedestal Building, we uncovered compartments defined by low, thin, partition walls that we suspected sat on top of pedestals, but that year we ran out of time to excavate further.

When we resumed excavations in the southern corridor during our fall 2006 and winter-spring 2007 field seasons, we discovered a complete pedestal ensemble. The partition walls did indeed stand on top of the pedestals, creating four compartments, each about 60 centimeters wide, straddling the space between two pedestals. At the floor level we were surprised to find four complete pottery jars still in place in front of the slots between the pedestals, leaning inward (see photo, page 3). Called “beer jars,” these porous, hand-made vessels are the second most common type of pottery across our site, after bread molds. Their pointed bottoms sat in the fill of a crude channel, lined with flagstones. We have found similar channels, as well as sockets, for individual jars at the base of pedestals elsewhere on the site.

A workman excavates in the Oven Room. The Pedestal Building, with the pedestals standing in two rows, extends to the south. View to the south. (Photo by Wilma Wetterstrom.)



## A Brewery?

Ever since we first uncovered the pedestals we have wondered about their function. Could they have served as bases for granaries or other storage containers? Could they have been stands where yogurt or butter rested in skin or cloth bags with fluids draining away? Were they used in malting grains for beer? In all our years at Giza we have found no obvious remains of brewing, although it seems certain that the residents of the settlement brewed beer—and in large quantities.

Beer was a staple, along with bread, throughout all periods of ancient Egypt. In tomb scenes and models, baking and brewing are often part of the same production facilities. Bread and beer shared some of the same ingredients and were consumed soon after they were prepared. Ancient Egyptian brews, unlike modern beers, had no preservatives and so had to be used promptly before they spoiled.

Could the pedestals have been used in brewing? We discovered during the 2006–2007 season that the Pedestal Building was part of a larger complex that perhaps included a brewery. Seeing how this complex might have functioned for brewing requires some understanding of ancient Egyptian beer-making. Delwen Samuel worked out the details of New Kingdom brewing by using optical and scanning electron microscopes to study beer dregs from pottery vessels.<sup>1</sup> We do not know if the same techniques were used in the Old Kingdom, but certain steps are basic for making any beer.

## Malting

The first step is to sprout the grain, which in ancient Egypt was barley and emmer wheat. The sprouted grain, called malt, contains enzymes that break down the grain's starches into sugar. During fermentation the sugars are converted into alcohol. To initiate sprouting the grain is steeped in water. Once sprouting has started, the grains are removed from the water, but kept cool and moist and turned every few hours. Home brewers today sometimes use big terra-cotta pots, as the ancient Egyptians may have done as well. One vignette in the scene of a bakery/brewery in the 5<sup>th</sup> Dynasty Tomb of Ty shows a man standing and reaching into a large jar lying horizontally on three supports that keep the vessel level (shown on the right). Scholars believe that this large, horizontal jar was part of a malting assembly, either for wheat<sup>2</sup> or barley.<sup>3</sup>

This brings us to the pedestals. Could they have been the stands where grains germinated in jars? Malting vessels could have rested horizontally over the slots between the pedestals. The curious configuration might have provided a cool, moist environment through evaporative cooling. When water evaporates, it draws energy from the immediate environment and the temperature drops.

Simple evaporative cooling mechanisms have been used since ancient times. The Egyptian ceramic water jar, still used today, cools its contents as moisture evaporates from the surface. In other traditional cultures, people place perishable food or drink in moistened earthen containers to cool them.

The ancient Egyptian malting jars could have maintained a cool interior as a result of moisture evaporating off their surfaces. But this

Right: From the tomb of Ty, Saqqara, west wall, brewing and baking scene. (After L. Épron, 1939, *Le Tombeau de Ti*, Cairo: Institut Français d'Archéologie Orientale.)



Below: Map of the Pedestal Building and the structure to the north.



requires good air circulation since air stops absorbing moisture—and reducing the temperature—once it is saturated. The malting jars, resting over the slots between the pedestals, would have been exposed to air on all sides. They also could have been easily turned.

But what was the function of the jars in front of the pedestals, which seem to be a key element of the assembly? If they were filled with water, they may have helped to keep the immediate environment of the malting jars from becoming too dry, particularly during the



The pedestals in the southern corridor of the Pedestal Building, with jars resting on the floor.

summer when blistering winds would have blown off the desert. Or they may have played a role in keeping the malting jars moist *and* cool. If the jars were filled with water and if the channels along the bases of the pedestals and the slots were wet, moisture would have been drawn from the whole ensemble, with a cooling effect.

Since air circulation was crucial for cooling, the building was probably not completely enclosed. A light mat-work roof forming an open canopy over each of the rows of pedestals would have allowed the prevailing winds to bathe the area with fresh air. During warm months, a canopy would have helped keep the jars cool during the day, particularly if the matting itself were moistened. From about March through October some sort of refrigeration would have been important for cooling the sprouting grains.

### Drying and Milling

The next step in the brewing process is to stop germination by drying the grains. During warm months the grains could have been laid out in the sun to dry, perhaps on the floor of the empty Long Room (see map on facing page). In cooler weather, the malt could perhaps have been dried in the Oven Room, where fires burning in the two ovens warmed the air.

Once dried, the malt could have been used immediately or stored for brewing later. Ancient Egyptians ground the dried, sprouted grains on a quern, which would have made the starches more immediately accessible for enzymatic attack after the malt was put in water. One of the rooms in the complex may have been used for the milling operation. A series of small compartments in the Bin Room could have accommodated a quern and a miller. The bins might also have been used for soaking the grains prior to malting.

### “Cooking” and Fermenting

During the next stage the malt is mixed with hot water and the enzymes begin to break the starches down into sugars. Then the husks and other indigestible components are removed by sieving and the liquid is left to ferment.

At this time we cannot connect these final stages of brewing to any features on our site. However, a good portion of the large complex north of the Pedestal Building and a very ashy area to the south with more ovens remain unexcavated and could well yield brewery installations in the future. At other sites in Egypt, archaeologists have found structures that probably functioned for brewing, so we have some idea of what these facilities might look like: rows of large vats, fire bricks, mud-brick shelters, ash, charcoal, and reddened earth. We would expect to find areas where

vats with malt and water were heated, where the beer was transferred to jars and sealed, and possibly a courtyard where scribes kept track of the beer as it was distributed.

The pedestal series that we have found elsewhere in the settlement are open-air structures. They might have worked as evaporative cooling facilities, possibly with canopies in hot weather. Since the tops of these pedestals are not preserved, there is no evidence of partitions. But since the pedestals include the sockets on the floor, they appear to have functioned in some way similar to the ones in the Pedestal Building.

Was the Pedestal Building a desert refrigerator and malting machine? Perhaps, but we are considering other hypotheses as well.

### Other Mysteries

The Pedestal Building was only one of a large number of projects that we undertook during the 2006–2007 field season, our biggest and busiest yet. In the next issue of *AERAGRAM* we present our work on some of these projects and explore more of the mysteries of everyday life in the Lost City of the Pyramid Builders.

~ Mark Lehner & Wilma Wetterstrom

1. Samuel, Delwen. 1996. Investigation of Ancient Egyptian Baking and Brewing Methods by Correlative Microscopy. *Science* 273 (26 July):488–490. —2000. Brewing and Baking. In *Ancient Egyptian Materials and Technology*, Paul T. Nicholson and Ian Shaw, eds. Cambridge: Cambridge University Press. Pp. 537–576.
2. Faltings, Dina. 1991. Die Bierbrauerei im AR. *Zeitschrift für ägyptische Sprache und Altertumskunde* 118:104–116.
3. Wild, Henri. 1966. Brasserie et panification au tombeau de Ti. *Bulletin de l'Institut Français d'Archéologie Orientale* 64:95–120.

# From Ideas to Reality:

## AERA Patron Charles Simonyi and Director of the Charles Simonyi Fund for Arts and Sciences, Susan Hutchison

*"In the beginning, there was the Word, and then Charles Simonyi created Excel."*

That's a quote from someone who knows him well: domestic mogul Martha Stewart.<sup>1</sup> Charles Simonyi is widely recognized in the tech industry as the father of Microsoft Word and Excel, a visionary, and, according to Bill Gates, "one of the great programmers of all time."<sup>2</sup> He is known worldwide for his generous support of arts and sciences and is now, "by his own admission, 'the first nerd in space.'"<sup>3</sup>

### AERA Patron

In 2004 our friends and supporters, Ed and Kathy Fries, arranged a dinner for Charles to meet Mark Lehner. That meeting would have a profound effect on AERA's future. Afterwards, Charles immediately called the executive director of his charitable fund, Susan Hutchison, and asked her to meet with Mark as soon as possible. The next day, Susan and Mark made plans to get Charles to Giza to see AERA's dig site.

A few weeks later, Susan called Mark to say that Charles was in Europe and could fly down to Giza the next weekend! We quickly made arrangements to meet him in Cairo.

Susan Hutchison, with AERA volunteer Brian Hunt, flew from Seattle to Cairo to join the trip. The next day, Charles, Susan, Mark, and Brian toured the Pyramids and our site (see sidebar). We were sorry that Charles was able to spend only a day with us, but the outcome was a generous grant to fund our new web site ([www.aeraweb.org](http://www.aeraweb.org)), our Geographical Information System (GIS), and a field school for Supreme Council of Antiquities inspectors (see page 9).

### Computer Visionary, Turning Ideas into Reality

It is not difficult to compare Charles Simonyi to the Giza pyramid builders. Building giant



Jacques van Oene and Space Adventures

Charles Simonyi sitting in front of the Soyuz simulator while training in Russia for his 10-day mission to the International Space Station. For the flight his Sokol spacesuit bore several patches, including his personal patch, which read "From Ideas to Reality."

### Giza Tour: Data!

Charles visited Giza in April 2004 primarily to see the vast site we have uncovered, part of the city where the pyramid builders lived and organized their forces. We had just discovered new rooms in the Royal Administrative Building with pots, tools, and other objects. Here, with Charles and Susan, we walked over floors that had not been trod upon in 4,500 years.

We then toured around the base of the Great Sphinx and looked at the engineering of the pyramids. Our last stop was the GPMP field laboratory and storeroom in the cemetery of huge mastaba tombs west of the Khufu Pyramid. Here Charles saw shelves and shelves of cartons and plastic boxes, all labeled with dates, locations, and types of ancient material: chipped stone tools and flakes, mud sealings impressed with hieroglyphs, animal bone, charred plant remains, and objects of everyday life. Charles took out his digital camera and began to take pictures. *Data!*

Charles and Susan lit up as we went from specialist to specialist, listening to team members explain all these classes of material culture. Here, in our field laboratory we have amassed just the kind and volume of data for which Charles programs ways of organizing, manipulating, and analyzing for practical ends. I felt a wave of appreciation as Charles understood, immediately, how all this data from everyday life 4,500 years ago is as monumental in its contribution to science as the Sphinx and Pyramids themselves.

~ Mark Lehner

pyramids changed the infrastructure and organization of Egyptian society just as personal computers have revolutionized the way we live our lives. Now Charles Simonyi is trying to change the way developers write software through the use of “intentional programming.” With “IP,” programmers will not have to write arcane software code in predefined languages. Instead, they will indicate their intentions on a graphical representation of software. Users will also have a chance to help develop software, without any knowledge of code, by annotating representations.

### From Computer Scientist to Astronaut

Born in Budapest, Hungary, Charles earned his BS in engineering mathematics in 1972 at the University of California, Berkeley, and a doctorate in computer science from Stanford University in 1977. From 1972 to 1980 he worked at the Xerox Palo Alto Research Center (PARC), where he created Bravo, the first WYSIWYG (what-you-see-is-what-you-get) text editor, which was also the first modern application for the personal computer.

Simonyi then moved on to the newly emerging Microsoft Corporation, where, over the years, he held the titles of Director of Application Development, Chief Architect, and, most recently, Distinguished Engineer. In 2002 Charles left Microsoft to found Intentional Software Corporation where he is currently President and CEO.

In late 2003 he and Susan established the Charles Simonyi Fund for Arts and Sciences to support arts organizations, science programs, and educational institutions. Major grants have included an inaugural gift of \$10 million to the Seattle Symphony, a \$3 million donation to the Seattle Public Library Foundation, and, to honor his late father, the \$25 million Karoly Simonyi Memorial Endowment Fund at Princeton University’s Institute for Advanced Study.

Before creating his foundation, Charles endowed the Charles Simonyi Professorship in Theoretical Physics in 1997, also at the Institute for Advanced Study, and the Chair for the Public Understanding of Science at Oxford University in 1995.

An avid collector of modern art, Charles is also a classical music enthusiast and a pilot certified to fly jets and helicopters. He has logged more than 2,000 hours of flying time.

On April 7, 2007, from a launch pad in Kazakhstan, Charles flew into space in a Soyuz TMA spacecraft. Two days later the craft docked at the International Space Station, where he spent ten days living and working. On April 21<sup>st</sup> he landed with the crew back in Kazakhstan before returning to Star City, Russia, to begin rehabilitation after the trip. For information about the flight and the blog that Charles kept see **Charles In Space**: [www.charlesinspace.com/](http://www.charlesinspace.com/).

### Running a Foundation

How does a man this busy find time to run a foundation? He leaves that to his longtime friend, Simonyi Fund Executive Director Susan Hutchison. Best known as a distinguished broadcaster in the Pacific Northwest, Susan anchored the highest-rated newscasts in Seattle (CBS affiliate KIRO-TV), receiving numerous awards, including five Emmys for producing, writing, and reporting news and documentaries. She has interviewed such public figures as President Jimmy Carter, Billy Graham, and First Lady Laura Bush.

Susan volunteers her time and talent to many civic and charitable organizations. She serves on the board of the Smithsonian’s Air and Space Museum and was appointed by President Bush this year to the board of the Woodrow Wilson International Center for Scholars in Washington, DC. In Seattle, she serves on the boards of the Children’s Hospital, the Seattle Art Museum, and is chairing the board of the Seattle Symphony. She also emcees charitable auctions and fund-raising dinners for worthy causes throughout western Washington.

All the programs related to Charles’s space experience are directed by Susan, his “mission coordinator.” She oversees his website, as well as all youth initiatives to fulfill another of Dr. Simonyi’s many goals: to inspire kids in space science.

Susan has also been a great friend to AERA. No one could have been more enthusiastic than Susan when she told us that the Simonyi Fund was awarding AERA a grant that would give us new direction and a higher platform of operation. She continues to be generous with her time and counsel in our fund-raising efforts.

Charles and Susan are now taking a leadership position in funding AERA’s plan to build a permanent residence for our field school at Giza (see page 16). We are incredibly fortunate to have the support of these two remarkable individuals who have been helping us turn *our* ideas into reality, as they have for many others. ▲▲▲

1. *New York Daily News*, March 9, 2006.
2. *Technology Review*, January/February 2007, p. 36.
3. BBC News, April 7, 2007 (<http://news.bbc.co.uk/2/hi/science/nature/6529149.stm>)

Simonyi Fund Executive Director Susan Hutchison on a visit to Egypt. Behind Susan is the Mena House Hotel and the Khufu Pyramid.



# “Treasures” from a High-Class Dump by Richard Redding

Trash dumps may not appeal to many people, but they are gold mines to archaeologists. Pottery Mound, located in the midst of the area of the site we call the Western Town, was an exceptionally rich “mine”. In 2005 Yukinori Kawae and Tove Björk excavated two 5 x 5-meter squares in this large midden and uncovered huge quantities of potsherds, bone, charred plant remains, mud sealings, and other trash. From the bone, Dr. Richard Redding, our faunal analyst, recovered a wealth of information about life in this district, including evidence that the residents who used the dump were no ordinary workers. We had suspected that the Western Town was home to high administrators based on the architecture. Many of the homes in the district, including the two adjacent to Pottery Mound, were large, many-roomed compounds, enclosed in thick walls.

**T**he two small excavation squares in Pottery Mound have yielded astounding quantities of pottery, animal bone, and seal impressions. To date, I have examined almost 100,000 bone fragments and that is only about 50% of the material.

The most striking feature of the Pottery Mound collection is the predominance of cattle bone. While in the rest of the Workers’ Town the average ratio of cattle to sheep/goat is 0.4:1, the ratio in the Pottery Mound sample is 14:1. Considering the average young male bull yields eight times as much meat as the average 2-year-old sheep, the ratio of cattle to sheep/goat meat would have been roughly 112:1. Clearly the people who dumped trash here ate very little sheep/goat. Instead, the mainstay of their diet was prime beef, meat from very young animals. I have almost no evidence here of any cow or bull over the age of two years, and most of the animals slaughtered were under 10 months old.

Some of the beef might have been more than prime meat; it could have been from sacrificial animals. The ratio of hind limb to forelimb fragments is 33:1. But we would expect it to be closer to 1:1, so what happened to the forelimbs?

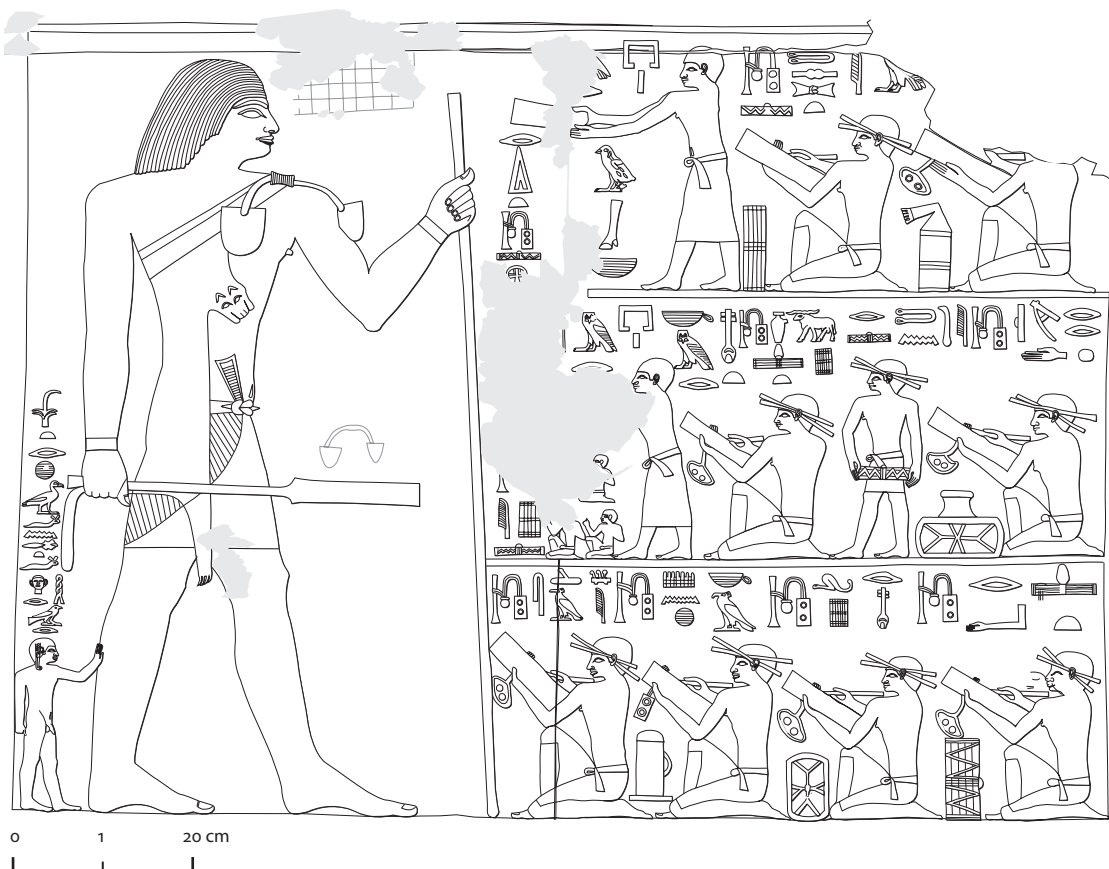
In the slaughter scenes in tombs at Saqqara, cattle are shown lying on the ground with the hind limbs tied and the forelimbs cut off. In the offering scenes I have seen in the tombs of Ty and Mereruka, the cattle parts being carried as offerings are clearly the front legs. Similar offerings of cattle forelimbs appear in upper class tombs on the Giza Plateau as well, such as the one shown on the facing page.<sup>1</sup> It seems likely that the forelimbs of the animals represented at Pottery Mound were used in mortuary rituals and that the leftovers were eaten in the Western Town, suggesting that the diners were high-status people.

Another remarkable find in the Pottery Mound fauna was the evidence of hunting: we found fragments of gazelle, the most desir-



Above: A leopard tooth from Pottery Mound. It could have fallen from the head on a leopard skin garment, like the one shown in the tomb painting on the right. (Photo by Richard Redding.)

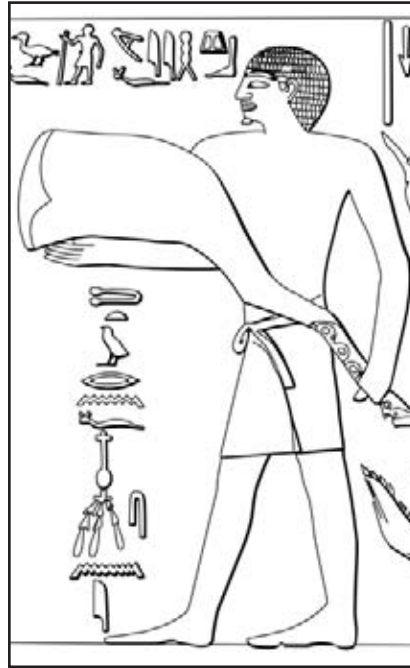
Right: Painting from the north wall of the tomb of Kanisut at Giza (G 2155). (From “Presenting the Scroll: Papyrus Documents in Tomb Scenes of the Old Kingdom,” by Peter Der Manuelian. *Studies in Honor of William Kelly Simpson, vol. 2*, edited by Peter Der Manuelian and Rita E. Freed. Museum of Fine Arts, Boston. 1996:567. Drawing by Dr. Peter Der Manuelian.)



## Why Bother with Bone?

In many areas of the world archaeologists do not study or even collect animal bone, particularly from historic sites, passing it over in favor of other types of material. In our very first season at Giza, however, we made a commitment to save and study all of the animal bone found while excavating the site—and it has paid off. Our work has demonstrated the value of animal bone in developing a deeper and more detailed understanding of the past. On the basis of the faunal remains, we hypothesized that a central authority most likely provisioned food to the majority of the residents, controlling their diet. The meat was not distributed equally among all residents but varied with status, an important indicator of class division. Our recent work on Pottery Mound highlights how valuable animal bone is for “fleshing out” the community that once lived here.

~ Richard Redding




An offering bearer carries a cattle forelimb for provisioning the dead in the afterlife. Detail from the portico of the tomb of Tjetu I, Western Cemetery of Giza (G 2001). (After Norman de Garis Davies's unpublished line drawing on the website of the Giza Archives Project: <http://www.gizapyramids.org/>)

able of the wild mammals—the one with the highest-quality meat. We have found no other evidence of wild mammals at our site, except for Bubal hartebeest, oryx, and addax, which we also recovered elsewhere in the Western Town. So the residents of this district either had preferential access to these hunted resources or they themselves were the hunters. By Old Kingdom times, hunting was probably a ritual or sport activity of elite people, rather than a subsistence pursuit.

Another intriguing discovery in the Pottery Mound sample is two leopard teeth. They may have fallen from leopard-skin garments. Depicted in tomb scenes, leopard-pelt garments were used exclusively in mortuary rituals. They were worn by the *sem* priest, a high-ranking individual—often the tomb owner's son—who performed the offering rituals. The leopard's head was frequently left attached to the pelt, as shown in the tomb of Kaninisut at Giza, on the left.<sup>1</sup>

The Pottery Mound faunal remains are remarkable for the several lines of evidence they offer about an elite class of residents, of people with special prerogatives. Without the faunal remains, the only evidence of this would have been the seal impressions and the sizes of the houses and their rooms. The fauna give us a much more

nuanced picture of the residents of the town. The overwhelming quantities of cattle and the wild mammal bone suggest that the residents ate the best meat available, and the traces of gazelle indicate the residents may also have hunted, an elite activity. Finally, the leopard teeth might have come from a pelt garment owned by a high-ranking individual who performed burial rituals. These remains from Pottery Mound give us a more complete and complex picture of the daily life of the high-ranking people whose trash was dumped here. 

1. Thanks to Dr. Peter Der Manuelian of the Museum of Fine Arts, Boston, for the Kaninisut drawing and for advice on the funerary ritual evidence.

*Dr. Richard Redding is based at the University of Michigan where he teaches in the Anthropology Department and serves as a curator in the Museum of Anthropology. He has done field work in Egypt, Iran, Turkey, China, Greece, Armenia, Georgia, and Kenya.*

East-west Pottery Mound section bursting with potsherds, bone, sealings, and other trash.



# In Memoriam: George Link, AERA Friend and Counsel by Mark Lehner

One hot spring day in 1985, George Link showed up at Giza with his wife, Betsy, and their twin boys, Thomas and Christopher. They came to meet me on referral from Bruce Ludwig, their Los Angeles neighbor and colleague. I had just begun the Giza Plateau Mapping Project the year before, and we had incorporated AERA within the current year. The Links had time only for lunch and a tour of the Great Pyramid, a quick but important visit. George, managing partner of a prestigious law firm, was so impressed by what we proposed to do at Giza that he offered his legal counsel *pro bono* for the very fledgling AERA, Inc. "Probably the most expensive tour of the Pyramid ever taken," he wryly commented later that year in his LA office as I gladly took him up on his offer.

That meeting set the stage for the next 21 years, when George not only took on our legal interests, but also became a member of our Board of Directors and a good friend. We were deeply saddened to hear of his passing this December, after a battle with lung cancer.

George was one of the most eminently qualified people to help us with legal matters. After studying at Harvard Law School in the 1960s, he joined the firm of Brobeck, Phleger, & Harrison, based in San Francisco, and became partner in 1970. He was the managing partner of its Los Angeles office from 1976 to 1992, and the managing general partner of the entire firm from 1992 to 1996. He remained a partner until he retired in 2001.

George established our legal beginnings. He was the first to guide us through policy as we grew and was always a dedicated Board member. In recent years George introduced us to Douglas Rawles, now with the Los Angeles firm Morgan, Lewis, & Bockius LLP, to whom we are grateful for continued counsel.

In spite of failing health in his last year, George worked for our interests right up until the end. In November of 2006 we held our annual Board meeting in Egypt, which George had hoped to attend. Though he could not be there, he participated by email and was still sending suggestions and advice

to me through early December regarding our plans to build a permanent home for our project in Giza. This was just two weeks before he passed away.

In addition to being a prominent lawyer, George was active in many organizations and had wide-ranging interests. Having grown up on a ranch, he never lost his interest in the land; in Napa County he owned a vineyard for a time and later a cattle ranch. In Ventura County, he grew avocados and Valencia oranges. Another enduring interest was history, which George studied in college. It was this interest that brought George to Egypt, and to the GPMP, in 1985.

George was a great help in advancing our mission in Egypt. He helped guide us as we evolved from a small excavation to one of the largest archaeological projects in Egypt that includes the educational and cultural exchange of our field school.

Considering George's long list of philanthropic and volunteer activities, we are especially grateful to have had his interest, support, and enthusiasm for more than two decades. He was a great friend and lasting influence.

George is sincerely missed. ▲▲▲



© 1992 Atkinson Business Photography

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## George Link Memorial Video Project

George chose AERA as one of the charitable causes to which friends could donate in his memory. To honor George's commitment to AERA, we used donations received in his memory to begin the George Link Legacy Project during our 2007 field season. Fellow board member Matthew McCauley and videographer Rian Flynn began producing a high-resolution video record of my thirty years' experience and knowledge of the Giza Pyramids and the surrounding site. ~ M. L.

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## Donors Who Contributed in Memory of George Link

Bruce & Carolyn Ludwig  
Matthew McCauley  
Rue Byars  
The Clyne Living Trust  
Michael and Janet Fourticq  
Mrs. J. Thomas McCarthy  
Kenneth M. Meyer & Kathleen D. Reich  
June Sapiro  
David & Janet Watts  
Madge & Laird Facey  
Lois & Sam Golden  
Vicki & Mark Silverman  
Loraine Sinskey





Excavation students prepare field drawings of the Pedestal Building. Left to right: El-Said Abd el-Fattah Amin, Rabea Eissa Mohamed Hassan, Ahmed Mohamed Said el-Laithy, and Susan Subhi Azeer.

## The Future of Egypt's Past: The 2006 AERA/ARCE Advanced Field School

When we launched our first Field School for SCA (Supreme Council of Antiquities) Inspectors in 2005, our goal was to offer rigorous training in standard archaeological practice (see AERA-GRAM 8/1 and [www.aeraweb.org](http://www.aeraweb.org)). Archaeologists come from a tradition of “Renaissance person.” To run excavations they must know how to survey; produce scientific illustrations of objects and inscriptions; sample and analyze pottery, chipped stone tools, ancient animal bone, and plant remains. They must also know how to write an interpretative report based on all this information. To master these skills, once the basic concepts have been grasped, one must practice. Thus we launched the Advanced Field School in 2006.

Our Beginners Field School covered a broad range of subjects, while emphasizing basic excavation and recording techniques. Our Advanced Field School offered greater depth in five areas: excavation, survey, illustration, osteology, and ceramics—areas that are particularly crucial in Egyptian archaeology. Each of our students concentrated in one specialty, while also attending lectures and tutorials on conservation and archaeological ceramics from all periods of Egyptian history. They also received training in photography, archaeobotany, and archaeozoology.

Advanced Field School students were integrated into our regular season, as during the first Beginners Field School. Each team made

substantial contributions to our ongoing research program with the squares they excavated and recorded (see photo above), the burials they dug and studied, the areas they surveyed and mapped, and the ceramic collections they illustrated and analyzed. While AERA benefited directly from their work, our ultimate goal was to invest in all Egyptian archaeology. With well-trained SCA archaeologists throughout Egypt, archaeological sites and all the information that they might yield will be properly studied and protected.

Our instructors were impressed with the dedication of the students. Jessica Kaiser, who directed the osteology concentration, wrote:

All of the students came to the course with an enthusiasm and thirst for knowledge seldom seen, and... they all exceeded my expectations in every way... I hope every instructor gets to teach such a committed group of students... I feel privileged to have experienced it myself.

Advanced Field School students have gone on to put their new skills and knowledge to work. Six became instructors in our second Beginners Field School (February–March 2007). A team of Advanced Field School graduates is excavating an Archaic Period cemetery at Abydos. Four are working on excavations in Luxor connected with developing sites for tourism. And some of our graduates are now the first specialists in their fields in the history of the SCA. We will be counting on all of them to help safeguard Egypt's past.

### 2006 ADVANCED FIELD SCHOOL

Co-directors: Ana Tavares and Mohsen Kamel

#### EXCAVATION

Instructors: James Taylor, Mike House, and Ashraf Abd el-Aziz

Students:

Ahmed Mohamed Said el-Laithy  
Amira Fawzy Ahmed  
El-Said Abd el-Fattah Amin  
Essam Mohamed Shehab  
Hamada Mohamed Abd el-Moaeen Kellaw  
Rabea Eissa Mohamed Hassan  
Susan Subhi Azeer  
Noha Ismael Sadek

#### OSTEOLOGY

Instructors: Jessica Kaiser and Tove Björk

Students:

Afaf Wahba Abd el-Salam Wahba  
Ahmed Mohammed Gabr  
Mahmoud Salem Ghanem Salem  
Mahmoud Aly Abd el-Rahman  
Sameh Abd el-Wahed Abd el-Aziz  
Amira el-Morsy Abd al-Ghany  
Zianab Hashish

#### SURVEY

Instructors: Ana Tavares and Afifi Rohaim

Students:

El-Tayeb Mohamed Khodary  
Heba Tallah Abd el-Baset  
Mohamed Abdel el-Baset Mohamed  
Mohamed Hatem Ali Soliman  
Salah el-Masekh Ahmed

#### CERAMICS

Instructors: Anna Wodzińska and Mariola Orzechowska

Students:

Ayman Mohamed Ibrahim  
Fatima Ragab Kamel el-Khayat  
Maha Ahmed Fathi  
Mohamed Ali Abdel-Hakim Ismail  
Mohamed Hassan Hiekal  
Shimaa Rasheed Salem  
Sherif Mohamed Abd el-Monem

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### Acknowledgements

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# Mapping Khentkawes

by Yukinori Kawae

The very genesis of the Giza Plateau Mapping Project (GPMP) was a quest to understand how the landform of the entire plateau related to the development of the sprawling Giza Necropolis. Mapping is a main focus of our work at Giza and an indispensable tool for understanding and analyzing any archaeological footprint.

This past season we set a powerful new technology, 3-D laser scanning, to the task of mapping on the plateau. Laser scanning equipment uses microwave or infrared signals to gather the coordinates and elevation of a point on a monument, amassing data at the blindingly fast rate of 10,000 points per second. The product is a “point cloud” of the subject.

Quite different from traditional line drawing, laser scanning provides minimal interpretation of the raw data. We capture sites as they really are: monuments, strata, traces of erosion, modern activity, and even wind-blown sand. This raw data forms the basis for further analysis and enables us to produce extremely detailed 3-D representations and orthophotographs (photos without distortion) of plans and sections, as well as monitor the long-term deterioration of our most important monuments.

We established the Giza Laser Scanning Survey (GLSS) team with a Japanese consortium to scan the tomb of Queen Khentkawes [1].



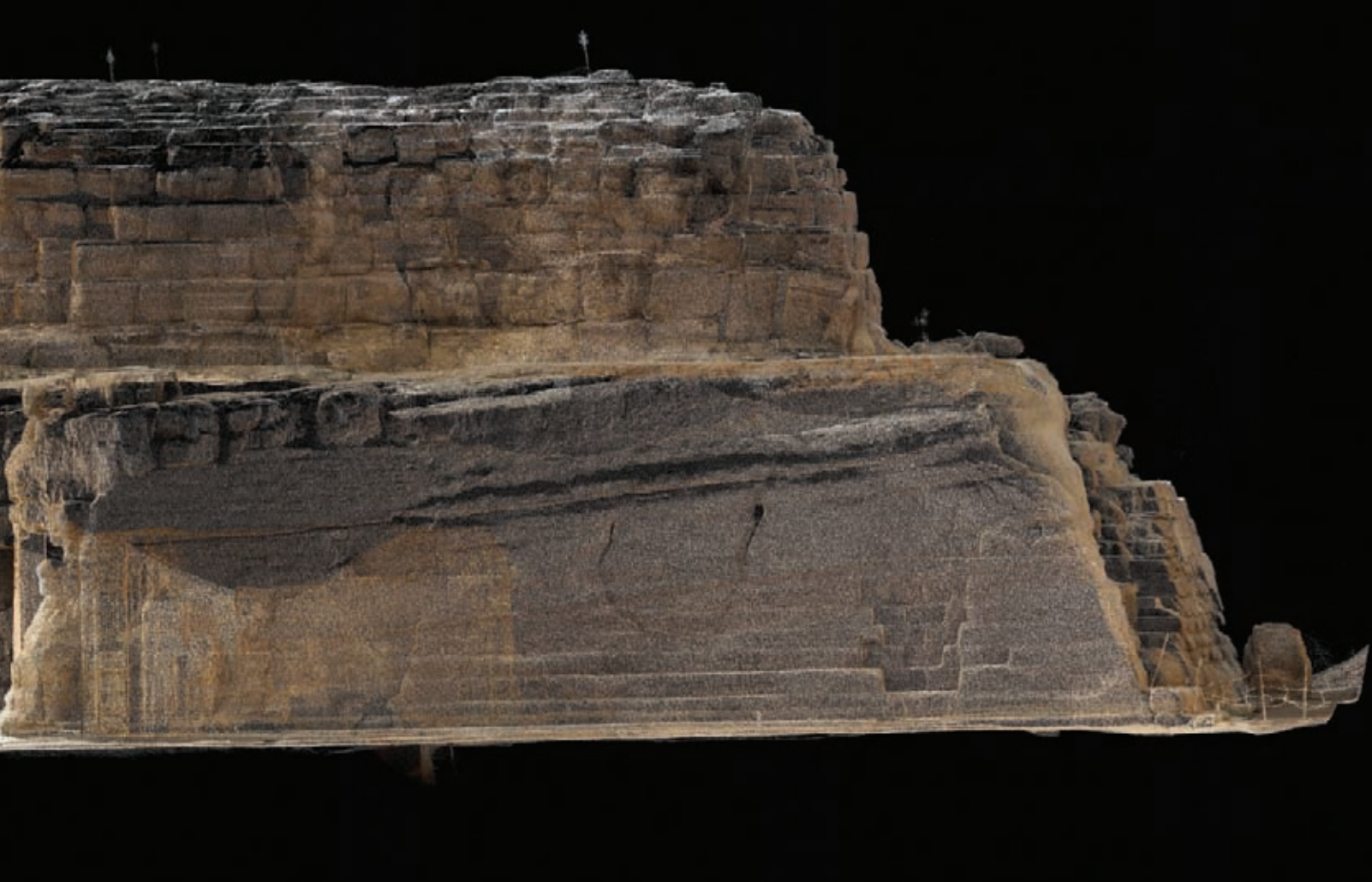
Wilma Wetterstrom

## Khentkawes

Queen Khentkawes [1] is a mysterious figure, having the ambiguous title of *mwyt-nyšwt-bity-nyšwt-bity* or *nyšwt-bity mwyt-nyšwt-bity* which, depending on interpretation, means either “mother of two Kings of Upper and Lower Egypt” or “King of Upper and Lower Egypt and mother of the King of Upper and Lower Egypt.”<sup>1</sup> She may have reigned over Egypt for a short time after Menkaure or his successor, Shepseskaf, at the end of the 4th Dynasty. Her tomb stands at the southeast of the plateau, near the Central Field of the Giza cemeteries and the Central Wadi.

The GLSS team focused on Khentkawes’ giant mastaba tomb, which is composed of two parts: a base cut from the natural limestone bedrock, 45.5 x 45.8 meters and 10.0 meters high, and a superstructure rising in eleven courses of limestone blocks to a height of 7.5 meters.

Using two laser scanners (a Riegl LMS-Z420i and a Riegl LPM-25-HA) and one laser range finder (a Konica Minolta Vivid 910), the GLSS team worked for two weeks to capture the monument and produce the first detailed archaeological images of this unusual tomb. The Egyptian archaeologist Selim Hassan excavated the base of the monu-



Above: A point cloud image of the eastern elevation of the Khentkawes tomb produced with the Riegler LMS-Z420i laser scanner. The interior room of the chapel shows faintly through the exterior.

Left: Khentkawes monument, eastern facade, with Khafre's pyramid on the right and Menkaure's pyramid to the left. View to the west.

ment in 1932-33 and published a 1:200 schematic map.<sup>2</sup> Maragioglio and Rinaldi also studied the architecture of the tomb.<sup>3</sup> Their plans and sections are the only ones to date that show the architectural details and include specific measurements.

### Methodology

There are two steps to producing 3-D models using laser scanning: modeling and rendering. Modeling converts a subject (e.g. a monument) into numerical data. Rendering uses that data to produce a digital image of the subject.

As archaeologists we are trained to focus on artifacts created by humans, but a laser scanning device makes no distinction between anthropogenic and natural features. The dense cloud of points is raw data, which is assembled into a neutral image. It is the archaeologists' responsibility to clearly convey their goals to the laser scanning specialists, who then determine the accuracy of modeling and the method of rendering.

The GLSS wanted to produce 1:50 scale orthophotographic images of a plan and sections of the monument from a 3-D model. Our goal was to generate images that showed details, such as the trenches on

the top of the southwestern part of the bedrock, the masonry of the superstructure stone-by-stone, and each casing stone laid against the bedrock base.

Atsushi Okamoto (long-range laser scanning specialist), Ichiro Kanaya (middle-range laser scanning specialist), and Toshio Tsukamoto (short-range laser scanning specialist) used different devices according to the accuracy required and the measurement ranges.

### Modeling

We scanned the monument section-by-section and eventually integrated the scanned surfaces into a single 3-D model. With the long-range scanner, Okamoto scanned the exterior of the monument from 55 positions including the surrounding landscape between the Maadi Formation and the bedrock outcrop immediately to the north of the superstructure of the Khentkawes tomb. The scan included all exterior structures with color information obtained by a digital camera, a Nikon D100, with the exception of two areas that were inaccessible for the scanner.

Using the middle-range (2.0 to 60.0 meters) laser scanner, Kanaya measured the inside of the tomb, including the inner and outer chapels, the sloping passage, the burial chamber, and the magazines. He also captured specific archaeological features, such as the recesses in the interior passage and chapel.

Unlike other scanners that use infrared technology, the short-range laser devices produce data using triangulation to measure the distance

to a subject. They require ambient lighting conditions of 500 lux or less (1 lux = 1 lumen per square meter), which is about the brightness at sunrise or sunset. Thus the team normally worked during early morning hours.

### Rendering/Data Processing

After scanning section-by-section, we integrated the data into a single model.

First, we aligned the positions of all the scanned point-clouds precisely by using the laser markers that we had distributed on the monument. We fine-tuned their alignment using an ICP (Iterative Closest Point) algorithm, which is widely employed for geometric alignment of 3-D models, and then merged them into a single point-cloud model. Duplicated points and noise were eliminated. Finally, color information from the digital camera was added to improve visualization.

### Production of Raw Data

Archaeology is interpretation. A line drawing presents only one way of interpreting a site, as a line only traces the outline of an architectural element. When a monument is drawn in relation to its surrounding landscape, contour and strata information are also drawn. If we monitor the long-term deterioration of a site, we concentrate specifically on weathered areas. Laser scanning, on the other hand, gathers raw data in point-cloud form, with coordinates and elevations (based on the world standard UTM32 system). Devoid of interpretation, this raw data includes all the information that we need to interpret a site, not just as a line drawing or for long-term monitoring, but in many other ways. For example, we could export the data to ArcGIS software for understanding a spacial configuration of the Giza Plateau and other sites in Egypt. Or we could export to AutoCAD to calculate the volume of the masonry structure.

### Recording and Conserving Archaeology in the Future

Furthermore, laser scanning of hieroglyphic inscriptions and reliefs, many of which currently are deteriorating beyond rescue, could also play an important role in Egyptian archaeology. Dr. Peter Der



Yukinori Kawae

Toshio Tsukamoto (left) uses a laser range finder to scan a fragment of the northern false door in the inner chapel. Hiroyuki Kouda mans the computer to check the scanned image. Tsukamoto used the laser range finder for other subjects which also required scanning in detail, such as the famous Khentkawes title, Khentkawes' image on the pink granite doorjambs, and a false door in the inner chapel.

Manuelian, of the Giza Archives Project and Museum of Fine Arts, Boston, advocates introducing digital epigraphy to Egyptian archaeology as “facsimile conservation” of the monuments.<sup>4</sup> Laser scanning can take this a step further. The production of 3-D representations of ancient remains can not only be applied to digital epigraphy, but can also facilitate long-term monitoring and, interestingly, the production of 3-D replicas. For these reasons 3-D laser-scanned data could take a leading role in recording archaeology in the near future. ▲▲▲

1. Translation and transliteration by John Nolan. See also: Dodson, Aidan, and Dyan Hilton. 2004. *The Complete Royal Families of Ancient Egypt*. London: Thames & Hudson, p. 62.
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4. Peter Der Manuelian. 1998. Digital Epigraphy: An Approach to Streamlining Egyptological Epigraphic Method. *Journal of the American Research Center in Egypt* 35: 97-113.

Yukinori Kawae has worked as archaeologist and photographer for the Giza Plateau Mapping Project since 2004. He graduated from the American University in Cairo and has lived in Cairo for the last 16 years.

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## AERAGRAM

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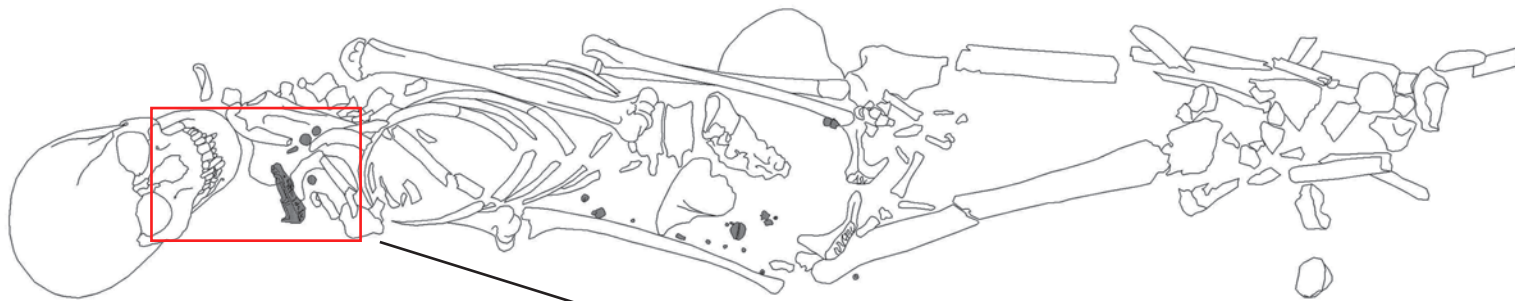
Dr. Richard Redding, Michigan Museum of Natural History

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## Thanks to Our Colleagues

For a very successful 2006 season we are grateful to Dr. Zahi Hawass, Undersecretary of State and Secretary General of the Supreme Council of Antiquities (SCA). We thank Sabry Abd al-Aziz, General Director of Pharaonic Monuments; Atef Abu El-Dahab, Director of Upper Egypt Pharaonic Monuments; Kamal Wahied, General Director of Giza Pyramids; Ala El-Shahat, Director of Giza Pyramids; Mohammed Shiha, Chief Inspector of Giza Pyramids. We thank Magdi Ghandour, Director of the Foreign Missions Department, and Shaaban Abdel Gawad for their assistance. We also thank Ashraf Abd el-Aziz, Ossama Hamed, and Ahmed Eiz for being our SCA inspectors.

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# A Girl and Her Goddess

by Marie-Astrid Calmettes and Jessica Kaiser

**T**wo thousand years after the pyramid builders abandoned their pyramid town, Late Period villagers in the area buried their dead in the sands covering the ancient settlement. They interred the first burials high up on the slope along the western edge of our site. Here, in 2005, osteologists Jessica Kaiser and Tom Westlin, along with students enrolled in the ARCE (American Research Center in Egypt)/AERA Field School for SCA inspectors, excavated 11 burials. A few of these skeletons were adorned with beads and amulets of deities to protect them in the afterlife. One of the richest and most interesting of this group was that of a young woman, about 16 to 20 years old, who was buried with the amulet of a little-known goddess named Hatmehyt, of the Egyptian Delta town of Mendes. The woman may have been an unusual burial here since her ancestors might have come from central Europe.

Ceramics from the 25<sup>th</sup> Dynasty (ca. 760–653 BCE) accompanied a number of the burials on the slope. Although the young woman was not interred with pottery, it is likely that her grave (Burial 407) and all of the others here date from the same period. They all appear to have been dug into the ground from the same level, and they are in close proximity without truncating one another, suggesting that this part of the cemetery was in use for a limited time only.

## Illness and Death

During her short life, health problems plagued this young woman as indicated by lesions on her bones. Lines in the enamel of her teeth (enamel hypoplasia) suggest that she was seriously ill during early childhood when the affected teeth were formed. She survived this incident, but severe pitting in the roofs of her eye sockets (cribra orbitalia) tells us that she probably suffered from iron deficiency anemia at the time of her death. Finally, marks on the bones around the ear canals point to a severe ear infection (mastoiditis). This may have been what killed her, since complications from ear infections were often fatal before the introduction of antibiotics.

## Unusual Origins

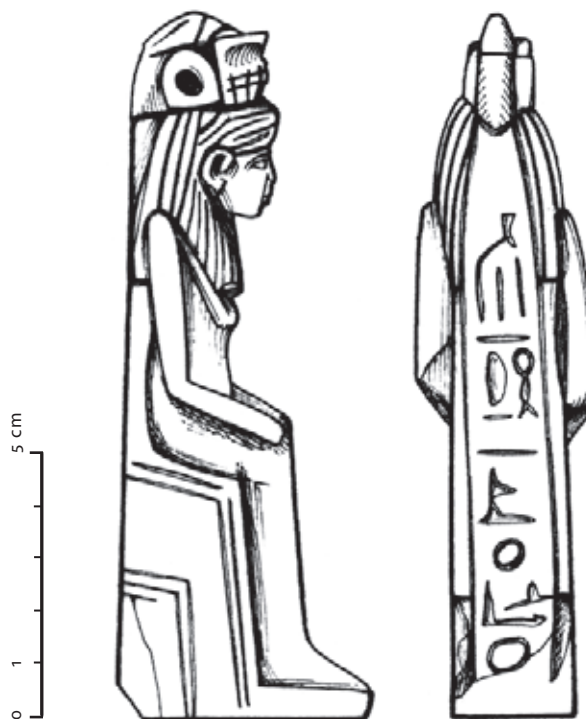
We carried out a craniometric analysis on her skull, and the results suggest that the woman's genetic origins lie outside of northeast-



Jessica Kaiser

Top: Drawing of Burial 407. A young woman interred during the 25<sup>th</sup> Dynasty with a collar of beads and an amulet of Hatmehyt. (Drawing by Johnny Karlsson.) The red rectangle indicates the area shown in the photo above. The amulet was found next to the woman's shoulder and was originally attached to a bead collar.

Below: The Hatmehyt amulet, side and back views. (Drawing by Will Schenk.)



ern Africa. We found that she may have been of central European descent based on *FORDISC*.<sup>1</sup> This very useful forensic anthropology



Yukinori Kawae

The Hatmehyt amulet

### Hatmehyt: A Goddess Identified

The girl's faience amulet, about 13 centimeters high, was originally attached to a bead collar. Initially we thought the amulet represented Isis, a very powerful and important mother-goddess of late Egyptian history, but closer inspection proved otherwise. Although the hieroglyph carved into our amulet is difficult to read and cannot be used to identify her, the goddess bears a key indicator of Hatmehyt: she wears a headdress topped by a fish, an indication that this is the goddess known as "Foremost of the Fishes."

Hatmehyt was a local deity of Mendes, in the 16<sup>th</sup> nome (district) of Lower Egypt. The goddess is often shown seated on a throne with a headdress comprised of a fish and sometimes with criss-crossed incised lines, perhaps to indicate water. In the case of our amulet, the tail of the fish was long, going down the back of the goddess's head and then curling up to create a loop for attaching the amulet to a necklace. Occasionally Hatmehyt appears to be depicted solely as a fish, as with some amulets in the British Museum described by Egyptologist W. M. Flinders Petrie, but her identity is more secure when she takes the form of a woman with a fish headdress, as in the case of our specimen.

computer program compares cranial measurements from the skull in question with the populations in its extensive database. Using statistical analyses, it then estimates the probability that the skull belongs to one of these populations. We cannot be absolutely sure about the girl's heritage; with very few well-preserved skulls among our burial remains we do not know the full range of variation. However, the FORDISC database includes both Egyptian (Saite) and sub-Saharan crania, and Burial 407 was nowhere close to either of these groups. She plotted closest to a central European population.

How would a non-Egyptian girl end up buried at Giza? Her amulet and its tie to Mendes may be the key. This Delta town was a major trading port between the 7<sup>th</sup> and 3<sup>rd</sup> centuries BC, trading mainly perfume and wine in the eastern Mediterranean area, especially with Greece and Phoenicia. During the Late Period, Mendes had immigrant colonies.


### Who Was Hatmehyt?

Unfortunately, very little is known about Hatmehyt from texts. She seems to have been a minor goddess, important in Mendes but perhaps not beyond it. The earliest documented appearance of this goddess dates to the 21<sup>st</sup> Dynasty, but she may date from earlier periods. Her epithet, "Foremost of the Fishes," is known from the Old Kingdom in the geographical processions in which rows of nome deities offer the products of their nome to the gods. But the name "Hatmehyt" is not known before the Ramesside period (19<sup>th</sup> and 20<sup>th</sup> Dynasties).

### A Leaping Fish

Richard Redding, our faunal analyst, identified the fish on the head of our amulet as most likely the schilbe, probably *Schilbe mystus*, a very common fish in the Delta and the sacred fish of Mendes. In later periods the Hatmehyt icon became a dolphin.

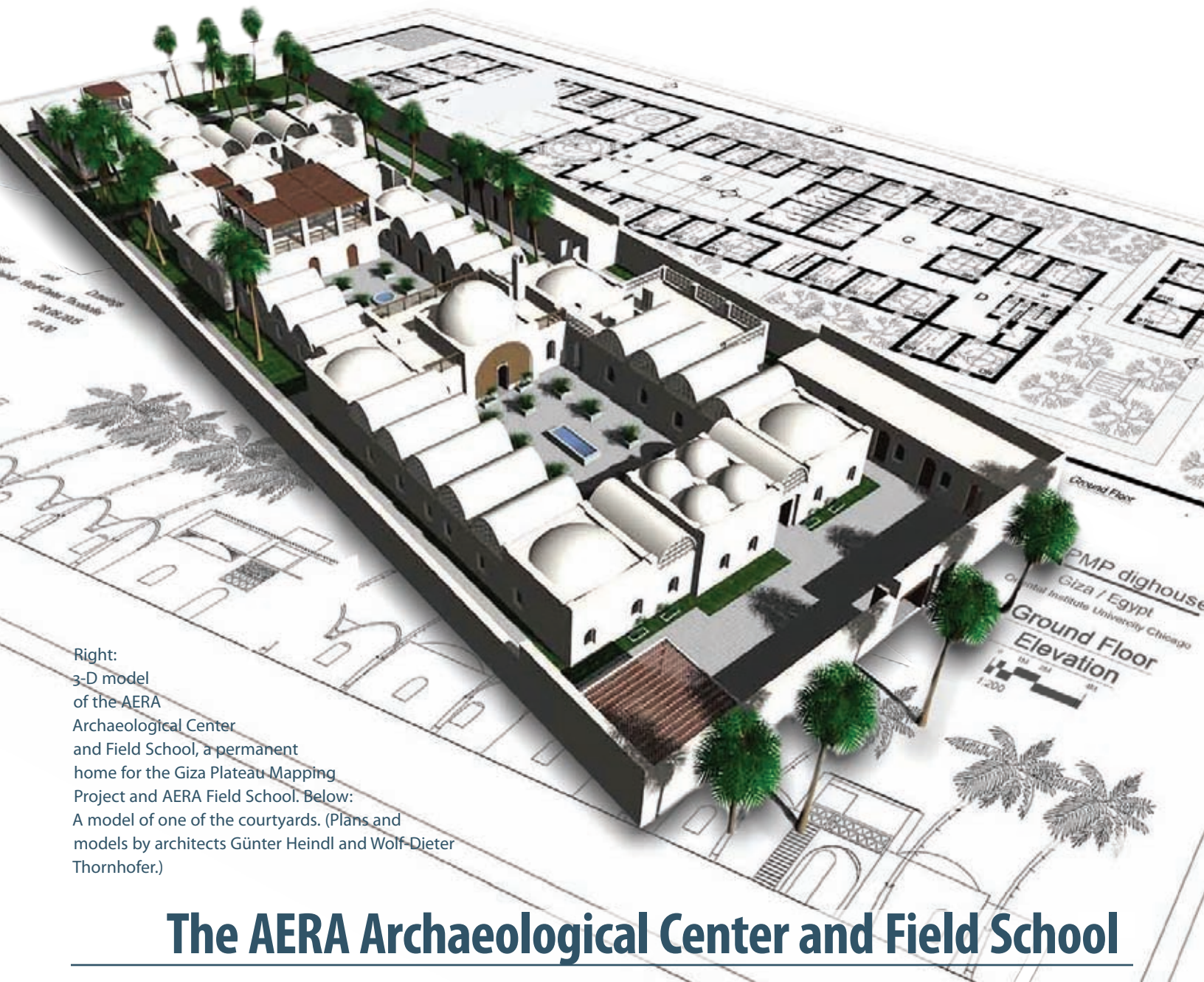
Egyptians buried their dead with amulets of deities to ensure that the god or goddess would protect them in the afterlife. Hatmehyt may have been selected for Burial 407 for a couple of reasons. The schilbe was said to be "in front" of other fish; that is, it swims faster and even jumps over the surface of the water. According to Richard the schilbe feeds on or near the surface and so would frequently be seen at, and jumping from, the surface. The dead would have to cross the waters of the underworld on their journey to the afterlife, so the Hatmehyt amulet would offer protection during this part of the journey. In addition, in some texts a fish helped search for parts of Osiris' body after he was dismembered in the myth of Osiris and Seth. Osiris, of course, as the God of the Dead, was a deity whom the deceased would meet at the conclusion of her journey through the underworld.

The burials from the Late Period are not part of our main focus, the 4<sup>th</sup> Dynasty occupation. But they are an important chapter in the history of Giza and are a significant addition to the poorly known bioanthropology of Late Period populations. The young woman in Burial 407 is an exceptional discovery with her possible connections to the Delta and central Europe and her unusual amulet of an obscure goddess who helped escort her to the afterworld. 

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*Marie-Astrid Calmettes is an Egyptologist and has worked with AERA since 2004. She worked with the Université Libre de Bruxelles, Belgium, and is now pursuing a PhD there. She also teaches Egyptian religion at the Kheops Institute in Paris.*

*Jessica Kaiser joined AERA in 2000 as project osteologist. She has been the osteology team supervisor since 2002 and is currently working on a PhD in Egyptian Archaeology and Osteology at the Department of Near Eastern Studies, University of California, Berkeley.*



Right:  
3-D model  
of the AERA  
Archaeological Center  
and Field School, a permanent  
home for the Giza Plateau Mapping  
Project and AERA Field School. Below:  
A model of one of the courtyards. (Plans and  
models by architects Günter Heindl and Wolf-Dieter  
Thornhofer.)

## The AERA Archaeological Center and Field School



In 2006 we launched a campaign to build a permanent home for the Giza Plateau Mapping Project and the AERA Field School. The Ann and Robert H. Lurie Foundation provided us with a \$500,000 challenge grant for acquiring land and building near the Giza Plateau (plans and model shown on this page and on page 19).

The Lurie Challenge provides a 1:1 match of each donation of \$50,000 or more. Since mid-2006 we have been making steady progress toward raising these funds and currently we have \$750,000 in hand or pledged towards our goal of \$2,750,000.

It will be our privilege and honor to name the key components of our center after those patrons who contribute significantly toward our capital campaign. For their extraordinary challenge grant the Lurie Foundation will have the opportunity to name the Archaeological Center and Field School. For their generous gift to our center we reserve for the Waitt Family Foundation the choice of a name for the first quadrangle, which houses the library, archives, study rooms, and dining hall. For their extraordinary help with our capital campaign we have invited the Simonyi Fund for the Arts and



Sciences to name the permanent administrative center, which will house senior team members and additional research facilities.

### The Need for a Permanent Home

AERA is uniquely placed to make a major difference to the future of Egyptian archaeology. Through its large-scale excavations, field school, conservation program, and sub-projects, AERA's Giza Plateau Mapping Project has evolved into one of the largest archaeological missions working in Egypt today. It is essential that we build a permanent facility to carry this work into the future.

The permanent center will enable a much more efficient use of our time and resources. Like many archaeological expeditions, we live like nomads, setting up and breaking "camp" from one season to another. With no single space large enough for our entire team, we set up camp on rented properties: an eight-bedroom villa, three apartments, and three floors of a modest hotel. We jury-rig these spaces into temporary group living and work areas. At the end of the season, everything must be packed up and stored again in other rented space.

Establishing a permanent facility will provide:

- ◆ More time for archaeology and research
- ◆ More time for teaching the AERA Field School
- ◆ Better protection of, and longer life for, equipment and archives
- ◆ Rapid availability of computer systems year-around
- ◆ Greater team collaboration and sociability

Field School students now have to be housed in a hotel, isolated from the regular GPMP team. Bringing the team and the field school students together is one of the strongest motivations for building our own center. The AERA Archaeological Center and Field School will enable the archaeological team, specialists, field school students, and management to live in one location, improving communications and interactions. It will provide a permanent working space, library and archive, lecture facilities, and laboratories for ceramic, osteology, and GIS, in addition to equipment availability at all times.

The center will feature traditional Egyptian architectural elements, well adapted to the climate. The plan (shown on page 19 and facing page) includes three modular quadrangles and a villa/administrative building. This modular design will allow us to build block-by-block, as funding permits.

We selected architect/archaeologist Günter Heindl to draw up the plans. Heindl has extensive experience in dig-house design, construction, and traditional mudbrick architecture in Egypt. Currently he oversees the restoration of ancient mudbrick buildings at our site. Heindl and Wolf-Dieter Thornhofer, a practicing architect in Germany with experience in Egypt, prepared plans, sections, and 3-D views. An Egyptian architect will prepare the plans to meet the specifications for submission to the Egyptian authorities.

### The Land

Since 2005 we have researched available land for the AERA Archaeological Center and Field School. We plan to purchase the land, rather

## GPMP Current Field Needs

Each season we set up:

- ✓ Sleeping quarters for up to 37 regular team members and as many field school staff and students
- ✓ A catering service to provide lunch to 65 people on site and another 30 at our rented villa
- ✓ A dining hall and kitchen serving dinner to 80 people
- ✓ A library and archive growing to hundreds of volumes of published books and bound hard copies of data and reports
- ✓ An equipment depot for surveyors levels, total stations, computers and hard drives
- ✓ Supply magazines for dry goods, bottled water, toilet paper, soap, and other sundries
- ✓ A GIS laboratory
- ✓ A video editing station
- ✓ An office and drafting work stations
- ✓ A storeroom for equipment used in the analysis of material culture, including scientific balances, three microscopes, and x-ray diffraction and x-ray fluorescence equipment.



**The Double Life of the Villa Dining Room:** Since 1991 we have rented a villa with a gracious living room and dining room. As the team grew, we began using these spaces for multiple functions. The living room became a dining area after we turned the original dining room into an office/library/archives. The top photo shows our November 2006 Thanksgiving dinner in the former living room. Between meals the large table becomes a work area. In the lower photo the Geophysical Survey team works at the table in the evening (fall 2006). But all materials must be removed before the next meal is served. In the background, the GIS team is fortunate to have its own "office," but they work with the noise and distraction from a large central common area. A video editing station and a drafting station also share the dining room.

than lease for long-term, in order to have greater independence, ownership, and flexibility.

Building costs are relatively low in Egypt, but real estate prices rise near the Pyramids and nearby urban Giza. We researched many options in an arc from northwest to southeast of the Giza Plateau (map on the right). We settled on two adjacent parcels totalling about three feddans (3.11 acres) bordering desert and cultivation.

Because they were about 20 minutes south of the Pyramids and the surrounding land is as yet undeveloped, these two parcels were \$850,000—within reach of our budget and the donations that had been pledged for our capital campaign by late 2006. However, we learned that these plots are zoned agricultural; construction is prohibited on agricultural land and foreign ownership is limited to small plots.

By mid-2007, we realized we needed to adjust the goals of our capital campaign if we were to purchase land that is within the limitations of foreign ownership, yet large enough for our center and near the Pyramids (we require about one feddan, 1.04 acres). In this location, the cost of non-agricultural land is between \$1.8 and \$2 million per feddan and rapidly rising.

To help with the intricacies of buying land in Egypt we retained the legal firm of Zaki Hashem and Associates on referral from board members and administrators of the American University in Cairo. The Hashem group includes specialists in Egyptian land law.

### AERA Archaeological Center and Field School

The contributions we received from mid-2006 to mid-2007 toward our capital campaign, totalling \$750,000 pledged or in-hand, have put us well on our way to our goal. We are now raising the \$2 million we still need to purchase land and build the AERA Archaeological Center and Field School.

This permanent home will transform the Giza Plateau Mapping Project from a seasonal archaeological endeavor to a permanent, more effective presence in Egyptian archaeology. In addition to running our regular field seasons, we will be able to host team members during off-season months for writing and work in the labs, library, archive, and



Satellite image of the area where we are looking for land upon which to build the AERA Archaeological Center and Field School.

storeroom. As part of our cultural exchange and educational mission, the center will be a resource for our field school graduates and other Egyptian archaeologists. We will also open our doors to other scholars working in Egypt.

We expect the AERA Archaeological Center and Field School to eventually become an intellectual center for archaeology, leading the way with cutting-edge technology and creative thought and insights into the development of ancient Egyptian society and broader issues, such as the rise of early states. We envision holding lecture series, workshops, and seminars, as well as conferences. During the off-season the center will be an ideal place to host attendees for several days, with our dormitory rooms, dining facilities, labs, and lecture space.

Along with the annual field school program, the AERA Archaeological Center and Field School will be a legacy to our host country and to our benefactors who made it possible.

### Capital Campaign for the AERA Archaeological Center and Field School





A permanent administrative center, housing for senior team members, and additional research facilities.

Year-round residence for personnel and team members & dormitories for field school sessions.

Library and project archives, research work stations, meeting and lecture rooms, and a commons room for social gathering.

The AERA Archaeological Center and Field School. (Model and plans by Günter Heindl and Wolf-Dieter Thornhofer.)

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An amulet of the goddess Hatmehyt is found in the Late Period grave of a young woman—evidence that her origins may not have been local.	
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Capital campaign to raise funds for a permanent home for the Giza Plateau Mapping Project and the AERA Field School.	



*Khentkawes tomb*

The Giza Plateau looking north: Khafre Pyramid on the left, Khufu Pyramid on the right. The Giza Laser Scanning Survey mapped the Khentkawes tomb during the fall 2006 field season (see page 10). (Photo by Mark Lehner.)