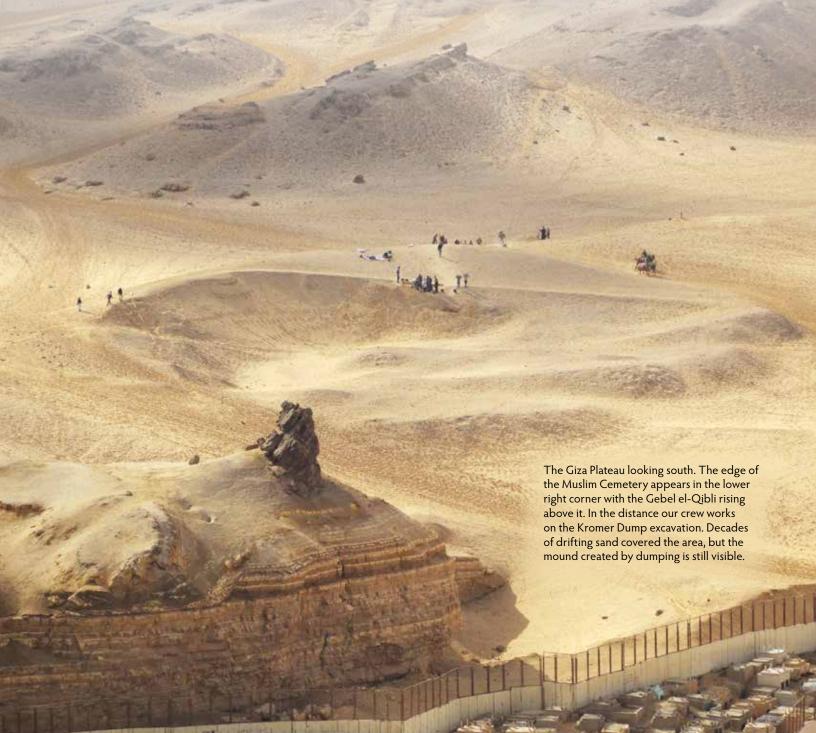


Annual Report 2017–2018







For 30 years Ancient Egypt Research Associates (AERA) has brought together archaeologists and specialists from around the world to address questions regarding the origin, nature, and development of the Egyptian state—one of the earliest states of the ancient world.

We seek answers on the Giza Plateau, at our flagship site, "Lost City of the Pyramids" (also called Heit el-Ghurab, HeG) and the Kromer Dump site, where debris from HeG was deposited, as well as the Great Pyramid, Sphinx, and communities associated with the tombs of Pharaoh Menkaure and Queen Khentkawes. After three decades of field and laboratory work, we have constructed a nuanced interpretation of how the Egyptians supplied and transported raw goods and materials to build the pyramids and maintain the HeG settlement, a large urban center dating to the reigns of Menkaure,

Khafre, and probably Khufu, builders of the third, second and first Giza pyramids, respectively.

Excavation, analysis, publication, and educational outreach stand as pillars of our mission in Egypt. Through multi-disciplinary analysis, rigorous archaeological fieldwork, and laboratory science we open windows on the everyday lives of Egyptians who built and administered the Giza Pyramids and Sphinx during the 4th and 5th Dynasties (c. 2543–2306 BC) of the Old Kingdom. In 2005, with the sponsorship of the American Research Center in Egypt (ARCE), we began an archaeological training program for Inspectors in Egypt's Ministry of Antiquities. After completing 17 field schools and graduating more than 300 inspectors, AERA continues to embed this important outreach program within our core research.

Founded in 1985, AERA is a 501(c)(3) tax-exempt, non-profit research organization located in Boston and Giza, registered in Egypt as a foreign NGO. AERA-Egypt maintains the AERA-Egypt Center in Giza—a year-round base for our team, with library, archives, and meeting facilities. Our scientific and educational missions are supported by philanthropic individuals, foundations, and USAID government funding, as well as USAID in collaboration with the American Research Center in Egypt (ARCE).

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Photos in the 2017–2018 annual report were taken by Mark Lehner, Dan Jones, Sayed Salah Abd el-Hakim, Claire Malleson, and Aude Gräzer Ohara.

Ancient Egypt Research Associates, Inc. 26 Lincoln Street, Suite 5 Boston, MA 02135-2608 USA

E-mail: info@aeraweb.org Website: http://www.aeraweb.org

PRESIDENT'S MESSAGE

In the fall of 2017 while I traveled and lectured about AERA's work in Cairo, Prague, New York, Shanghai, and Kaifeng, the AERA team planned our new research initiative: to look for the older phase of the Lost City site (a.k.a. Heit el-Ghurab, HeG) and, as part of that search, investigate the Kromer Dump site (see graphic at left), a massive trash heap of demolition debris and waste that the 4th Dynasty pyramid builders dumped from their nearby settlements.

Season 2018, directed by Dr. Mohsen Kamel, AERA-Egypt Executive Director, launched in February with the Kromer Dump (KRO) excavation, work in Area Standing Wall Island (sw1) in HeG and the Khentkawes Town (KKT). Eight Advanced Field School trainees from the Ministry of Antiquities were fully integrated into our primary research agenda, and, as in the past, they worked alongside us. Under the direction of Dr. Richard Redding and Dan Jones, they made significant contributions to our basic survey and excavation work and to our analysis and interpretation of results, more than in any of our other field schools. Former field school student turned field school teacher, and now professional surveyor, Mohamed Abd el-Basat, assisted by Survey Instructor Amr Zakaria and the advanced survey students, carried out all the survey work at the Kromer site.

Our 2018 excavations at the "OK (Old Kingdom) Corral," Area SWI, and in House D of the Khentkawes Town (KKT), were in the hands of advanced excavation students, supervised by Dan Jones and Rabee Eissa, another AERA Field School graduate.

In AERA's Giza Field Lab, veteran AERA Field School supervisors Mahmoud el-Shafey and Samar Mahmoud honed in on the pottery and chipped stone tools (lithics), with Dr. Claire Malleson directing. The advanced archaeozoology students analyzed animal bone from the Kromer Dump and contributed the "Knucklebone Soup" hypothesis to explain the missing distal ends of the long bones of sheep and goat: did elites enjoy the flesh of meat-bearing bones while supplying fat and protein in a bone soup for a workforce?



Samar was seeing more flint knives than usual—for bone cutting? Ali Witsell, who led us in conceiving and promoting the Kromer research, found a surprising number of clay stoppers—perhaps for soup jars?

Ali and David Jeřábek, our clay sealings team, recognized and documented a clay sealing fragment from the Kromer Dump that has important implications for our work. It bore hieroglyphs that spell out Egypt's oldest known use of *Setep Za*, one of five terms for "palace," one of many clues that suggest a palace, perhaps a royal resthouse at the pyramid construction site, graced the older phase of the HeG or KKT settlement sites.

Everyone on AERA's 2018 team brought together pieces of a puzzle from which a picture has emerged, a hypothesis we will test in future field seasons: a palace belonged to the older phase of one of the nearby settlements, HeG or KKT, from which people of the highest rank directed and provisioned a workforce. Can we locate its foundations?

Please stay with us on our adventure of discovery, as we take the clues from Season 2018 on a search for the pyramid workforce and palace, apparently as intertwined in ancient times as training and discovery have intrinsically become in AERA's agenda.



FIELD SEASON 2018: The Search for Khufu

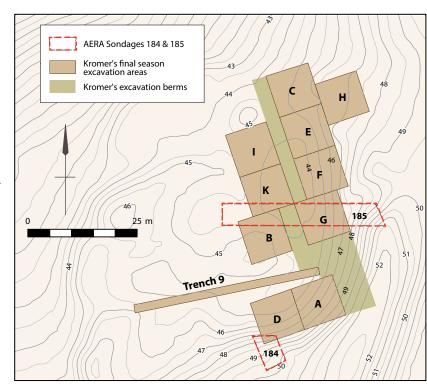
Season 2018 saw the launch of our new research agenda: the search for the settlement that Khufu used as a base (pyramid town) when he built the Great Pyramid. We suspect that it may have been an older phase of the Lost City of the Pyramids site (or Heit el-Ghurab, HeG). Thus far we have only excavated levels dating to the time of Khafre and Menkaure, builders of the second and third pyramids. But we have caught glimpses of an older settlement in deeper levels, which we plan to excavate in future seasons.

Our search for Khufu began at a massive trash mound, spread over 5.1 hectares (12.6 acres) and up to 6.5 meters (21.3 feet) thick, on the other side of the ridge running along the western edge of our site (see graphic on page 2). In the 1970s Austrian prehistorian Karl Kromer excavated portions of the mound and found debris from the demolition of buildings—mudbricks, fragments of painted and plastered walls—and objects of everyday life, including clay sealings impressed with formal, official designs naming Khufu and Khafre. Kromer concluded that the dump was debris from the demolition of a royal resthouse and settlement dating from the time of Khafre, Khufu, and earlier.

We hypothesized that HeG was that settlement, from which workers toted debris when Khafre reorganized and restructured the town. This material could offer insights into an early phase of HeG and provide comparative material for studying the older levels.

Our seven weeks at the Kromer site (KRO) began with a resurvey of the area, staking out grid squares, and locating Kromer's original survey points, squares, and trenches. We next opened two trenches; the first, Sondage 184, produced only limestone quarry debris. Sondage 185, on the other hand, yielded a wealth of information and material culture. We ran the trench east—west for a total of almost 40 meters (about 130 feet), overlapping some of Kromer's squares as well as taking in untouched portions of the mound.

At the east end of 185, beyond Kromer's squares, we cut into massive layers of undisturbed settlement



debris. Below the top layers of quarry debris lay deposits of cultural material, built up over time as ancient workers dumped basket after basket. In the profile we could see successive dumps, sloping down to the east, varying in color, composition, and texture—diagonal striations or "tiplines" (see photo on the near right).

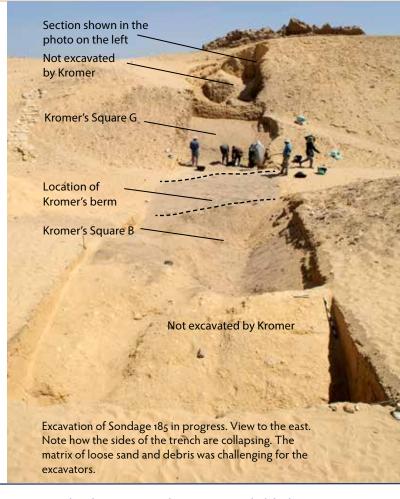
Features 512 and 518 were rich in Old Kingdom finds, such as fragments of pottery and mudbricks; charcoal; shells; pieces of textiles; large quantities of animal bone; and clay sealings for bags, boxes, jars, and doors, impressed with hieroglyphic patterns.

After excavating down 3 meters, we stopped, even though we had not reached bottom, and moved down slope to the west (photo, top far right). Here we encountered the crater Kromer left when he excavated his Squares G and B. In the areas Kromer left untouched we found more cultural material. At the west end of the trench we again saw tiplines, but these sloped down to the west. Workers apparently emptied their baskets from at least two different directions. Did the debris come from two different sources? We also pondered whether the dump was used only for de-

bris from demolition of buildings, as suggested by the mudbricks, fragments of plastered walls, and pieces of flooring. Or was the site an all-purpose trash dump for the Giza Plateau, used over a long period of time, as suggested by hardened upper surfaces on some of the tiplines and lenses of sand between some?

For answers, we turned to our specialists in the AERA Field Lab. On the next page we present some of the lab team's preliminary results from their work on material from the Kromer Dump.





Locating the Khufu Pyramid

Before the Glen Dash Foundation for Archaeological Research team carried out its mission this season. researchers lacked correct coordinates for the location of the Great Pyramid. The published values place it more than 180 meters west of where it is actually located. These coordinates positioned it on the "Helmert reference ellipsoid," the shape of the Earth proposed in 1906 and subsequently replaced in 1984 by the World Geodetic System wgs 1984. As there was no practical way to convert to the newer ellipsoid with high accuracy, the Dash team, with permission from the Ministry of Antiquities, carried GPS equipment up to the top of the Great Pyramid to re-establish its coordinates on the WGS 1984 ellipsoid, which they determined to be Latitude 29° 58' 45.05570" North and Longitude 31° 08' 03.11209" East.

Surveyor Joel Paulson rests atop the Great Pyramid while the GPS equipment collects data. The mast on the right was erected by David Gill in 1875. Its base is a good estimate for the center of the pyramid; the coordinates listed in the text on the left are for its center. View to the southwest.



The Search for Khufu in the Lab

The 2018 excavation in the Kromer Dump (KRO) flooded the AERA Field Lab with a veritable tsunami of bags and boxes loaded with material culture, far too much for the lab team to process and analyze in one season. Still, their preliminary results offer insights into the nature and source of the debris.

This season's clay sealings provided chronological markers and connections between HeG and the Kromer Dump. Used by administrators to secure jars, doors, and packages, clay sealings were impressed with designs carved into small cylinders that were rolled across the clay while it was still wet. The seals often bore the owner's title and the name of the king who reigned at the time the cylinder was carved. Among the many sealings we recovered, none bore Menkaure's name, suggesting that the dump predated his reign. But one Kromer sealing was impressed by the same cylinder seal as some HeG sealings. The owner of the seal, an administrator whose titles included "Scribe of Royal Documents," was busy in both HeG and the source of the Kromer Dump debris.

In addition to sealings from high-level administrative officials, material culture from the dump suggests a source with both elite folk and workers, elegant buildings and messy workshops. Fragments of architectural elements included what one might find in the reception hall of an Old Kingdom official: pieces of plastered door jambs; chunks of plaster painted blue, white, black, and red; and traces of painted dados.

Pottery workshops were suggested by the great quantity of clay globs. The ceramics team recognized among them discards from pottery production: fragments of aborted pots, unfired vessels, and clay ready for throwing on a wheel. The sealings team encountered among the chunks of clay many fragments of jar stoppers and lids, but these too were twisted and

> Far left: A clay jar stopper positioned on a pot rim. Left: A section of plaster with a precisely painted dado.

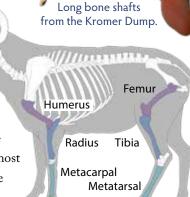
misshapen, as if removed while still wet—discards from a busy workshop filling pots with food or beer and quickly sealing them.

The Kromer animal bone also reflects varied social rank. Intact long-bone shafts of sheep/goats, many without the ends, were extremely abundant, in contrast to the HeG site where complete shafts are almost entirely absent, while the ends are fragmented and numerous. At KRO the humeri and femurs, the meatiest meat-bearing bones, were probably left over from meals for elites, while the radius and tibia, the most numerous long bones shafts and less meaty, may have been fed to slightly lower-ranking people. The ends of the long bones (including the

non-meat-bearing metacarpals and metatarsals) had been hacked off, possibly so diners could suck out the marrow. They may have been saved for extracting bone grease. Or they might have been cooked in soup for low status people, such as pyramid workers.

What was the source of the Kromer Dump trash? As Kromer suggested, a royal resthouse, or perhaps a palace, seems to fit: a busy complex where goods and documents came and went, where multitudes were fed, where elites and non-elites mingled, where high officials presided.

Perhaps there were two sources, as suggested by the tiplines left by baskets of trash dumped from the east and from the west (see page 4). In addition to HeG, Building м in the foot of Khentkawes Town (see graphic on page 2) predating Menkaure was a possible source of the debris. Although it was rebuilt, traces of the early structure can still be studied. And that is our plan for future seasons as we continue our search for Khufu.





AERA FIELD SCHOOL 2018

AERA held its 17th training program, an Advanced Field School, funded by a grant from the Antiquities Endowment Fund (AEF) of the American Research Center in Egypt (ARCE) and directed by Richard Redding. The students, embedded in our excavation, survey, and lab teams for eight weeks of on-the-job training, made major contributions to our research. They excavated at SWI and Khentkawes Town (KKT), analyzed KRO bone, and surveyed and laid out grids in all our operations.

House D in the Khentkawes
Town. View to the north.

Northern
doorway

Pilastered
niche

Ash

KKT chapel

Causeway

Blocked
doorway

SWI (Standing Wall Island). Since 2011 we have suspected that this stone-walled compound was a livestock processing facility, with a large corral on the south and two smaller enclosures, ES1 and ES2, on the north, which we thought might have been for butchering (see graphic on page 2). In 2015 we discovered an official's house in ES2. In 2018 we excavated in ES1.

Plagued by a high water table, SWI was challenging. The saturated ground and roots of dense reeds made it difficult to clean and identify features. Still, the team succeeded in unveiling something we had not expected: an earlier, smaller stone-walled enclosure. We knew that the thick stone wall wrapping around SWI (see photo below) and bounding ESI, was a late addition, suggesting that ESI were also added late. But now we know an earlier enclosure functioned here. Perhaps what began as a small livestock facility expanded over time. We did not find evidence of butchering in ESI, but we have yet to fully excavate it.

KKT, House D. Our 2018 team excavated and mapped House D, one of the priests' residences in Khentkawes Town (KKT), which Selim Hassan excavated in 1932 and we have been investigating since 2005 (see graphic on page 2). The team revealed a floor plan that, like all the other KKT priests' houses, followed a template, which people remodeled over time, radically changing the building's use and orientation.

As in the other priests' houses, they blocked the doorway to the causeway on the south, denying entry to the passage that gave direct access to the chapel and offerings for the monument of Queen Khentkawes I, for whose memorial the town was founded. Thereafter, the only doorways were on the north side, with no direct access to the chapel. People also refurbished the pilaster and niche in the southern end of the chamber, where the master sat to carry on business. The pilastered niche, a feature seen in most of the KKT houses, devolved in House D into a place for cooking or keeping warm, reflecting changes in officiating.

butchering in ESI, but we have yet to fully excavate it.

ES1

High official's house (backfilled)

ES1 in SWI. View to the north.

Stone wall encircling SWI (late addition)

Older enclosure discovered in 2018

SHARING OUR WORK

Publications

MARK LEHNER

"The Giza Plateau Mapping Project," In *The Oriental Institute 2016–2017 Annual Report*, ed. by Christopher Woods, Chicago: The Oriental Institute, 2017, pages 94–115.

MARK LEHNER and ZAHI HAWASS

Giza and the Pyramids: The Definitive History, London: Thames and Hudson, Cairo: American University in Cairo Press, Chicago: The University of Chicago Press, 2017.

Lectures & Conference Presentations

YUKINORI KAWAE

"Analyzing Egyptian Pyramids in the Digital Age," Harvard Museums of Science and Culture, Harvard University, Cambridge, MA. April 4, 2018.

MARK LEHNER

"Did Patronage Build the Gigantic 4th Dynasty Pyramids? And What Was a Za?" Generous Patrons, Loyal Clients, The Question of Evidence Conference, Charles University, Prague. September 4–5, 2017.

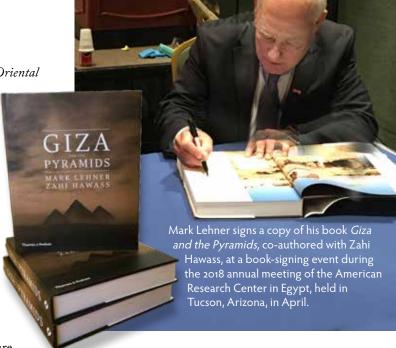
"Fourth Dynasty Water Transport Infrastructure at Giza, A Bathymetric Model," Egyptian Riverine Harbors 1st Workshop, Netherlands-Flemish Institute, Austrian Archaeological Institute, Cairo. September 17, 2017.

"Giza's Back Bays and Bathymetric Modeling," Egyptian Riverine Harbors 1st Workshop, Netherlands-Flemish Institute, Austrian Archaeological Institute, Cairo. September 17, 2017.

"New Discoveries from the Giza Plateau: The Lost Port City of the Pyramids," The Ira Haupt II Lecture of the Archaeological Institute of America, The Explorers Club, New York. October 3, 2017.

"New Discoveries from the Giza Plateau: The Lost Port City of the Pyramids," The Shanghai Archaeology Forum: Water, Society, and Civilization, The Shanghai Museum. December 10, 2017.

"On Pyramids, Cities, and Bronze Age Complexity: New Discoveries from the Giza Plateau," Comparative Archaeologies in the Old World, Henan University, Kaifeng, China. December 13, 2017.



"Looking for Khufu in the Heit el-Ghurab," American Research Center in Egypt Annual Meeting, Tucson, Az. April 20, 2018.

MARK LEHNER and PIERRE TALLET

"Merer, the Sphinx, and the Lost Port City of the Pyramids," The Barbara Herman Memorial Lecture, Museum of Fine Arts, Boston, MA. February 4, 2018.

SAMAR MAHMOUD

"Lithic finds from the Giza excavations," 2nd table ronde on Lithic Industries in Ancient Egypt from the Neolithic and Dynastic Periods, Institut français d'archéologie orientale, Cairo, Egypt. November 3, 2017.

CLAIRE MALLESON and RICHARD REDDING

"The Big Question: How Were the Pyramids Built? The Answer: By Well Fed People...!" Continuities and Transitions: Approaches to Studying Food and Drink in Egypt and Sudan Conference, Cairo, Egypt. March 21, 2018.

RICHARD REDDING

"Design in Archaeology: Examples from Giza," Ross School of Business, University of Michigan, Ann Arbor, мі. November 29, 2017.

"The Old Kingdom at Giza," Kelsey Museum, University of Michigan, Ann Arbor, MI. February 25, 2018.



Documentaries. This season AERA

team members worked with five documentary film-makers to share our research with a vast audience. A team from the American Research Center in Cairo (ARCE) filmed ARCE-funded Advanced Field School students at work for a video capturing ARCE's history as they celebrated their 70th year.

Blink Films next filmed Mark Lehner and the team for a WGBH NOVA television production, *The Great Pyramid Mystery*, including the new information on the pyramid builders flowing from AERA's work. A Blink crew also filmed with Glen Dash on the Giza Plateau and with Mark at the pyramids of Sneferu, Khufu's predecessor, at Meidum and Dahshur.



TV Man Union filmed team members at the Kromer site and in the AERA Lab for a Tokyo Broadcasting System (TBS/TV) film, which also includes new findings from AERA's research.

Windfall Productions worked with Mark Lehner at the Heit el-Ghurab site for a film in Science Channel's *Unearthed* series, tentatively titled *Dahshur-Giza*, *Proto-Cities*.

Finally, Donkey Universe Films worked with Richard Redding on a documentary on the pig, featuring his work on pig domestication, the relationship between the pig and the chicken, and the development of the prohibition on pig consumption.



In the Popular Press. AERA'S Sphinx Archive Project was the cover story in the first issue of *Scribe* (Spring 2018), the new member magazine of the American Research Center in Egypt (ARCE). In "New Light on an Old Archive," David Everett describes the

ARCE 1979–1983 Sphinx Project and the 2016–2017 program to prepare the project archive to go live on the opencontext.org website.

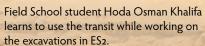
Current World Archaeology, a popular British magazine, also featured Aera's work as its cover story: "How the Pyramids built Egypt, Taking a New Look at Life and Death in Giza." The author, Matthew Symond, based his article on interviews with

Mark Lehner and Zahi Hawass and on their co-authored new book, *Giza and the Pyramids*.

The July/August 2018 issue of *Discover* highlighted some of AERA's discoveries in its special feature section "Everything Worth Knowing About" on the Giza Pyramids pages.

Scenes from 2017-2018





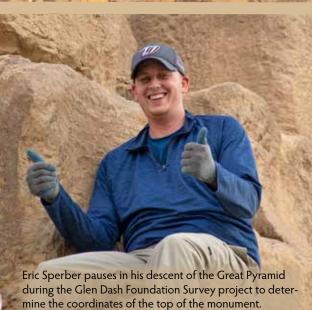




Manami Yahata holds a fragment of a painted plastered wall from the Kromer Dump excavation.







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The generous contributions of our benefactors and members have made our work possible. Every tax-deductible donation supports AERA's archaeological excavations, publication of our findings, and educational programs aimed at advancing knowledge about our common human heritage. We are extremely grateful to the following foundations, businesses, and individuals who support our work.

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