AERA

Ancient Egypt Research Associates

Annual Report 2021–2022

Catching Up on Fieldwork

Below: Looking north across the newly revealed enclosures long buried under the old Abu Hol soccer field. In the foreground, the high water table stops us from clearing farther south. In the background, stands the Wall of the Crow and beyond, Khafre's (on the left) and Khufu's pyramids.

AERA: WHO WE ARE

For 31 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 more than 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 multidisciplinary 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 more than 20 field schools and graduating more than 300 inspectors, AERA continues to embed this important outreach program within our core research.

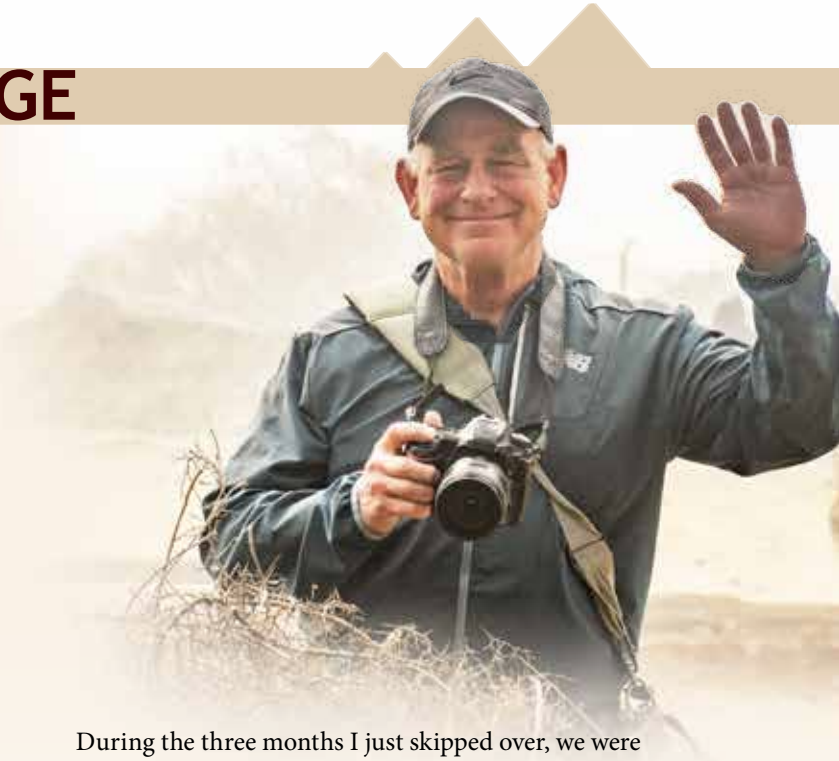
Founded in 1985, AERA is a 501(c)(3) tax-exempt, nonprofit research organization located in Boston and Giza, registered in Egypt as a foreign NGO. AERA-Egypt maintains the AERA-Egypt Center in Giza—a year-round base for our team, with library, archives, and meeting facilities. Our scientific and educational 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).

Photos in the 2021–2022 annual report were taken by Mark Lehner, Dan Jones, Sayed Salah Abd el-Hakiml. Maps by Rebekah Miracle, AERA GIS.

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



If our year 2020–2021 was the Year-of-COVID-and Catch-Up-On-Writing, Year 2021–2022 (July 1, 2021–June 30, 2022) was the Year of Catch-Up-on-Fieldwork-Postponed, at our flagship Heit el-Ghurab site (a.k.a. Lost City of the Pyramids) and in the Menkaure Valley Temple.

We began our fall 2021 season in August, clearing camel thorn and the invasive reed *Phragmites australis*, which had run rampant since we last cleared the site in 2018. It looked like the Delta swamps.

During the three weeks that workers cut and hauled away vegetation, the old, derelict soccer field of the Abu Hol ("Sphinx") Sport Club was finally handed back to the Ministry of Tourism and Antiquities (MoTA), after MoTA built a new soccer field for the local town youth. Ashraf Mohi, Director of Giza, encouraged us to "put our hands on the land" to reclaim it for archaeology.

Starting September 25, thanks to a grant from National Geographic Society (NGS) and our many generous donors and members, we did three rapid test trenches from the middle of the soccer field to the north on line with the western wall of the Royal Administrative Building (RAB).

We first found the RAB in 2001 and cleared its northern end between 2002 and 2007. From this work, we knew it continued south under the soccer field. This season we expected to find the southwest corner of the RAB in our first trench. But we found only clean, sterile sand, far deeper than the level of the surrounding 4th Dynasty settlement. We had better luck in the other two trenches. The story about our discoveries starts on page 4.

On New Year's Day, 2022—and now I leap forward three months—we returned to the soccer field and began to demolish the cement and block structures of the sports club. Once they were gone, we took our first major look at what lay below and cleared in the northwest and the southwest corners. Our discoveries are described on page 5.

Through all this exploration of what lay under the soccer field, we confirmed our hunches and hypotheses. Next season we explore the southern end of the RAB.

During the three months I just skipped over, we were not idle. Back at the Menkaure Valley Temple (MVT), we resumed work in the back end of the temple, where we had been working before the pandemic shut us down in 2020. We finally located the bottom of the temple on its bedrock foundation, but failed, again, to reach the bottom of the Dyad Hole. Here in 1910 George Reisner found one of the most famous statues in the history of art: the Dyad of Menkaure and his queen mother. Reisner was convinced there were more statues, or statue fragments, to be found down in the hole below where he worked We hoped to look for them, but in 2020 ground water stopped us. This season we pumped the water, again, but to no avail. Workers even dove down underwater. (How strange, doing underwater archaeology this far out in the Egyptian desert.) But we could not get to the bottom of the hole. Nonetheless, our "divers" pulled out interesting materials. The report on the MVT work starts on page 6.

This has been a very busy year for AERA, making up for time lost at Giza to COVID, with your support. All your contributions go directly to fund our research. We keep no reserve. AERA patches its way, year after year, based on gifts and grants like yours.

Please stay with us on our unique adventure of discovery. We discover what was never before known, even as I write from Giza in our Fall 2022 field season.

Mark Lehner

Field Work 2021-2022

Finally with the COVID threat much diminished, we resumed field work, through the fall of 2021 and into the spring of 2022. At the Heit el-Ghurab site, after waiting 20 years, we were finally able to begin exploring the soccer field that covered the southern end of the site. We also resumed our Menkaure Valley Temple excavations, which had been shut down prematurely in March 2020 by the pandemic.

HEIT EL-GHURAB: THE SOCCER FIELD

After discovering the Royal Administrative Building (RAB) in 2001 and excavating portions of this large compound between 2002 and 2007, we knew that we only had the north end and that it continued south, under the Abu Hol soccer field. But we could not excavate it, not until Summer 2021. We were finally given permission to begin excavations, after the soccer field was moved to a new location and the land was turned over to MoTA.

We began the Fall 2021 season in August by clearing vegetation that covered the southern end of the HeG and then demolishing the old soccer club structures. With the field clear, we began searching for the buried RAB. We followed the lead of an electromagnetic conductivity survey in 2003 that seemed to show the southwest corner of the RAB lying 1 meter below the surface. Here we dug Sondage 145, but found only clean sand down to ground water 3.29 meters below the surface, or 14.38 meters above sea level (asl).

Puzzled, but still searching, we moved 22.5 meters to the north, along the line of the RAB west wall and excavated Sondage 146. We again encountered clean sand and then ground water, but at a depth of 3.54 meters below the surface we found what appeared to be the extension of the wall. We confirmed that the RAB wall did indeed extend south under the soccer field when we opened Sondage 147 at the northern perimeter of the sports club.

In February and March 2022, we resumed work on the soccer field and cleared down to the Old Kingdom settlement ruins in the northwest and southwest corners, areas outside the southern end of the RAB. We are saving the RAB, under the soccer field, for a longer season of more intensive excavation.

In the northwest we removed clean sand 2.70 meters deep, exposing the surface of the settlement ruins, which sloped markedly down to the south. At 14.74 meters asl, ground water prevented us from following the slope any farther.

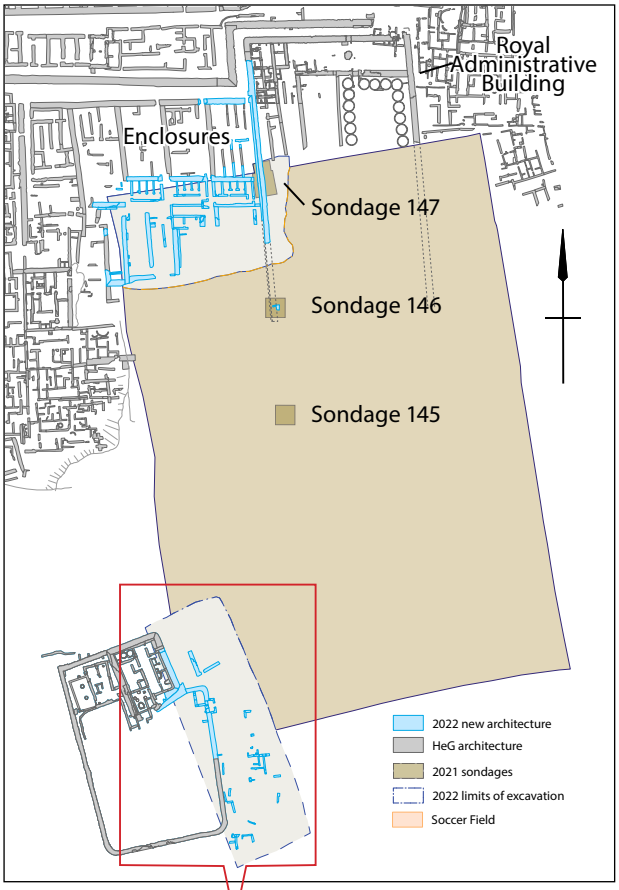
The ruins (shown on the cover) consisted of a sophisticated layout of huge enclosures (similar to some just to the north that we excavated in a previous season) with ramps leading down to a lower terrace of smaller enclosures and compartments, and then yet another lower terrace with more large galleries. The whole looked like a precociously modern port, something like the Brooklyn docks, but 4,600 years older.

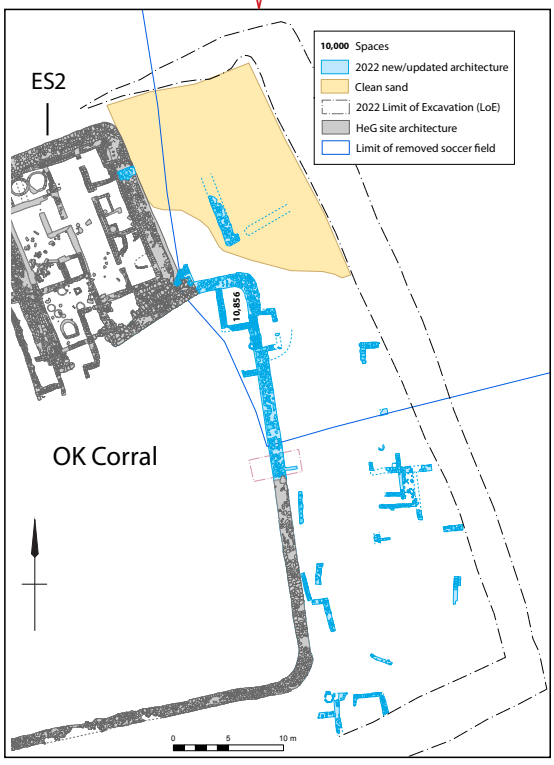
In the southwest corner of the soccer field, we

Looking to the north-northwest over the clearing at the southwest corner of the soccer field and SWI. In the area to the east of SWI, clearing exposed the high watertable.

Above: Dan Jones excavates inside the chamber at the north end of the OK Corral, while Manami Yahata works on in the area to the east of the corral where evidence of settlement was discovered. View to the north.

Right: Map of 2012–2022 work in the soccer field and below, detail map of work at the southwest corner of the soccer field and SWI. Maps by Rebekah Miracle, AERA GIS.





cleared a 4.17-meter-deep blanket of sand to expose an area along the east side of Standing Wall Island (SWI), (named for the Old Kingdom fieldstone walls we found standing more than 1 meter high in 2004). SWI is encircled by a large wall of broken stone that loops around to the south and east, then returns north. We dubbed the compound the OK ("Old Kingdom") Corral after noting parallels with animal enclosures in Egyptian sites, ancient depictions, and ethnographies. The north end of SWI consists of Enclosures ES1 and ES2. Earlier excavations revealed a house compound in ES2, up against the southwest corner of the soccer field. We hypothesized that a corridor ran between the eastern wall of ES2 and the SWI wall and that cattle might may have been led through this corridor into the corral.

But when we excavated this season, we found that the SWI wall turned west in a rounded corner and attached to the southeast corner of ES2. We discovered a chamber inside the curve and a gate through the northern end of the wall.

East of the OK Corral wall, we uncovered an ancient settlement deposit rising gradually to the south, with walls showing in the surface, including a possible bakery.

MENKAURE VALLEY TEMPLE

Our principal goal in 2021 (September 11–December 16), carried over from the 2019 and 2020 seasons, was to complete our work on the west side of the Menkaure Valley Temple (MVT).

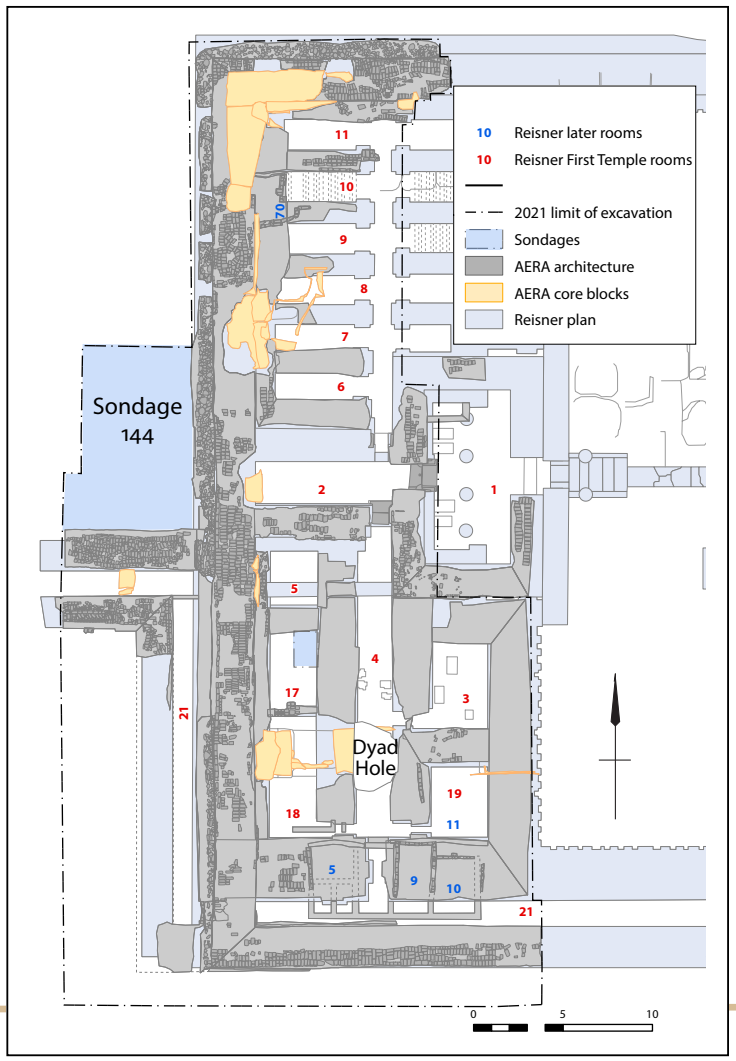
In the temple's northwest corner, we partially cleared the magazines, Rooms 6–11. In so doing we finally found the temple foundations, which had eluded us for two seasons in our quest to understand the building and occupation history of the structure. In Rooms 7 and 11, we came upon the limestone bedrock foundation of Menkaure's stone temple, thanks to exploratory holes that George Reisner, the original temple excavator, dug in 1910. The holes revealed that the bedrock, on which the foundation was laid, steps down from north to south 17.00 to 16.25 meters asl. Menkaure's builders based the temple on the steps, terraces, or slope of a quarry, resulting in a very deep foundation. Menkaure's predecessors, Khufu and Khafre, had removed great quantities of limestone for their mortuary complexes, leaving Menkaure with a massive hollow in which to erect his temple.

In the process of clearing the northwest magazines, we completed our exposure of the east-facing elevation of the MVT west wall. Using photogrammetry, Dan Jones documented this elevation profile with over 3,500 photos and created a photo montage of the entire wall.

Sondage 144

We continued our excavation in Sondage 144, started in 2020, where the north wall of the causeway (which runs west to Menkaure's pyramid temple) meets the back of the temple's west wall, an area that had never been excavated. At some point, builders raised the floor level 1.1 meter for a new paved surface. Above it we found very little cultural material, but we documented gravel deposits culminating in much larger limestone pieces deposited by a flash flood that broke through the west temple wall. Reisner saw evidence

The west side of the Menkaure Valley Temple in March 2020 shortly before the pandemic shut down excavations. View to the northwest.



Left: Workers pump water out of the Dyad Hole.

Left below: Map of the west end of the Menkaure Valley Temple showing AERA's 2021 work. Maps by Rebekah Miracle, AERA GIS.

of this flood from inside the Offering Hall. When people rebuilt the temple (Reisner's "Second Temple"), probably in the mid- to late 6th Dynasty, they first cleaned out the flood deposits and dumped them outside against the west wall, which they rebuilt. Later, a "water wall" of broken stones and clay was added as a barrier against further desert flash floods.

Dyad Hole

In the hole where Reisner found the famous dyad statue of Menkaure and a queen in January 1910, we tried again this season to reach the bottom and search for statue fragments. Reisner believed more statue fragments lay below the level at which he found the dyad. He could not explore further at that time, but planned to return. To retain the debris from his backfilling, he built walls of broken stone and mud around the Dyad Hole as he excavated to the east. He never returned.

We were thwarted by ground water in our initial attempts to reach the bottom. We tried again this season to pump the water out, but failed once more. Still, our workers were able to prove that Reisner was right. Undeterred by the water, they stood in the hole, even going below the water's surface at times, and pulled up small fragments of exotic stone from the bottom, 3.71 meters below the top of the core block against which the dyad stood. Their haul included fragments of graywacke, red granite, travertine (Egyptian alabaster), and larger fragments of limestone. Some of the graywacke and travertine pieces bore worked surfaces. One showed pleating, as on a royal skirt or headdress. The workers also pulled up pottery fragments, most of which were of Old Kingdom date.

At the end of the 2021 fall season, we built wooden shoring around the Dyad Hole to allow any future work to be undertaken safely. In March 2022, we tried again, unsuccessfully, to reach a lower level by pumping the ground water.

AERA Field Lab

After the pandemic hiatus at Giza, the AERA lab was once again filled with specialists working on material culture under the direction of Dr. Claire Malleson, AERA Archaeological Science Director and Archaeobotanist. Their work starts with mundane tedious sorting, counting, and recording, but quickly moves to analyses that yield valuable insights to life at Giza in the Old Kingdom.

The Fall 2021 lab season was not held in the traditional building near the Great Pyramid, but at an on-site facility, a large tent set up near the Menkaure Valley Temple (MVT), primarily to process material coming from the MVT excavations. Dr. Anna Wodzińska and Aisha Montaser studied and registered ceramics and Emmy Malak registered objects. Dr. Richard Redding and Mona Hares studied animal bone from the MVT 2021 excavation and also worked on the backlog from prior seasons. David Jeřábek worked on registering clay sealings. Near the MVT, workers sorted ceramics and wet-sieved material. The latter came from a wet-sieving station and drying yard to the southeast of the MVT.

In February 2022 the AERA Lab opened, and a large team of specialists began rotating through. Some focused on material culture coming out of the 2021–2022 excavations, while others worked on their backlogs from previous seasons. Richard Redding continued studying animal bone from MVT with three trainees from the Ministry of Tourism and Antiquities (MoTA), while Dr. Anna Wodzińska studied ceramics from the 2022 season with Amany el-Naggar. Mahmoud el-Shafey worked on the ceramic backlog from the 2020 MVT-W (MVT-West) excavations and Samar Mahmoud documented lithics from the MVT-W excavations. Claire Malleson analyzed plant remains from the soccer field excavations, while Agata Bebel-Nowak studied the remains from past excavations around the Royal Administrative Building at the Heit el-Ghurab site. Ali Witsell directed sealings analysis remotely from the USA with David Jeřábek working in the lab on the MVT material.

Several team members carried out more specialized studies of some of AERA's material culture. Martin

Not all lab work took place in the field. Publication of our finds remains an important part of AERA's mission. To that end, Emmy Malak, Claire Malleson, and Ali Witsell, sealings team leader and Publications Managing Editor, worked to finish the publication of AERA's first Object Typology, now available online for free download. Each object class is illustrated with photographs and drawings, accompanied by a general discussion of its use. We mean for this to be an ongoing project, updated with new finds from future excavations.

Left: Trainees Mai Samir Ibrahim (left) and Amal Ahmed work on faunal remains in the Giza Field Lab. Above: Richard Redding training Mona Hares in animal bone identification in the tent lab. Far right top: Philip LaPorta examines a pounder. Right: Jiří Kmošek points out traces of copper in an object. Both are working in the Giza Field Lab.

Odler and Jiří Kmošek worked on the copper objects and copper-working waste from the HeG site, the largest corpus of the Old Kingdom metallurgical remains in both Egypt and Nubia. While Martin photographed the corpus, Jiří used the XRF analyzer to determine the objects' element profiles.

Philip LaPorta conducted a geological study of many of our larger pounders, which may lead to insights into their use-life and recycled/rejuvenated functions. Emmy Malak documented faience objects from all seasons.

While the specialists' studies are ongoing, some tentative observations/conclusions emerged from this past field season. Thus far the plant materials from the soccer field are similar to those elsewhere at Heit el-Ghurab (HeG): some cereal chaff and grains with a large quantity of crop weeds. The pottery from the soccer field is likewise similar to that found elsewhere at HeG, including high quantities of bread molds. There was one surprising find: fragments of a Combed Ware krater (a Lebanese cooking pot), probably a knockoff made locally. Only one other Combed Ware krater has been found at HeG, and that was an import.

The imitation pot raises questions about who made the pot. A Lebanese living in Egypt or a local Egyptian?

For the sealings team the MVT-W excavations yielded a particularly significant collection, including a large quantity of sealings from stamp seals as well as from cylinder seals. These stamp sealings were entirely missing from the records of George Reisner, the original excavator of MVT, even though he must have found a great deal of them. Many of the sealings came from bins/small doors/granaries in the Central Court, as well as containers (bags, jars, and documents), a mix that reflects the richness of the inhabitants' activities.

SHARING OUR WORK

Publications

MARK LEHNER

"Giza Plateau Mapping Project," in *The Oriental Institute Annual Report 2020/21*, edited by C. Woods. Chicago: University of Chicago, 2021, pages 51–54.

MARK LEHNER and PIERRE TALLET

The Red Sea Scrolls. How Ancient Papyri Reveal the Secrets of the Pyramids. London: Thames and Hudson, 2022.

YUKINORI KAWAE

"3D Survey of Giza Pyramids." *Journal of the Japan Society for Precision Engineering* 88, no. 8, 2022, pages 606–609. (In Japanese)

"3D Surveys in the Pyramids of Egypt." In *The Creation of Religious Heritage Textology*, edited by M. Kimata and C. Kensuke. Tokyo: Benseisha Publishing Inc, 2022, pages 589–596. (In Japanese)

"Cultural Memory in the Sphinx at Giza." In *Ancient Mediterranean World and Cultural Memory*, edited by Y. Suto. Tokyo: Yamakawa Shuppansha Ltd, 2022 pages 44–66. (In Japanese)

"Pyramids in Egypt." In *World Pyramids Encyclopedia*, edited by Y. Kawae and E. Sato. Taipei: MOOK Publication Inc, 2022, pages 16–83. (In Chinese)

CLAIRE MALLESON

"Archaeological Approaches to the Logistics of Feeding Ancient Egyptian Workforces: The Value of Traditional Techniques and Consistent Methods," *Proceedings of the First International Conference on the Science of Ancient Egyptian Materials and Technologies,* edited by B. Gehad and A. Quiles. Cairo: Institut Français D'archéologie Orientale, 2022, pages 132–142.

RICHARD REDDING

"What I Have Learned: Assumptions Bad, Intersections Good." In *The Ancient Egyptians and the Natural World: Flora, Fauna, and Science*, edited by S. Ikram, J. Kaiser, and S. Porcier. Leiden Sidestone Press, pages 223–231, 2021.

Lectures and Presentations

MARK LEHNER

"Large, Dense and Heterogenous at Giza: A Proto-City for Building Pyramids Comparing Urban Heterogeneity." Aarhus University, June 27, 2022.

"Giza and the Pyramids: Deciphering the Old Kingdom Land- and Waterscape." Sorbonne University, the Bibliothèque nationale de France, and the Académie des Inscriptions et Belles-Lettres, May 16, 2022.

MARK LEHNER and PIERRE TALLET

"The Red Sea Scrolls: How Ancient Papyri Reveal the Secrets of the Pyramids," York Festival of Ideas, June 2022.

YUKINORI KAWAE

"A Study on the Chevron of the Great Pyramid Invented in the Age of King Khufu," 63rd Congress of the Society for Near Eastern Studies in Japan, November 30, 2021, online.

"Reconstruction of Ancient Visual Information in the Pyramids Based on 3D Survey," Nagoya University Initiative Webinar, December 13, 2021, online.

"Open Innovation Project in the Pyramids of Egypt", Frontiers of Engineering Japan, June 24, 2022, Nagasaki Prefectural Art Museum. (In Japanese)

"Reconstruction of ancient visual information in the pyramids based on 3D survey," Nagoya University Initiative Webinar, December 13, 2021, online. (In Japanese)

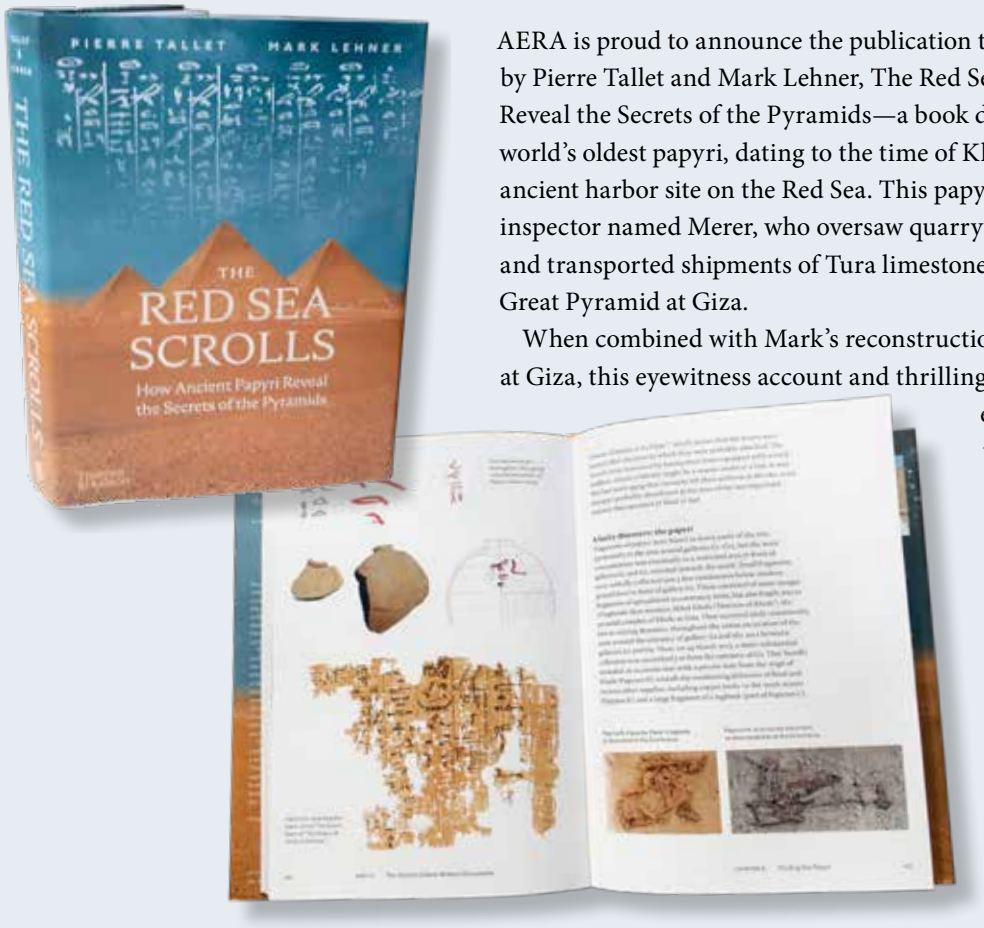
"3D Surveys in Egyptian Archaeology", National Geographic Explorer Spotlight Asia, November 30, 2021, online.

"Study on the gable structure in the pyramids invented in the reign of King Khufu", the 63rd Annual Meeting of the Society for Near Eastern Studies in Japan, October 30, 2021, online. (In Japanese)

CLAIRE MALLESON

"Feeding the Forces: Providing for the Pyramid Builders. What was on the menu for the Pyramid builders?," Interview by The National, May 27, 2022. Online at https://www.youtube.com/watch?v=losxtRHkvgg.

The Red Sea Scrolls: Ancient Papyri Reveal Pyramid Secrets



AERA is proud to announce the publication this year of an important work by Pierre Tallet and Mark Lehner, The Red Sea Scrolls: How Ancient Papyri Reveal the Secrets of the Pyramids—a book detailing the discovery of the world's oldest papyri, dating to the time of Khufu, from Wadi el-Jarf, an ancient harbor site on the Red Sea. This papyri includes the diary of an inspector named Merer, who oversaw quarry workers while they prepared and transported shipments of Tura limestone for the construction of the Great Pyramid at Giza.

When combined with Mark's reconstruction of the waterways and harbor at Giza, this eyewitness account and thrilling tale provides new detail and explores how the building of the pyramids helped create a unified state, propelling Egyptian civilization forward.

Now available at Amazon and Bookshop.org.

RICHARD REDDING

"Using Faunal Data to Examine Ancient Diets." LSA, University of Michigan, September 15, 2021.

"Animal Use at Giza: The Life History of a Study." Ministry of Tourism and Antiquities, Saqqara Training Center, October 26, 2021.

"Life in the Field." Kelsey Museum, University of Michigan, November 5, 2021.

"Status and Diet at Giza." Long term perspectives on Foodways & Agriculture in North East Africa. Brussels Institute for Advanced Studies, April 6, 2022.

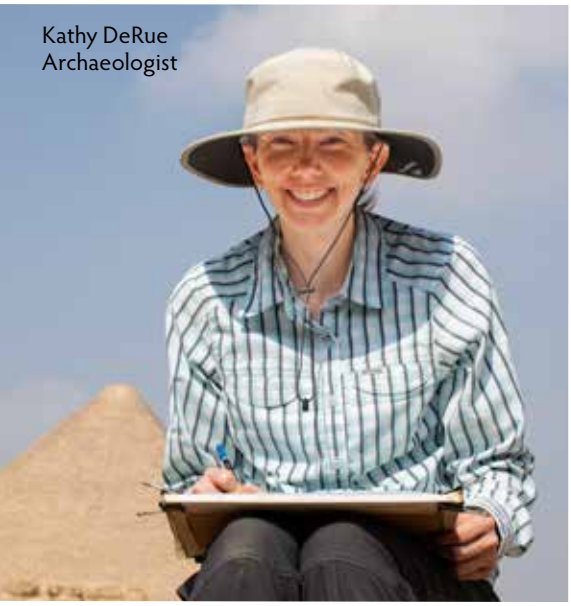
ALI WITSELL

"Old Kingdom Seals and Sealings from Recent Excavation in the Menkaure Valley Temple, Giza." Ameircan Research Center in Egypt Annual Meeting May 6, 2022, online.

SCENES FROM 2021-2022

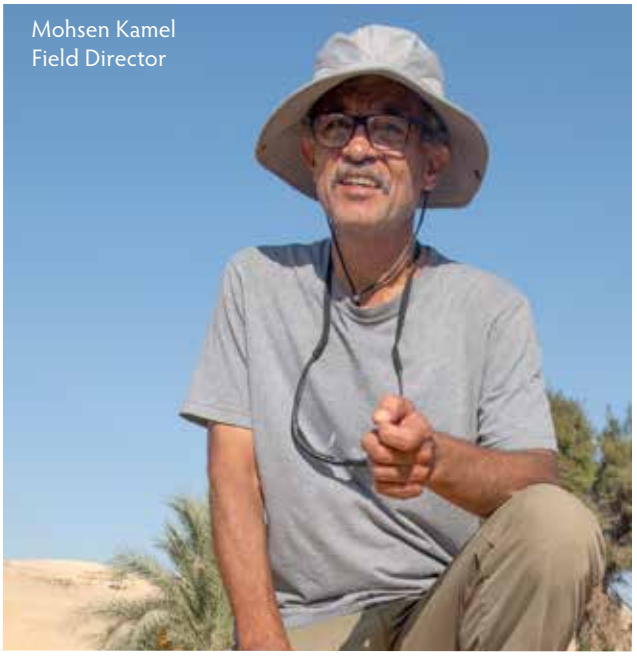
From left: Mohamed Abd el-Hamid Sufi, Ahmed Ibrahim Gooda, and Sayed Gamal work to clear deposits under the ground water of the Dyad Hole.

Claire Malleson
Archaeobotanist
Lab Director



Kathy DeRue
Archaeologist

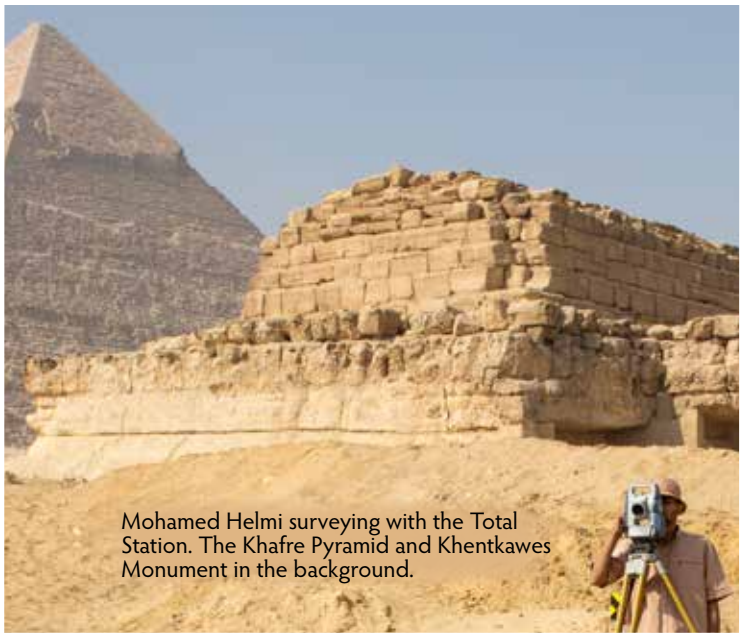
At Heit el-Ghurab an ibis surveys the reeds recently cut down and soon to be hauled away.



Mohsen Kamel
Field Director

Dan Jones, Archaeologist

Anna Wodzinska, Ceramicist, and Aisha Mohamed Montaser, Ceramicist



Mohamed Helmi surveying with the Total Station. The Khafre Pyramid and Khentkawes Monument in the background.

Visitors tour the southwest corner of the Menkaure Valley Temple with Mark Lehner.

Workers use sledgehammers to demolish modern buildings from the Abu el-Hol soccer club.

Workers cut down the "forest" of reeds covering the south end of Heit el-Ghurab.

Workers sort pot sherds at the Heit el-Ghurab site. Many baskets of sherds wait in the foreground.

Working set wet-sieved samples out in the drying yard during Fall 2021.

THANKS TO OUR DONORS

The generous contributions of our benefactors and members make 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. Donations through December 2022 are included.

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