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An Alabaster Workshop for a Pyramid City

A return to an early excavation area resolves a decades-old question … 2

A Special(ist) Story

Objects, stone tools, sealings and an alabaster workshop … 6

Sealingspalooza 2023

Surprises from the backlog … 13

Something Great

A day in the (dig) life at AERA … 22

In Memoriam

Dr. Richard Redding … 29

Below: Daphne Myhrvold and Ben Bazely begin excavating in Enclosure 1 at the Heit el-Ghurab site. See what they uncovered in the article beginning on page 2. Photo by Ali Witsell.

An Alabaster Workshop for a Pyramid City

by Daphne Myhrvold, Ben Bazely, and Dan Jones

On the Giza Plateau, one becomes a time traveler with the simple scrape of a trowel. In the sun and shadow of the pyramids, with Saharan sand blowing in the breeze, the AERA team digs 4,600 years into the past, striving to uncover and understand the everyday lives of people who lived and worked in the Heit el-Ghurab (HeG) settlement, aka the Lost City of the Pyramids. Each season brings a new goal, a different mystery to be investigated and fit into the puzzle of this 4th Dynasty (ca. 2,600 BC) city of the pyramids—who lived and worked there, what the societal structure looked like, how the city was built and managed.

In our Spring 2023 Field Season, we revisited a question we first asked 21 years ago: What was the function of Enclosure 1 (E1), one of a series of five large enclosures, all contiguous, attached to the west side of the Royal Administration Building (RAB) in HeG where in 2002 AERA team members found alabaster* chips and in 2005, more chips and a large block of alabaster embedded in the surface—all hints of an alabaster workshop? During the Fall 2022 and Spring 2023 seasons we exposed the layout and full extent of one E1. Much of it had been buried under the soccer field until 2021 when we were allow to begin excavating it.[1] With our 2023 work we resolved the question about an Egyptian alabaster workshop.

At HeG we have found evidence of stone workshops, including some for manufacturing objects out of a variety of stones, as indicated by drilling tools and vessel fragments. In addition, we have recovered alabaster fragments, some with worked surfaces, and alabaster dust in many places across HeG, much of it in dumps. Was there a workshop creating alabaster objects in E1 or was the enclosure a trash midden for alabaster waste from stone workshops elsewhere?

EARLY HINTS OF A WORKSHOP

Before answering this question, let's go back to where this story began. In 2002 an AERA team discovered E1. Just to the west of the RAB they exposed an entrance off RAB Street. It opened onto a corridor running between RAB's west wall and an enclosure with three chambers, numbered Rooms 1 through 3 (see map on page 3).

* Technically, this "alabaster" is travertine, a form of gypsum, and not the same as the calcite or calcium carbonate rocks that make up typical alabaster. For this reason, the stone discovered is referred to as "Egyptian alabaster."

Enclosure 1 during the 2023 season, view to the northwest. Photo by Mark Lehner.

The excavators removed debris that had accumulated as the building collapsed, including bread mold sherds, ashy material, and other trash that indicated these E1 rooms had become dumps in the city's twilight years. They also found the first hints of a stone workshop—abundant worked pieces of Egyptian alabaster with sharp, angular surfaces—and suggested that an alabaster workshop could have been somewhere nearby.

In 2005, AERA returned to E1 with a team of students in the first AERA–ARCE (American Research Center in Egypt) field school for inspectors in the Egyptian Ministry of Tourism and Antiquities (MoTA). The students extended the excavations south, exposing more of the three rooms and the corridor. They found more alabaster fragments, many of which had been worked, and a large rectangular block of alabaster (see photo, page 4).

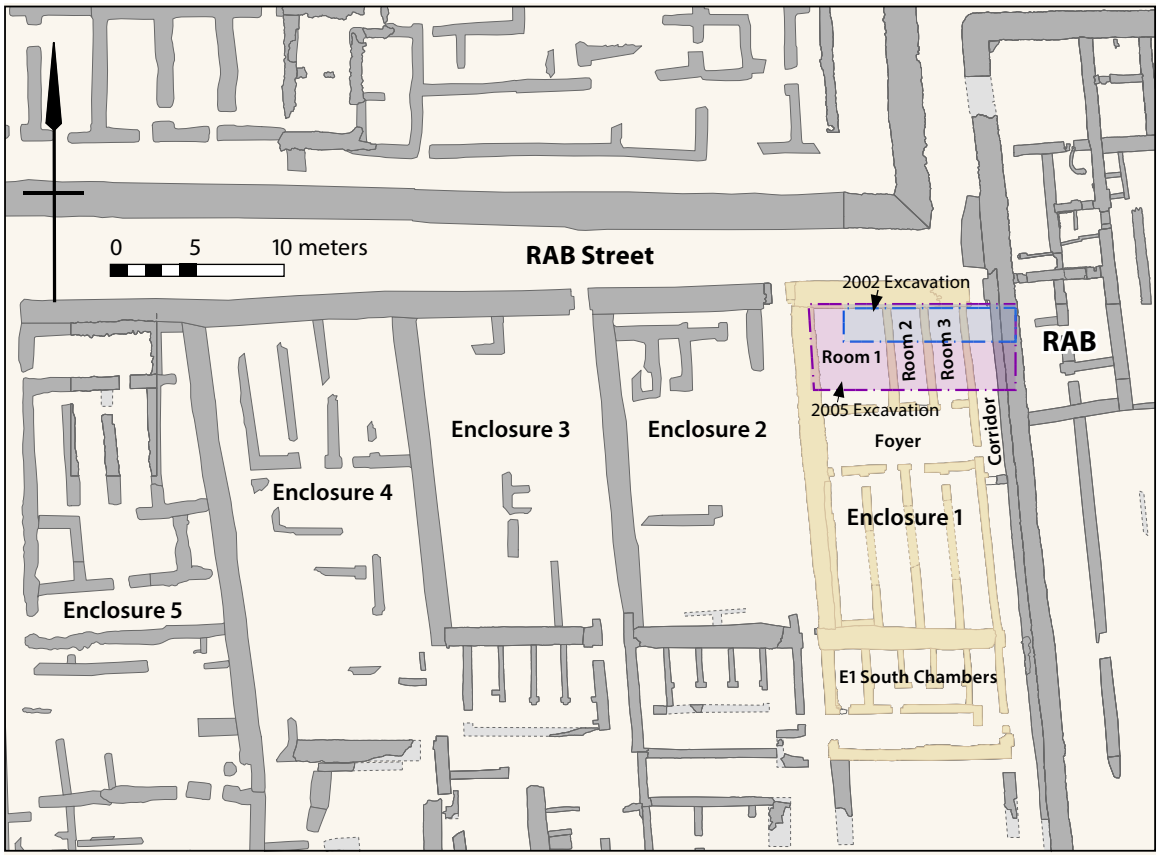
RETURN TO ENCLOSURE 1

Seventeen years would go by before AERA returned to E1. In Spring 2022 with the northwest end of the soccer field stripped off, we were able to uncover the southern end of the enclosure. Our excavations revealed its layout, which includes small chambers on the south end and longer gallery-like rooms in the center section. But we could not answer the lingering question about the alabaster workshop. In January 2023, we returned to explore the northern end of E1 to finally determine if a stone craft workshop once functioned in the enclosure or nearby.

EXPLORING E1

The entrance off RAB Street leads via three low steps down into the corridor, which runs 27 meters, the full length of the building. A door once opened and closed at the base of the stairs as indicated by a limestone pivot socket where a pole on which the door was mounted could rotate and secure E1 from RAB Street (photo, page 5). Clearing down through debris from the collapse of the mudbrick walls in this corridor and surrounding areas, we encountered kilo upon kilo of alabaster fragments, along with huge quantities of red and black granite fragments—another clear indication of stoneworking.

Part way down the corridor, another door opened into a foyer that gave access to the three northern rooms and the long galleries. The foyer would have been a bright space as it must have been open to the elements. We don't know how high the walls stood, but if they were full height, the room would have been too wide to support a flat roof. The distance across the chamber, including the bounding walls, was 4 meters, exceeding the 3.5 meters maximum distance that ancient Egyptian flat roofs could span, unless supported by columns, of which there was no evidence in the foyer.



Map showing E1 and its immediate surroundings in the Heit el-Ghurab site. E1 is one of five similarly oriented enclosures (E1 to E5), each about 10.20 meters wide, separated by thick fieldstone walls. The pale gray walls with dotted lines are projected. Map by Rebekah Miracle, AERA GIS.

In Room 1 we found good evidence of an albaster workshop, described below. But Rooms 2 and 3 offered no artifacts or features that might indicate how they were used, except for the floors. A brilliant white floor in Room 2, made of gypsum or crushed limestone, is unlike any floor we have seen at HeG. The other E1 floors we exposed are hard-wearing surfaces, while Room 2's is more friable and not as durable, so it was probably not meant for heavy footfall or heavy manual work. Room 2 may have had a formal or administrative function. On the other hand, the beaten mud and clay floor in Room 3 could take rough use.

Both rooms are only about 1.80 meters wide. If the walls rose to full height, these chambers were narrow enough to have been roofed without a support column. A roof would been desirable if Room 3 had been a storeroom, but if used for craft work, good light would have been essential, ruling out a roof.

AN ALABASTER WORKSHOP

During our Spring 2023 excavations we finally recovered unequivocal evidence that solved our craft workshop question.

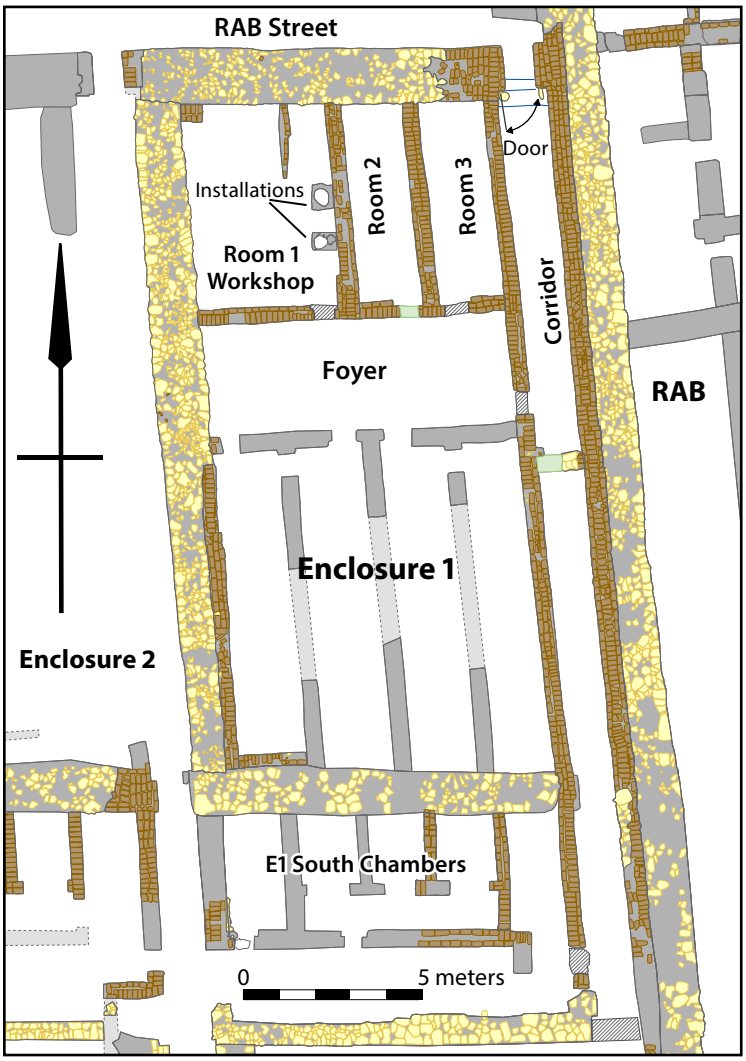
We recovered more fragments of worked Egyptian alabaster along with tools and clay sealings related to craft production. But even though these rooms and the corridor were also filled with alabaster dust and fragments, we believe they came from somewhere nearby, not necessarily E1 itself. But when we dug down to the oldest floor, and found things where people left them, we discovered yet more worked and unworked alabaster fragments. With finds from 2002 and 2005, the total came to 500 alabaster chips and fragments! We also recovered many stone tools, a cluster of 17 cylindrical alabaster cores, discards from hollowing out blocks of alabaster, and albaster pieces that had been left between the holes that drills cut into the stone (see article starting on page 6).

The large block of alabaster found in 2005 was also telling. Many chips had been knocked from it, likely during an early stage of working. Craftsmen probably intended to remove pieces from this core to transform into objects. But they did not get far into the block and apparently abandoned or discarded it. Perhaps they deemed it unfit for their purposes. Or those chips taken out might have been some of the last work in the workshop before the room was abandoned.

More evidence of an alabaster workshop lay on the floor. The surface was beaten crushed alabaster and silt, thicker than other HeG floors we have encountered. Along the west wall, workers built two low emplacements of clay. A shallow depression in the center of each might have held an alabaster block in place while craftsmen chipped/drilled/hammered/sanded away alabaster to create small objects.

Still more evidence of the workshop may await us in future field seasons as there is much more

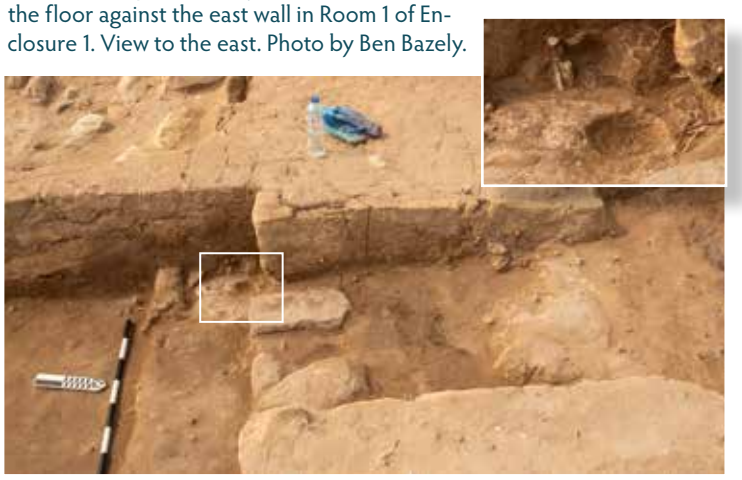
Excavators at work in E1. The alabaster block (shown in the inset) appears in E1 where it had been placed temporarily. View to the northwest. Photos by Mark Lehner.

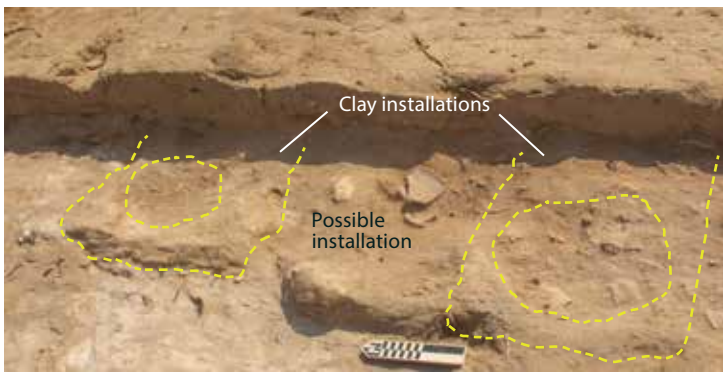


Map of Enclosure 1 following the 2023 Spring excavations. Map by Rebekah Miracle, AERA GIS.

Below: The entrance to the corridor in Enclosure 1. Inset: socket that a door pivot once swung on. View to the west. Photo by Ben Bazely.

Bottom: The possible clay installations, outlined with a dotted line, on the floor against the east wall in Room 1 of Enclosure 1. View to the east. Photo by Ben Bazely.





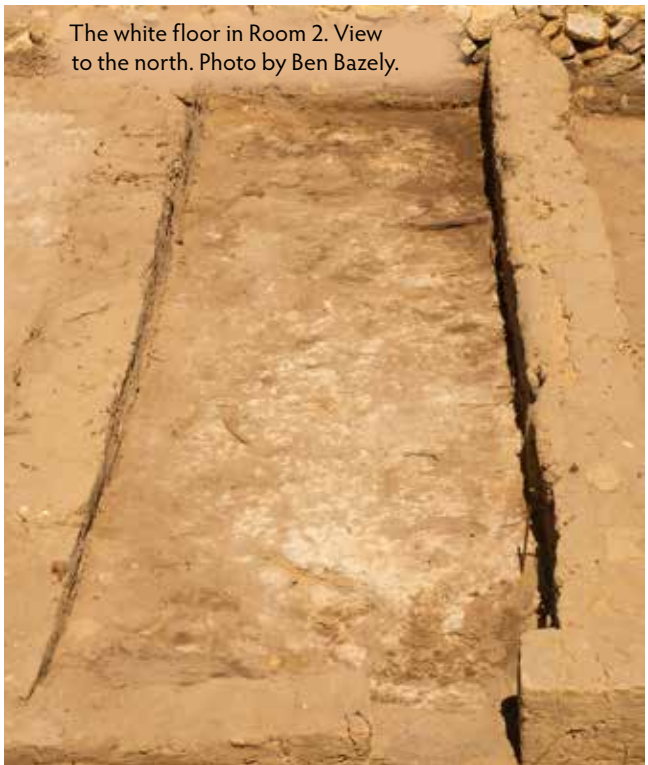
to excavate in Room 1. But we have more than enough evidence to say that Room 1 was a workshop dedicated to making objects out of alabaster. This is a first for HeG. In all the years we have worked here we have not found a workshop for alabaster exclusively.

What were craft workers in the E1 workshop making out of Egyptian alabaster? Almost certainly not jars, vases, bowls, and cups, as there were no clear vessel fragments. An abundance of worked fragments with flat surfaces suggests that they were primarily cutting alabaster blocks to further reduce into a variety of objects. See the article starting on page 6 to learn what Emmy Malak, AERA small finds specialist, thinks these might have been. But note that there is more to excavate, so we may find vessel fragments in the future.

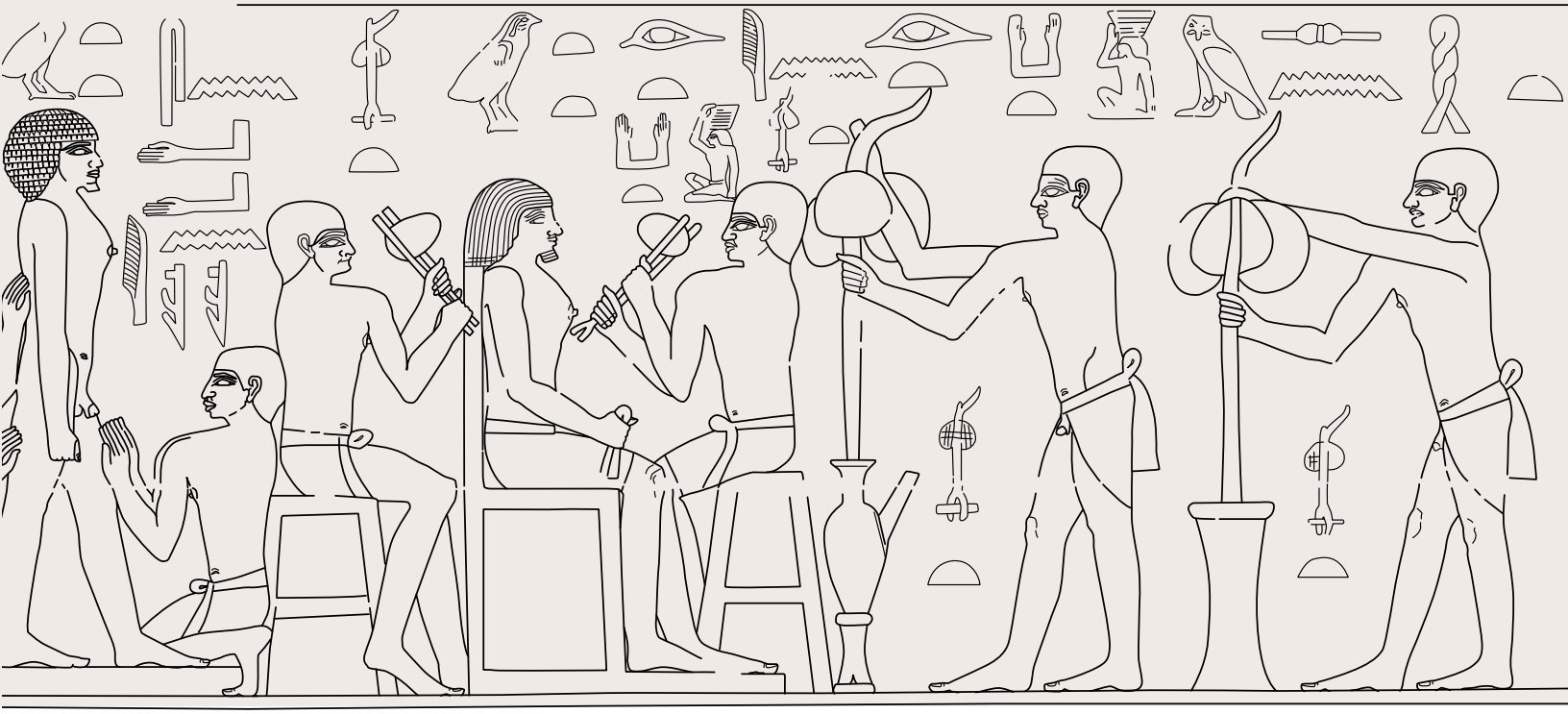
MORE QUESTIONS

Our work this season answered some important questions about E1 that had lingered for almost two decades. However, as is the case with all excavation work, we ended our season with many more questions. What type of work was being undertaken in the four long rooms on the south side of the foyer? What secrets does the E1 workshop still hold? Are there workshops in the other four enclosures that lay to the west? How and why was E1 connected to the RAB? Hopefully, we will be able to tackle these questions in a future season, but for now, we have an enormous amount of information from this season that requires further study and interpretation.

1. M. Lehner, 2021, "Soccer Field Sondages, Palace Promises," *AERAGRAM* 22-1 & 1, pages 2, 7–10.



The white floor in Room 2. View to the north. Photo by Ben Bazely.



A Special(ist) Story: Stone Craftsmen in Enclosure 1

by Emmy Malak, Samar Ibrahim, and Ali Witsell

At AERA, certain team members specialize in the analysis of different kinds of material, what archaeologists call "material culture." These specialists breathe life into the ruins of the Giza Plateau by studying the small bits of material culture excavated by the dig team. With their analyses of stone tools, lithics (chipped stone tools), animal bone, small finds, clay sealings, pottery, and more, the specialists add to our reconstructions of daily life at Giza. But their interpretations of the function of ancient objects are often just that—interpretations. Since objects might have been put to a second use before being discarded, we may fail to see their original function.

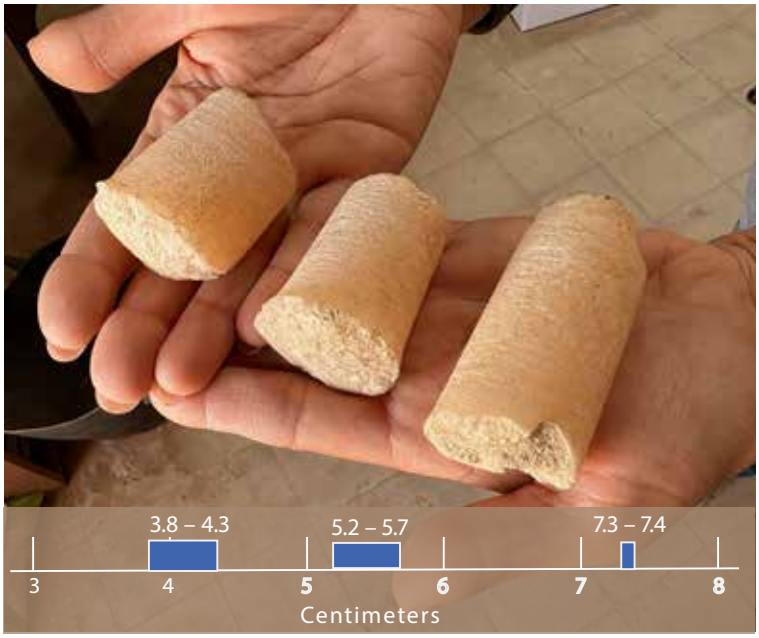
Enclosure 1 at Heit el-Ghurab is the rare exception. It is not often that several different kinds, or classes, of material culture come together to tell as clear a story as the one currently unfolding here. AERA specialists Emmy Malak (small finds), Samar Mahmoud (lithics), and Ali Witsell (clay sealings) present preliminary thoughts on how the lithics, small objects, and sealings illuminate a craft workshop in Enclosure 1 and perhaps another nearby.

Enclosure 1 (E1) yielded overwhelming evidence of stoneworking. In the article starting on page 2, the excavators describe the rooms and features they found. We specialists working with the artifacts they recovered produced much of the data that "clinched" the hypothesis that E1 was a craft workshop, with perhaps another nearby. We identified and documented direct and indirect evidence of the tools workmen used to hollow out objects, as well as abundant byproducts and discards from manufacturing Egyptian alabaster objects, and even sealings related to craft work. From combining our analysis with the work of the excavators, we are sure that Room 1 held a stone craft workshop, covered with stoneworking waste. But what were they making?

EGYPTIAN ALABASTER OBJECTS — *E. Malak*

The discards from stoneworking included fragments of alabaster with worked surfaces, innumerable alabaster chips, drill cores, and alabaster pieces with concave surfaces bearing fine concentric lines from drilling. We registered in total 545 Egyptian alabaster objects/fragments from the 2002, 2005, and 2023 seasons. Nearly all of the alabaster pieces that show signs of working have one or two flat, smoothed surfaces, probably pieces chipped off a block as artisans shaped an object. Two examples are shown in the photo on the bottom of page 7.

Craftsmen probably used many of the tools found in E1—pounders, abraders, hammers, anvils, polishers, grinders, and axes—to finish objects by removing stone and smoothing and flattening their surfaces. To hollow out the interior of objects, they used a variety of tools. E1 yielded evidence of an assembly of a stone drill bit, crankshaft, and copper tube—all known from tomb scenes of craftwork and drilling.



Page 6: A craft workshop scene depicting, on the right, craftsmen using drills to hollow out stone vessels, and, on the left, completing the details on two statues, from the 5th Dynasty tomb of Ti at Saqqara. After H. Wild, *Le Tombeau de Ti III* II: La Chapelle (Deuxième Partie). Vol. 3. Cairo: l'Institut français d'archéologie orientale, 1966. plate CLXXIII. Drawing prepared by Ali Witsell.

Top: Three drill cores illustrating the three different sizes found in E1. The bar graph shows the ranges of the sizes. Photo by Ali Witsell.

Above right: The cache of drill cores found in E1 in Room 1. Photo by Mark Lehner.

But we only have indirect evidence of the copper tube; the metal was much too precious to allow any loss or pilferage. On the other hand, we have ample evidence of stone drill bits in E1.

E1 DRILL CORES & COPPER TUBE DRILLS, *E. Malak*

When craftsmen hollowed out objects with copper tube drills, they cut out a core, a byproduct or waste, which is our indirect evidence of the drill. In the E1 workshop we recovered 21 drill cores, 17 clustered together along the northern wall in the workshop (photo, top right, above).

Most interestingly, the drill core lengths fall into three groups: 3.8–4.3, 5.2–5.7, and 7.3–7.4 centimeters (shown in the graph and photo, top left). Although we are uncertain as to why, it seems likely these groupings must relate to the size of a finished product made multiple times, with the longer cores extracted from larger, deeper objects.

Drilling was probably the first step in finishing the interior of an object. When creating boxes like canopic chests and sarcophagi, the craftsmen would hollow out the interior by repeatedly drilling and removing core after core and knocking out the pieces left between drill cavities, using a hammer and copper chisel. We found examples of

Two of the many fragments of Egyptian alabaster in E1 that craftsmen had worked to form smooth, flat surfaces. The fragments are probably pieces of objects that broke before they were completed. Photo by Mark Lehner.

EGYPTIAN ALABASTER

Ancient Egyptians liked to use "alabaster" for making objects, such as statues, jars, bowls, and vases. Although this stone is often referred to as alabaster, it is actually travertine, a form of gypsum. It does not have the calcium content that normally makes up true alabaster and is also harder than alabaster. Therefore it is often called "Egyptian alabaster."

But they also worked with other types of stone, such as limestone, diorite, basalt, granite, and slate, some of which, along with alabaster, also served as building materials. Stone objects were placed in the kings' mortuary temples, and in the tombs of royal family members, priests, and high-ranking officials.

Menkaure's two temples were stocked with great quantities of stone objects—some of alabaster. Many were probably carried away by looters in antiquity. Nonetheless, when George Reisner excavated the temples in 1906–1907 and 1908–1910, he recovered many broken objects, statute fragments, and even some whole statutes.

Large statues were probably crafted close to the temples, but smaller objects might have been created at Heit el-Ghurab (HeG), including alabaster pieces like some of those that Reisner found: offering tables, model basins, model wands, and a great many alabaster vessels. Perhaps some were even made in the E1 workshop.

stone that had been left between drill holes, and then knocked out: 42 "negatives," pieces of alabaster with concave drilled surfaces. Two are shown on the right.

Artisans used crescent drills to complete the drilling process, discussed on the facing page. Once the interior was cleared, they would finish the walls and floor by abrading and smoothing the ragged surfaces.

Negatives, pieces of alabaster left between drill holes. Photos by Amel Eweida.

Right: Emmy Malak, AERA small finds specialist. Photo by Mark Lehner.

ANCIENT EGYPTIAN DRILLS

We have a decent idea of how copper drill tubes worked based on a combination of tomb scenes, texts, archaeological evidence, and especially Denys Stocks's experimental archaeology.[1] Most of the discussion of copper drill tubes in this article is drawn from his work.

The copper tubes were force-fitted onto a wooden shaft that workers prepared from a branch or stem of a tree. They may have formed the tube by pounding a sheet of copper around the end of the shaft or casting it in a mold.

The tubes varied in size and were probably driven by a couple of different methods. The small tubes, such as the ones that would have cut out the drill cores found in E1, probably worked with a crankshaft mechanism, like the ones illustrated in a scene from Mereruka's 5th Dynasty tomb at Saqqara in which two workers drill out vessels, shown on page 10. (We should note, though, that most of our E1 worked alabaster pieces have smooth, flat surfaces, reflecting a different sort of object, perhaps a box.)

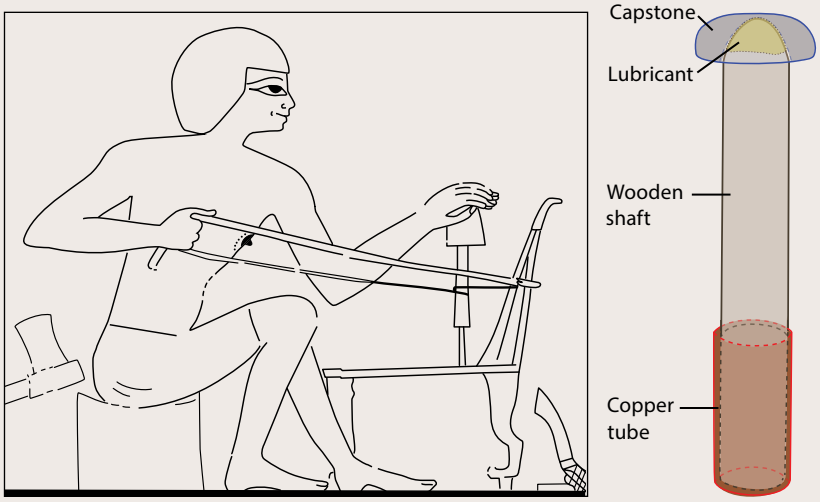
The drill in the scene consists of a shaft weighted with two bags or nets filled with stones or possibly sand. The operator turns the handle at the top with one hand while the other steadies the vessel. He may have used a twist-reverse-twist motion[2] or possibly turned the handle continuously in a 360° path.[3] The business end of both drills in the scene are inside the vessels, unseen, but they may have been either copper tubes or crescent drill bits made of chert, described on the facing page. After the artisans drilled out a column, they would have enlarged the interior with a wide crescent drill bit and/or a stone borer.[4] They may have also used quartzite drill bits, like those we have found at HeG.

Craft workers also used a bow-driven mechanism with the copper tube drill, like the one a carpenter is using in a scene in the New Kingdom tomb of Rekhmirē in Thebes (below). But the copper drill here was not a tube, but probably a chisel-like tool.

For small copper tubes, the craftsperson probably worked the bow themselves. As they pulled it back and forth with one hand, the rope turned the shaft, which rotated back and forth inside a lubricated capstone that the craft worker held in their other hand to steady the drill. The copper tube gradually cut through the stone, aided by sand abrasive. For large copper tubes used to hollow out large objects, two workers pulled the bow back and forth, while another worker held the capstone on top of the shaft.

We have not found any capstones in E1, but have recovered them elsewhere at HeG, as well as drill cores similar in size to the E1 cores, measuring 2.8, 2.9, and 5.9 centimeters across.

No copper tube drills have been found in any Egyptian sites. Nor are the tubes depicted in any tomb paintings. But there is indirect evidence in the form of drill cores, like those found in E1, and telltale striations and holes left in objects.



Left: Copper tube drill fitted to a wooden shaft. Drawing based on fig. 1.5 in D. A. Stocks, 2023, *Experiments in Egyptian Archaeology. Stoneworking Technology in Ancient Egypt*, Second Edition, Oxon and New York: Routledge, page 44.

Far left: Scene from the tomb of Rekhmirē in Thebes showing a carpenter drilling a hole in a chair using a bow-driven copper wood drill. After N. De Garis Davies, 1993, *The Tomb of Rekh-Mi-Re' At Thebes*, Volume II, New York: The Metropolitan Museum of Art, plate LII.

E1 LITHIC TOOLS AND DEBITAGE, *S. Ibrahim*

The most striking find among the lithics from E1 is the large number of crescent drills—29 were recorded within the assemblage. This tool (photos on page 10) was used to carve out and wide a shaft within a object; that is, to help remove the "core."

Crescent drills (also referred to as drill bits) were made from pebbles or quarried raw material that craftsmen knapped (or chipped) to create a bow or crescent shape. They crafted a concave upper edge and a convex lower cutting edge. The E1 drill bits, all chert (also called flint) but one, were made from quarried raw materials—identified by the presence of the chalky cortex on the tool surfaces—and non-quarried pebbles, which were available at Giza lying about in the desert. The desert cortex surface can be seen on the drills where it was not chipped away, polished by wind and sand to a high sheen.

We recovered two types of crescent drills from E1: a tall, or elongated, one, and a wide drill. Some of the tall drill bits show abrasions on the edges of both sides and concentrations of fine lines on the working edges, indicating that they were rotated horizontally (see photo taken through the microscope on the right).

Above right: Photomicrograph showing fine horizontal striations on the side of a drill, evidence of turning within a stone object in order to hollow it out. The photo was taken at 20x magnification. Next to the photomicrograph is the whole tool shown in side view. Tool photo by Amel Eweida. Photomicrograph by Samar Ibrahim.

Craft workers used stone tools, such as crescent drills, for the first step in hollowing out stone vessels. They attached the tall drill to the end of a shaft weighted with stones. As they rotated the shaft, the drill scraped and gnawed away stone inside the vessel (see scene of craftsmen drilling on page 10). To further open the interior space, they may have drilled with the wide drill bits or used stone borers.

We believe craftsmen also put their crescent drills to work hollowing out stone boxes and perhaps other objects with flat surfaces, although tomb scenes only depict drills

Top: Samar Ibrahim, AERA lithics specialist, enters information in her database of chipped stone tools. Photo by Ali Witsell.

Above right: A small Middle Kingdom alabaster box, 16 centimeters long, in the Grand Egyptian Museum (GEM 1426 a–e). Found in the area of the el-Masara/Tura quarries, ancient Egypt's main source for limestone. Photo by Ahmed Mohamed-Elhami Aly, courtesy of the Egyptian Museum in Cairo and Samar Mamoud. Above left: The drawing illustrates clearly the striations left by a crescent drill. Drawing by Samar Ibrahim.

hollowing out vessels. The alabaster box on the right shows holes that appear to be the work of a crescent drill bit.

This large number of drills would in itself be an exciting find. However we also identified multiple stages of the production process, including unfinished crescent drills and flakes (called debitage, on the left), as well as drill bits in different sizes—all of which support the idea that this area was likely a workshop for stone objects and alabaster working.

Above: An unfinished crescent drill bit at the top. Below it, flakes, or debitage, the waste a craft worker generated while chipping a nodule of chert to create a drill bit. Photo by Samar Ibrahim.

1. D. Stocks, 2023, *Experiments in Egyptian Archaeology: Stoneworking Technology in Ancient Egypt*, Second Edition, London and New York: Routledge, page 116.

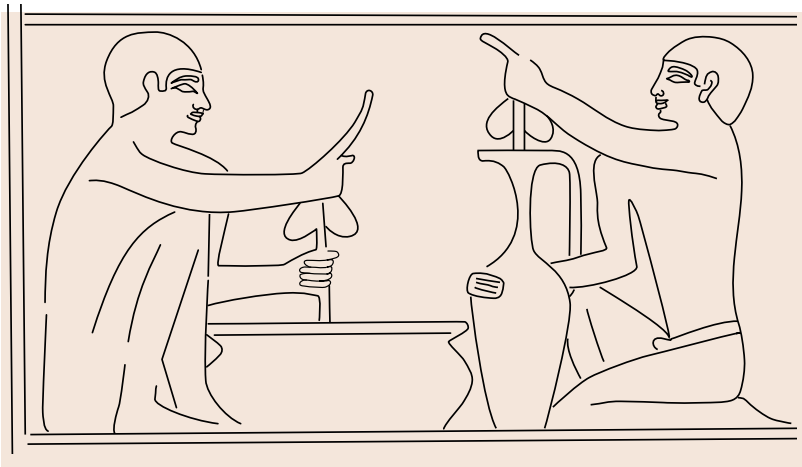
2. Stocks, *Experiments in Egyptian Archaeology,* page 185.

3. S. Saraydar, 2012, "The Egyptian Drill," *Ethnoarchaeology* 4:1, pages 37–52.

4. For more on the borers found at Heit el-Ghurab, see A. Tavares, 2008, "Small Finds, Big Results. Inconspicuous Stones as Key to an Ancient Industry," *AERAGRAM* 9-2, pages 4–5.

Left: A variety of crescent drills from E1. The bottom row shows the front and back images of a wide drill. Immediately above are front and back views of a tall crescent drill. Note the remnants of the chalky cortex in the small drill. Photos by Amel Eweida.

Below: Detail from a craft workshop scene in the 6th Dynasty tomb of Mereruka at Saqqara. Drawing modified from N. Kanawati, A. Woods, S. Shafik, and E. Alexakis, 2010, *Mereruke and His Family*, Part III.1, Oxford: Aris and Phillips, plate 74.



E1 CLAY SEALINGS, *A. Witsell*

We have registered about 145 clay sealings and sealing-related objects from E1. We use the word "seal" for the actual stamp or small cylinder, carved with hieroglyphs or designs that were used to make impressions in clay. We use the word "sealing" for the fragments of clay that received the impression, and that were broken when officials or their representatives opened the bag, box, jar or door. Sealings closed string locks on jars, bags, and baskets; sealed papyrus documents; or locked wooden bins and doors on granaries or buildings. The hieroglyphs on the seals can give us information about the role and responsibilities of the seal holder. At Giza they are also the only source of written (or carved, as the case may be) evidence we have excavated. We refer to other bits of clay, like discarded sealing clay (used, but removed or wadded up), or sealing blanks (small tabs of clay prepared for use as a sealing but never used), as "sealing-related objects" (SRO).

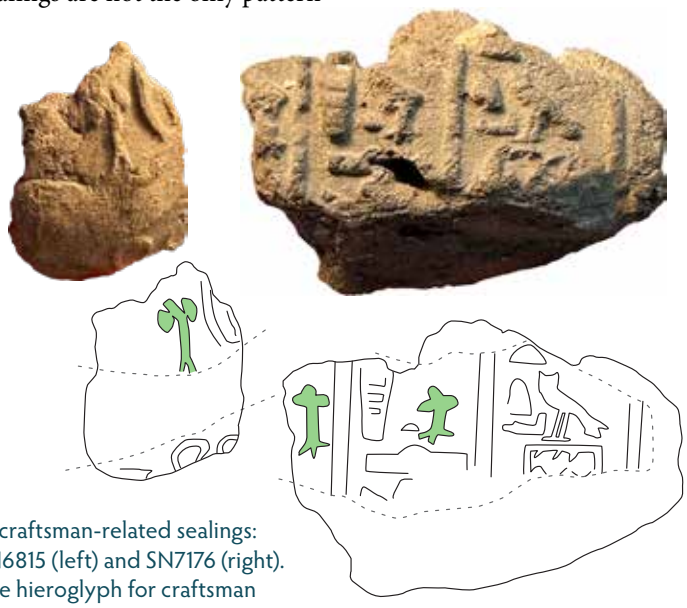
Old Kingdom seals and sealings varied widely. At AERA, we see types as sitting on a continuum from "formal" to "informal." This is an imprecise but flexible terminology that allows us to meaningfully classify and place the sealings we find within the larger study of Old Kingdom seal development. In general,[5] formal seals were used by officials at work in the highest levels of the pharaoh's administration—scribes, priests, judges, and the like—while informal seals are thought to have been for a private individual's or institution's usage. Formal seals usually carry one of the king's names as an incarnation of Horus, god of kingship, written inside a rectangle above panels—a stylized palace facade. This motif, called a serekh (see sidebar, page 17), is thought to have been used only while the king was alive and on the throne. Because of this, we are able to carefully use formals as dating evidence. Within the E1 corpus, we have formals with the Horus names (see sidebar, page 17) of both Khafre and Menkaure (6 pieces and 1 piece, respectively), but nothing dating any later, suggesting that the source building for the dumped E1 material was no longer in use by the time of the 5th Dynasty activity that we know occurred next door in the area of the Royal Administrative Building (RAB) during the time of Userkaf.[6]

We also regularly find informals, but it is unusual for us to find them in greater numbers than formals, as is the case in E1. Where we were able to determine type among the seal-impressed pieces, we have 37 informals to 16 formals. Informals often feature animals (see SN6859 below) and geometric patterns, with larger carving and layouts that are less predictable and more chaotic than formals.

However, informals can also bear job titles, as illustrated in two very important E1 sealings that include the hieroglyph for *ḥmwt* or "craftsman"—SN6815 and SN7176. The sign is an image of a stoneworking drill, made from a forked wooden staff with weighted bags fixed at the top. The fork held the stone drill that rotated as the artisan spun the stick, hollowing out the vessel below. Several scenes from tombs dated from the Old Kingdom (see drawing on page 6 showing stoneworkers from the tomb of Ti) show a drill and how it was used in the process of manufacturing stone vessels. The sign (shown in green) is clearer in SN6815; it is more abstract in SN7176. SN7176 also seems to contain a portion of the title *imy-r³ ḥmwt*, "overseer of craft(smen)," in its middle column. Although we have seen this sign in two other HeG sealings, it is by no means common, and having two examples occurring within the same deposit is a coincidence that merits our attention.

SN6859, an informal cylinder seal impression from E1, featuring a nature scene of animals, including a crocodile, (likely) a ram (upper right, with horns unfortunately not preserved in the top break), and parts of three birds in tête-bêche (head-to-tail or head-to-head) arrangement. Photo by Ali Witsell.

However, the two craftsmen sealings are not the only pattern



E1 craftsman-related sealings: SN6815 (left) and SN7176 (right). The hieroglyph for craftsman (*ḥmwt*) is highlighted on both in green. SN7176 also bears a portion of the title *imy-r³ ḥmwt*, or "overseer of craft(smen)." Photos and drawings by Ali Witsell, with thanks to Brendan Hainline and Vicky Almansa-Villatoro.

5. For more on the formal-informal continuum, see A. Witsell, 2022, "An Old Kingdom Seal Continuum," *AERAGRAM* 22–1&2, page 30.

6. For the latest on Userkaf at HeG, see "Silos 2022: End Game at Heit el-Ghurab?," *AERAGRAM* 22–1&2, pages 2–5.

worth noting among the informal E1 sealings. Stamp seal impressions also increased—a type of seal that was stamped into the clay rather than rolled across the surface like a cylinder. Scholars have traditionally thought that the use of stamp seals began in Egypt during the late 5th Dynasty, eventually overtaking cylinder seals in popularity during the 6th Dynasty. During the Old Kingdom, stamp seals did not usually include pharaoh's names like the formal seals, meaning we cannot use them as a precise dating tool as we can some cylinder seals. Stamps must be dated in tandem with other material culture, and E1 is another instance[7] where HeG provides evidence suggesting they were already in use during the 4th Dynasty, most likely beginning during the reign of Khafre (or even Khufu[8]), even if they were not yet common. We also found an actual limestone stamp in these same E1 deposits, shown at right, which has a geometric motif similar to some of the E1 sealings. It came from the same feature as the Khafre-dated sealings. Taken in conjunction with the other seal evidence from E1, this might suggest a connection between stamp seals and artisans.

Lastly, another interesting find in the E1 sealings is clear leather impressions. A sealing has two main impressions: the front, which was impressed by the seal, and the back, which takes on the shape of the item sealed. For portable goods such as jars and bags, we much more commonly find textile impressions—leather is actually a rare find at HeG and can be harder to discern. But we have two very clear examples from E1 (SN6812 and SN6820, see photos below).

Impressions made from clay sealing backs showing leather cinched tightly by twine, on either leather bags or leather-draped jar openings; SN6812 (left), SN6820 (right). Photos by Ali Witsell.

Although the excavation team believes that the majority of the E1 stoneworking debris was dumped from a nearby location, we know there was at least a small-scale stoneworking facility in Room 1's first occupation. However, the dumped finds on top tell a cohesive story beyond that first usage, suggesting this "time capsule" came into E1 at the same time as part of the same event, even if we are not exactly sure from where. When we weave together all of these strands of material culture from E1—stone tools, lithics, and clay sealings—with the architecture and finds like the large alabaster block, we are left with an increasingly clear picture of stoneworking and a craft workshop. We hope future excavations in E1 might shed more light on the original source of the dumped material.

STAMP SEALS IN E1

E1 sealings impressed by geometric-motif stamp seals. Below: limestone stamp seal SN7273, shown lifesize (Object 5744). The stamping surface has a small geometric pattern. The top knob for holding the stamp may have originally represented a frog or falcon head. Sealing photos by John Nolan and Ali Witsell; stamp photos by Amel Eweida.

7. A. Witsell, 2022, "Stamp Seals from the Heit el-Ghurab in the Time of Khafre and Menkaure," *AERAGRAM* 22–1&2, back cover.

8. H. Willems, 2018, "'Cylinder Seals for the Lower Classes' Ein Merkmal der Provinzkultur des ausgehenden Alten Reiches?" *Zeitschrift für Ägyptische Sprache und Altertumskunde* 145 (2): 187–204. H. Willems et al., 2009, "An Industrial Site at Al-Shaykh Sa'īd/Wādī Zabaydā." *Egypt and the Levant* 19, 293–331.

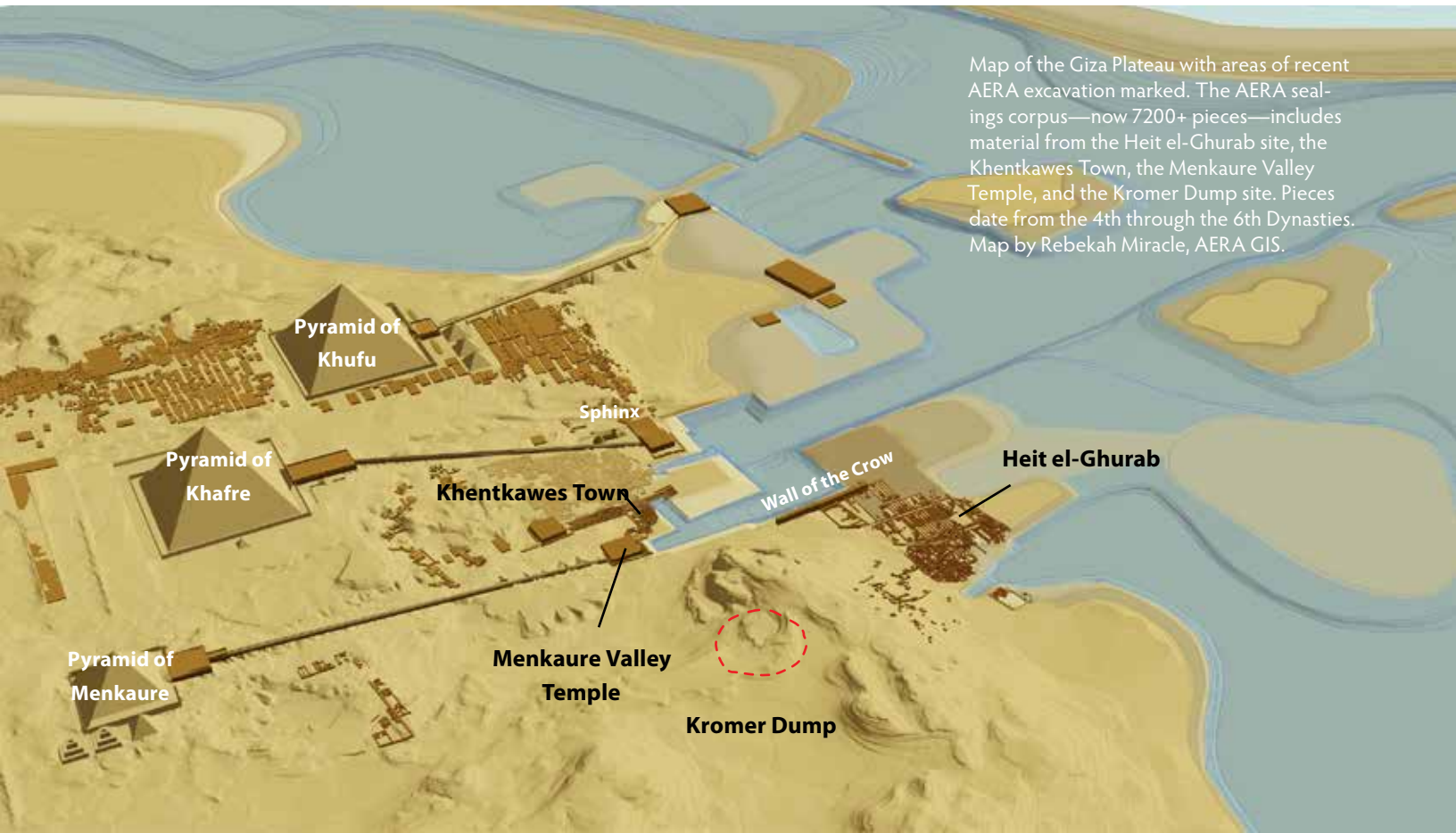
Sealingspalooza 2023: Surprises from the Backlog

AERA's specialists often have backlogs, material they haven't yet had a chance to study. Excavation always moves faster than scientific analysis; a week in the field can produce objects that need two to three weeks of documentation, photography, and illustration just to keep apace. We conduct a quick triage—an assessment and "cherry picking" meant to identify the most important pieces that must be brought to everyone's attention—but it is often impossible to get everything registered in the time allotted. The season ends too soon, or job and family responsibilities call you home. The boxes go back up on the shelves, their contents waiting patiently for their day in the sun, and the lab goes quiet until the next season, when new material flows through the door.

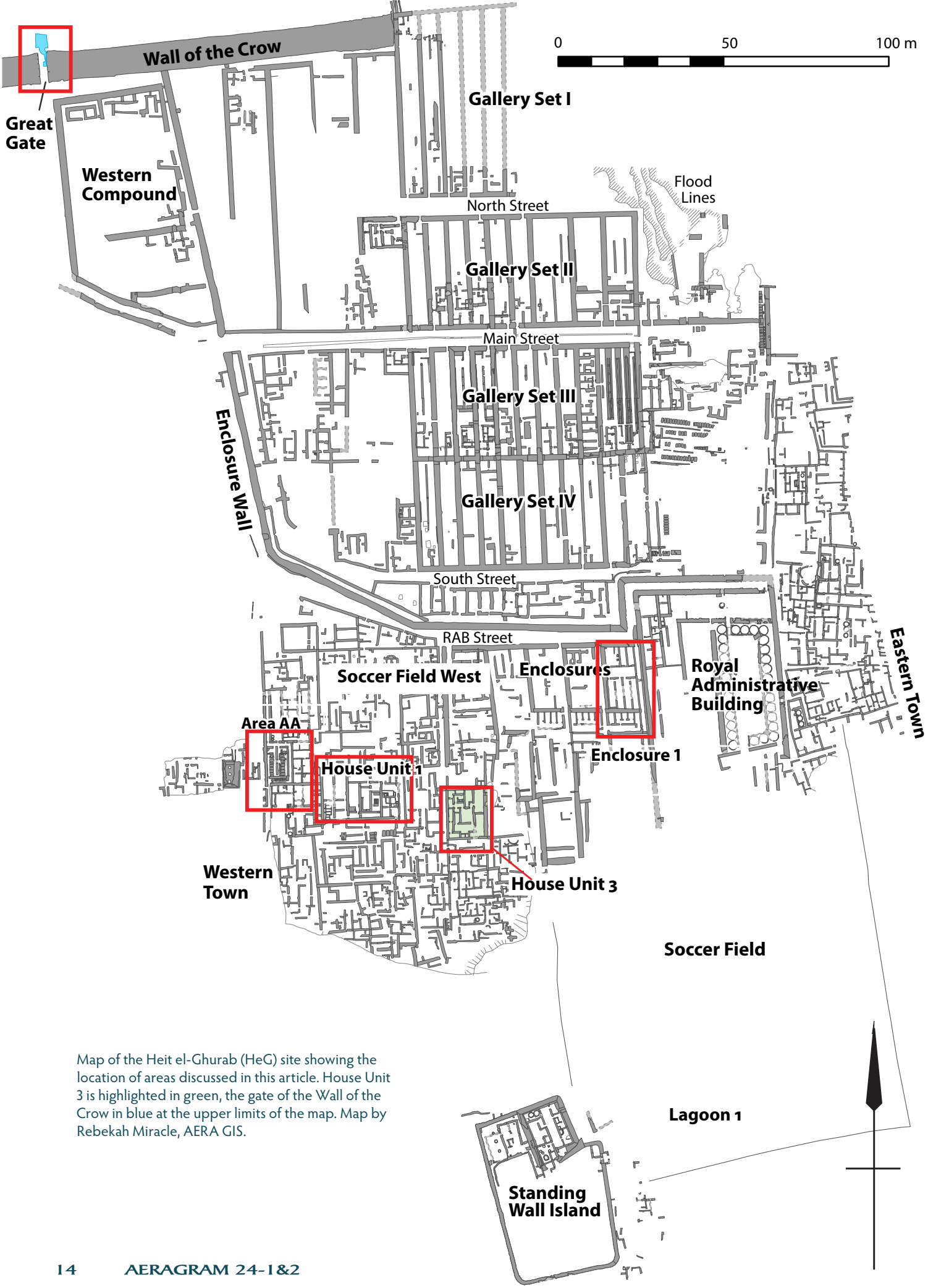
AERA's sealings, and sealings team, are no different. Our backlog has been among the biggest in the lab. So I was grateful and terribly excited when Mark greenlit AERA's first-ever "Sealingspalooza"—funded by AERA's generous donors—a two month-long deep dive with extra staff focused on clearing as much of the sealings backlog as possible. A "lollapalooza" is defined by Dictionary.com as "an extraordinary or unusual thing, person, or event; an exceptional example or instance." And Season 2023 was most certainly exceptional for AERA's sealings team.

Sealings are small pieces of clay that were wrapped around the openings of jars or bags or peg-and-string closures for doors and small bins, impressed by cylinder or stamp seals carved with king's names and officials' titles or geometric or animal designs. At AERA, they remain the primary source of written documentation from our Old Kingdom excavations.

Although AERA team members first excavated sealings in Season 1988–1989, it wasn't until Spring 1991 that John Nolan initiated a proper registry starting at Sealing Number 1. Sealing registration forms were added in the early 2000s, and by the end of Season 2022, we had entered our 6,238th registration form—one sealing at a time. But still, our backlog only grew as AERA's excavations marched across the plateau—the Heit el-Ghurab (HeG), Khentkawes Town, the Menkaure Valley Temple, the Kromer Dump site (see map below and on next page)—this vastly important 4th Dynasty corpus slowly pushing out at its edges, growing to add 5th Dynasty and 6th Dynasty examples to its ranks. Over the years, we kept up as best we could, but I



Map of the Giza Plateau with areas of recent AERA excavation marked. The AERA sealings corpus—now 7200+ pieces—includes material from the Heit el-Ghurab site, the Khentkawes Town, the Menkaure Valley Temple, and the Kromer Dump site. Pieces date from the 4th through the 6th Dynasties. Map by Rebekah Miracle, AERA GIS.



Map of the Heit el-Ghurab (HeG) site showing the location of areas discussed in this article. House Unit 3 is highlighted in green, the gate of the Wall of the Crow in blue at the upper limits of the map. Map by Rebekah Miracle, AERA GIS.




The Sealingspalooza 2023 Team working in the AERA Field Lab: clockwise from upper left, Brendan Hainline, Vicky Almansa-Villatoro, David Jeřábek, and Ellie Westfall. Photos by Ali Witsell.

Below: Ellie, in charge of data entry, with a stack of 1000+ sealing registration forms at the end of the season. Photo by Daphne Myhrvold.

knew that whole groups of important sealings awaited us, boxed up in the lab and sure to change our understanding of Old Kingdom bureaucracy and administration on the Giza Plateau.

So with our palooza officially on, I gathered new team members and brought back old, completed a two-day Giza "Sealings 101" training session, and let them loose with two main goals: clear as much of the backlog as possible, and register new material coming up from Season 2023's excavations in the Royal Administrative Building (RAB) and Enclosure 1 (E1; see map on previous page and story on page 2).

Three team members joined us at Giza for the first time. Dr. Brendan Hainline (Metropolitan Museum of Art, Egyptian Art Department) and I were already working on a full catalog of the RAB sealings from home, so his field time was spent checking old material with fresh eyes and serving as point person on the new RAB and E1 material. Dr. Victoria Almansa-Villatoro (Harvard University) joined us to evaluate a potential future study of the sealings from House Unit 1—the largest single area corpus (over 600 pieces) left in the backlog. She also worked on clearing several smaller areas, including Area AA. Lastly, Ellie Westfall (Kenyon College), who had volunteered previously for AERA as a sealings intern, worked on registering the backlog of sealings from the Kromer dump site and wrangled data entry and photography. Returning team member David Jeřábek (Charles University, Prague) continued registering the Menkaure Valley Temple sealings and a few pieces from the Khentkawes Town.

Staggered over two months' time, the team flew through the backlog boxes. By the time the lab closed on April 10th, the five of us had registered over 1,000 new sealings and sealing-related objects (pieces that are related to sealing production, but not necessarily sealings themselves, like discards or blank starter clay). I cannot thank my fellow team members enough. The data we captured provided new insights and unexpected discoveries, which we are now working on sharing. We need a whole year just to prepare this material properly for publication. But to that end, and as a first step, we are happy to include in this issue two small articles with Brendan and Vicky about surprises they found in the backlog. Both have important implications—Vicky's for chronology and our understanding of HeG in its twilight, and Brendan's for the role of women in Old Kingdom society and bureaucracy and their presence at HeG.

Here's to that next training session—"Sealings 201"!

- Ali Witsell, Sealings Team Lead

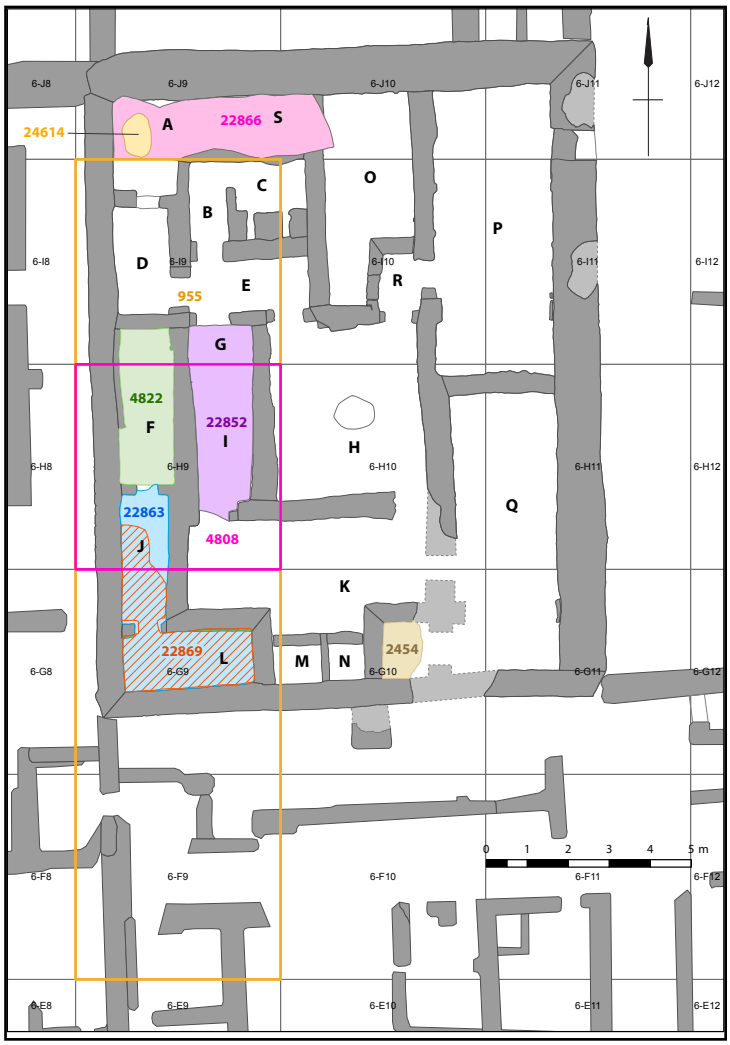
A Very 4th Dynasty House: Two Shepseskaf Sealings from House Unit 3

By Victoria Almansa-Villatoro

The backlog of unregistered sealings from the 2005 excavations at the Soccer Field West (SFW, see map, page 14) yielded some unexpected surprises. We identified two sealings with the cartouche and serekh (see sidebar, page 17) of Shepseskaf—last king of the 4th Dynasty, successor of king Menkaure, and a pharaoh previously unattested at the Heit el-Ghurab (HeG) site. These demonstrate the continuous administrative use of the site between Khafre until Userkaf,[1] the first king of the 5th Dynasty.

Both of these sealings come from House Unit 3 (HU3; also called Western Town House, or WTH, see location on previous page and detail map at right), a house in Soccer Field West—an area known for large well-planned homes belonging to officials. Very little of the 200-square-meter house was left; the walls were eroded down to 1–4 centimeters in height; the southeast corner was especially reduced. The excavator, Mohsen Kamel, found the floorplan featured an open courtyard (with a tree growing in its center, a sign of luxury and an indicator of the longevity of the house) and spaces surrounding it, including an alabaster-working space (Rooms Q and N), areas for cooking/baking and grain storage, and private living quarters.[2] We know very little with certainty about the inhabitants of HU3. In Rooms L and H the floors showed evidence of fires for cooking or baking. Faunal analysis indicated a diet rich in meat, including hunted wild game (addax and hartebeest—additional high-status markers). Black paint was found on the remains of the walls, suggesting a dado, another high-status marker.

Sealing 6336 from HU3, with part of a cartouche bearing the name of Shepseskaf. To the right of it is a corner of a stylized palace facade, or serekh, with the toes of a Horus falcon peeking out atop it. Photo and line drawing by Ali Witsell.



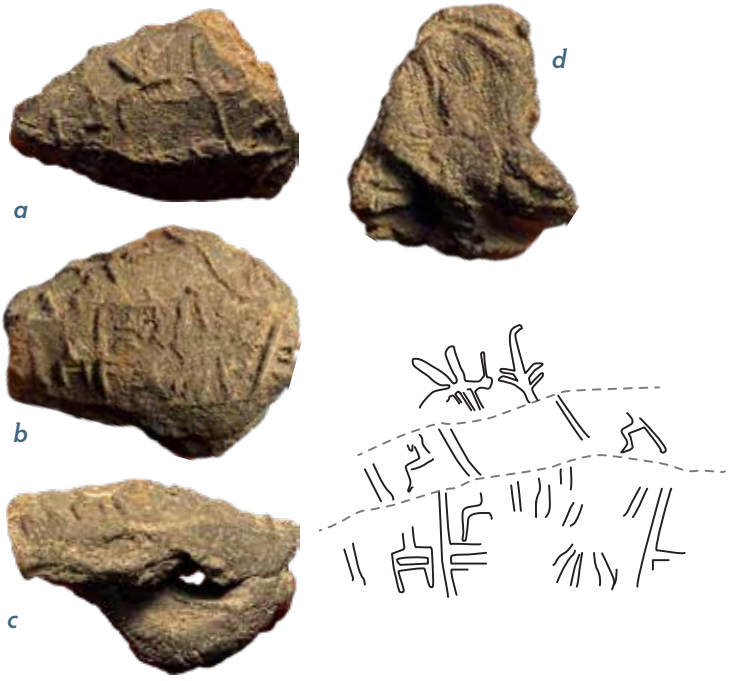
Detail plan of Western Town House, also called House Unit 3 (HU3). Features that included sealings finds are highlighted in color. It should be noted that the eastern side of the house (especially the southeast) saw extensive erosion. Map by Rebekah Miracle, AERA GIS.

Two dozen sealings or sealing-related objects were recovered, including three with clear scribal titles and an additional four with backs that indicate the clay sealed a papyrus document (which suggests literacy). Although it is unwise to jump to conclusions in a structure so heavily eroded, it seems the inhabitants were scribes or involved in scribal activities. There was no cache of sealings overwhelmingly indicative of scribal activity like at the nearby House Unit 1,[3] but these HU3 pieces fall into a pattern that suggests the Western Town served as a scribal area.

The two dozen sealings finds mostly date to the house's last occupation phase,[4] but are a very interesting group with clear scribal ties covering the reigns of Khafre, Menkaure, and Shepseskaf. One Khafre document sealing bears a cartouche of Sneferu, founder of the 4th Dynasty. (This cartouche is likely part of an older estate name related to Sneferu.) Among these two dozen pieces are the two Shepseskaf pieces. They include Sealing 6336 (photo at

left), which came from Feature [24,614] (map above). It is a very small fragment, less than 1 centimeter tall. The back impression is indistinct and largely broken, but a small section showing passes of twine is preserved. The front shows the cartouche (see sidebar below) of Shepseskaf (*špss-kȝ.f,* "His name is noble") and the top of a serekh right next to it, set at a lower height than the cartouche.

Sealing 6338 comes from Feature [22,869] (see map on page 16). It is nearly complete and its back shows the impression of twine and textile. Its general size and clay mass, as well as the way the clay sat on the object and smooshed into the folds of the fabric suggest that it sealed a bag. The front was impressed three times, revealing two different sections of the seal. One of the sections contains two serekhs. Only the two *špss* men of the serekhs and the *nswt bjt* (literally, "[He] of sedge [and] bee," meaning "King of Upper and Lower Egypt") are preserved. The presence of the *nswt bjt* in the top impression means we can suspect a cartouche would be below them, as part of the prenomen (see sidebar below) of the king, but unfortunately it is missing here. The other section shows a few very damaged signs next to the serekh that would have contained the



Sealing 6338 from HU3. Sides (a) and (b) show three overlapping rolls from the cylinder seal, with traces of a serekh with the Horus name of Shepseskaf, and perhaps an epithet of the seal owner. The bottom impression is smeared up and to the right. Side (c) shows a hole through the sealing, where the twine once passed. The back surface (d) shows a detailed impression of cinched textile. Photos and line drawing by Ali Witsell.

Serekh, Cartouche, Epithet, Title: Anatomy of an Official Seal

Cylinder seals come in many types during the Old Kingdom, but one very common type at the Heit el-Ghurab site is the official seal or "Amtssiegel." These were reserved for officials serving in the pharaoh's administration, people like scribes, overseers, and priests. They were carefully carved and highly standardized, such that their hallmarks are often easy to spot when excavating and their layouts easier to reconstruct. One such hallmark is a structure governed by a repeating pattern of serekhs, a rectangular motif representing a stylized palace facade. Atop the serekh is regularly found a Horus falcon, and the space inside the serekh holds one of the five names of the king, this one being called the Horus name. On most official seals, the serekh repeats itself three to four times with a full roll of the cylinder.

The space in between the serekhs are columns typically reserved for epithets related to the king or seal owner, and the job titles of the seal owner. Also usually included is a line above the serekh register for different names of the king, interspersed between the Horus falcons, and a line below, for additional epithets and titles placed in between vignettes related to the strength or piety of the pharaoh. Beyond the Horus name, another common way to write another of the king's five names on an official seal is within a cartouche—an oval shape with a line at one end, thought to represent a rope tied in a loop. It contained the prenomen (or throne name) or the nomen (the "Son of Ra" name) of the king. — *Ali Witsell*

Below: Two reconstructed official cylinder seals used at Giza during the 4th Dynasty reign of Khafre. The top belonged to a scribe from House Unit 1, the bottom to a scribe and purification priest known to us from the Kromer Dump site. While the artisan(s) who carved them used the repeating serekh pattern as the backbone of their layouts, the cartouche is used in different ways.

Horus name of Shepseskaf, *špss-ḫt* (preserved on a different impression). Only two signs are recognizable in the lines between the serekhs:  *wḏꜣ mdw*, probably part of the title "the one who justifies (*smꜥ*[*w*]) the judgments (*wḏꜣ mdw*)," preserved also in Seal 7[5] from House Unit 1. This is a scribal title.

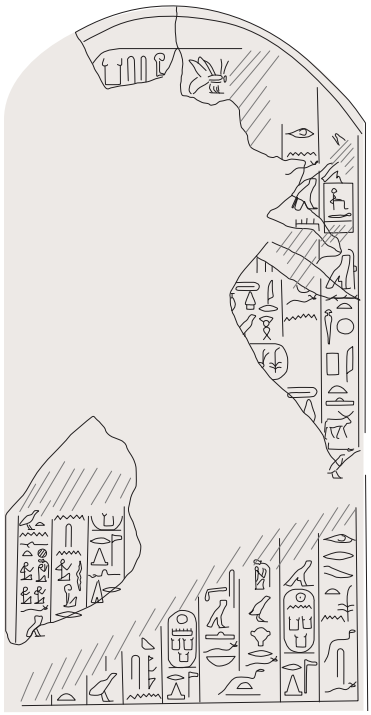
Given the lower level of the cartouche in 6336 with respect to the serekh in Sealing 6338, they came from different seals, which confirms that two different official seals were in use in SFW during the short reign of Shepseskaf. Both sealings show a similarly fine and small carving of the signs, which is also found in another Shepseskaf sealing from Tomb G5080 in Giza.[6] Overall, Shepseskaf's seal(ing)s are a rare finding, with only four other examples published so far.[7] With these two SFW sealings added to the picture, half of all known Shepseskaf's sealings have been uncovered in Giza.

Shepseskaf was the successor of king Menkaure (see lineage chart, page 20), but their relationship is unclear. George Reisner, excavator of the Menkaure Valley Temple, concluded that Shepseskaf was Menkaure's son because he completed Menkaure's funerary complex after he died.[8] However, the decree of Shepseskaf that inaugurates the monument and cult of Menkaure does not clarify the former's connection to the latter. Miroslav Bárta suggested that Shepseskaf and Userkaf were both sons of Khentkawes I, who would either be Menkaure's daughter or sister.[9] Given the short reign of Shepseskaf, likely only about four years, it seems reasonable to assume that he was crowned king at an advanced age, which makes it possible that he was Menkaure's brother. Be that as it may, Shepseskaf did not build his tomb close to his predecessor's pyramid, choosing instead to be buried in a large mastaba (the "Mastabat Faroun" or "bench of the pharaoh") in South Saqqara.

Despite not having a funerary monument in Giza, Shepseskaf's presence in his royal ancestors' necropolis is not insignificant. As mentioned above, he finished Menkaure's pyramid complex, issuing the oldest-known royal decree (see drawing at right) as proof of his endeavor. Reisner found seven pieces of the decree in debris on the floor. It reads:

> Horus Shepes-Khet. The year after the first occasion of counting of the cattle and all animals, which was done to the side of the king himself. He made his monument for the King of Upper and Lower Egypt, [Menkaure]. (As for the) Pekher offerings […] in the Pyramid of Menkaure. […] As for the pekher offerings placed [for] the King of Upper and Lower Egypt, [Menkaure] […] priestly duty is performed on account of it perpetually […] All his managing decisions perpetually.

Above: The Mastabat Faroun at Saqqara, Shepseskaf's 100-m long mudbrick tomb, which was cased in red granite and Tura limestone. It is unclear why he chose to be buried at Saqqara rather than the Giza Plateau. Photo by Mark Lehner.



A drawing of the oldest-known royal decree in Egypt. It was issued by Shepseskaf to establish a cult for Menkaure, his predecessor, as well as an endowment free of taxation for the workers of his pyramid complex. Found by George Reisner in Menkaure's Pyramid Temple. Drawing after H. Goedicke, 1967, *Königliche Dokumente aus dem alten Reich*, Ägyptologische Abhandlungen 14, Harrassowitz, fig. 1, page 17.

The above-translated portion follows with a few fragmentary lines that declare the temple, its priests, and town-dwellers exempted from taxation. The decree proves that Shepseskaf started a cult for Menkaure and endowed its workers, who were probably living in the Menkaure Valley Temple-Khentkawes Town. The Shepseskaf sealings from SFW suggest that, even if he did not have a pyramid there, the king's officials had administrative tasks to conduct near the construction sites in Giza. Did state officials have a reason to interfere with the workers' and cult officiant settlements after a royal pyramid had been finished? Alternatively, could official seals be used by people in their internal everyday activities as well? Or were those Shepseskaf seals in use only while Menkaure's complex was being completed?

Returning to HU3 and its sealings, these two small pieces help us dial in on a very narrow historical window—just four years of time. That this one house saw scribal activity of Khafre, Menkaure, and Shepseskaf suggests a continu-

ity not only of scribal tradition across the reigns of three pharaohs but also a continual presence associated with this part of the town. It also suggests that HeG still had an active scribal population, buildings still functioning as in previous reigns, and the administrative engine was still functioning to the extent that new seals could be issued, presumably, at the switch between the reigns of Menkaure and Shepseskaf.

Shepseskaf's short reign seems to have left, nonetheless, a somewhat remarkable imprint in Giza. The name Shepseskaf-ankh ("Shepseskaf is alive") was borne by some individuals, like the owner of Tomb G6040 in the Western Cemetery, who were buried or mentioned in Giza mastabas dated between the end of the 4th Dynasty and the time of Niuserre, sixth king of the 5th Dynasty. Shepseskaf-ankh of G6040 was an overseer of a royal estate of Niuserre, which Reisner hypothesized was located in Giza.[10] It is possible that Egyptians serving new kings would still show devotion to the king they recognized as founder of the funerary endowment of Menkaure's pyramid town. As the SFW sealings show, sealers were working on behalf of Shepseskaf at some point close to the larger Menkaure Valley Temple-Khentkawes Town area. Shepseskaf's connection with Giza was thus felt as real as that of the three kings who built pyramids there.

1. J. Nolan, 2012, "Fifth Dynasty Renaissance at Giza," *AERAGRAM* 13-2, pages 2–5. See also "Silos 2022: End Game at Heit el-Ghurab?," *AERAGRAM* 23 1-2, pages 2–5. All back issues of *AERAGRAM* are available for free download at www.aeraweb.org.

2. M. Kamel, 2015, "The Ground Plan as a Tool for the Identification and Study of Houses in an Old Kingdom Special-Purpose Settlement at Heit el-Ghurab, Giza," PhD dissertation, University of California, Santa Barbara, pages 97–ff., on faunal analysis, see page 109.

3. J. Nolan, 2010, "Mud Sealings and Fourth Dynasty Administration at Giza," PhD dissertation, University of Chicago.

4. H. Mahmoud, 2010, "Data Structure Report of Soccer Field West [SFW House Unit 3," Report on file, AERA Archives, page 15.

5. J. Nolan, 2010, page 183. Seal 7 was reconstructed from pieces found in nearby House Unit 1.

6. G. Reisner, 1955, *A History of the Giza Necropolis II: The Tomb of Hetep-heres the Mother of Cheops: A Study of Egyptian Civilization in the Egyptian Old Kingdom*. Cambridge: Harvard University Press, page 51, fig. 50.

7. P. Kaplony, 1981, *Die Rollsiegel des Alten Reich. Volume 2: Katalog der Rollsiegel*. Bruxelles: Fondation Égyptologique Reine Élisabeth, pages 135–44.

8. G. Reisner, 1931, *Mycerinus: The Temples of the Third Pyramid at Giza*. Cambridge: Harvard University Press, page 241.

9. M. Bárta, 2016, "'Abusir Paradigm' and the Beginning of the Fifth Dynasty," in The Pyramids: Between Life and Death. Proceedings of the Workshop Held at Uppsala University. Uppsala, May 31-June 1st, 2012, ed. by I. Hein, N. Billing, and E. Meyer-Dietrich, Uppsala: Acta Universitatis Upsaliensis, pages 51–74, see page 57 especially.

10. G. Reisner, 1939, "A Family of Royal Estate Stewards of Dynasty V," in *Bulletin of the Museum of Fine Arts* XXVII (220), pages 29–35, see page 30.

*Ḥetepḥeres, but Probably Not *That* Ḥetepḥeres: The First Woman at HeG*

By Brendan H. Hainline

The name of Ḥetepḥeres (*Ḥtp-ḥr=s*, "May her face be content!") is a famous one at Giza and of great importance to the royal family of the Egyptian Old Kingdom. Ḥetepḥeres I was queen to Sneferu, founding king of the 4th Dynasty and father of Khufu, builder of the Great Pyramid (see chart, page 20). Although perhaps most famous for being mother to Khufu—and grandmother to his sons, pharaohs Djedefre and Khafre—she also bore Sneferu a daughter, also named Ḥetepḥeres (sometimes called Ḥetepḥeres A, a princess and sister-then-wife of Ankhhaf, Khufu's brother and a vizier). However, Khufu himself named a daughter after her as well, now known as Ḥetepḥeres II, mother of Meresankh III, who married Khafre. With so many royal women named Ḥetepḥeres in the Old Kingdom royal family, it should come as no surprise that Ḥetepḥeres was a popular non-royal personal name, as well.

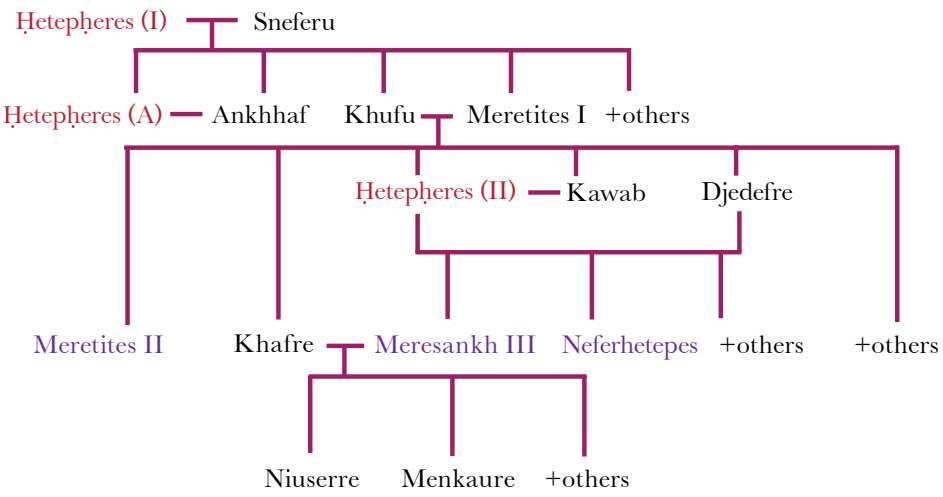
Against this confusing backdrop, we add an interesting sealing to the mix. Originally excavated by AERA and registered by John Nolan in 2001, but re-examined as part of Sealingspalooza in 2023, it was found somewhere in exterior contexts around and through the gateway of the monumental Wall of the Crow (see map, page 14)—the massive limestone wall separating the living community at the Heit el-Ghurab site from the necropolis of the Giza Plateau to the northwest. Sealing 2079 is small, with portions of two impressions preserved; an upper impression was rolled over by the lower main impression.

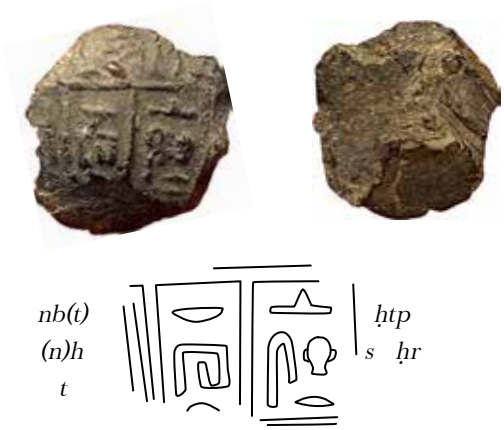
The back of the sealing shows that the clay was pushed against a flat wooden surface on its bottom and had two passes of woven cordage along its side. Even though the sealing fragment is small in size, the traces on the back are consistent with cordage wrapped around a knob on a box; however, it is a different sort of box than the box sealings so well-known from the scribal houses[1] in western HeG—one of a smaller size that needed less clay mass to keep its contents secure.

The seal had a paneled layout and was quite small, maybe just a little more than 1 centimeter tall. We can reconstruct the two main panels. A third, and likely final, panel is partially visible along the left-hand edge, with only traces remaining. In the right-hand panel we see the name *Ḥtp-ḥr=s,* and in the second panel, the epithet *nb(t) (n)ht,* meaning "Lady of the Sycamore"—an epithet associated with the goddess Hathor that is well attested in seals and other texts belonging to priests and priestesses who served

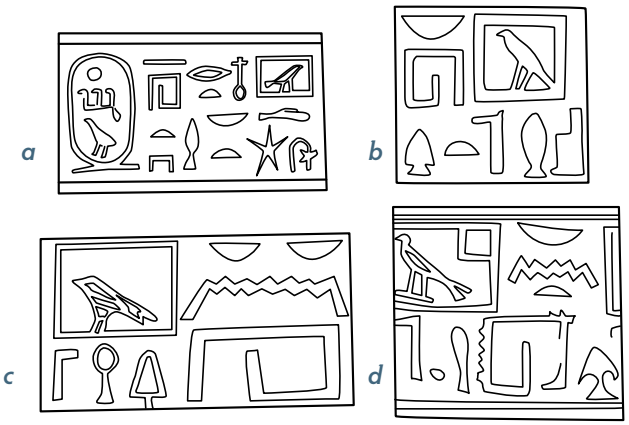
Lineage chart for the 4th Dynasty royal names discussed here. Many of the Old Kingdom royal family relationships are unclear. Several (half?-) brothers and sisters were intermarried, and every pharaoh had more children (and possibly wives) than are shown here. This chart is solely for illustrative purposes of the names mentioned in this article.

The three Ḥetepḥereses in this article are highlighted in red, the three women's names in purple are among the earliest known priestesses of Hathor.





Above: Front and back impressions of Sealing 2079 from Heit el-Ghurab. Below: line drawing of theoretical reconstruction of the seal that produced these impressions. Shown approximately 2:1. Photos and drawing by Ali Witsell.



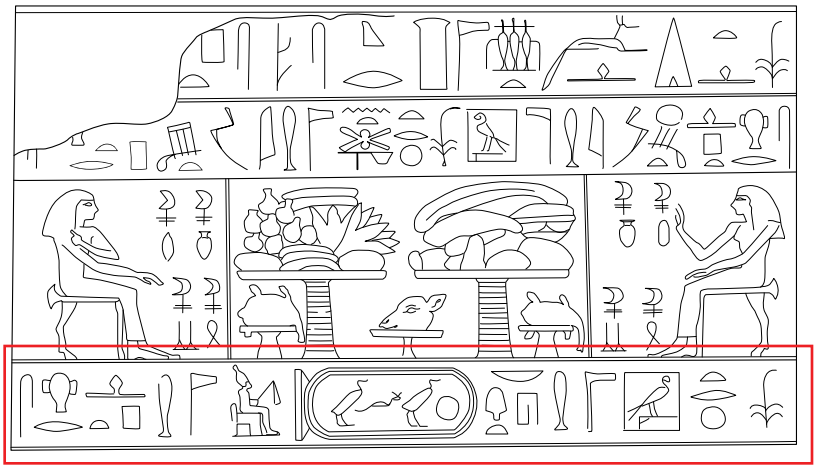
Examples of comparable seals belonging to priests of Hathor of approximate 4th–6th Dynasty date that bear the same *nbt-nht* "Lady of the Sycamore" epithet: a) personal seal from 5th Dynasty reign of Sahure; b) unknown findspot, dated 3rd–6th Dynasties; c) unknown findspot and date; d) private collection, dated 3rd–6th Dynasties. Drawings from (a, Sahure 2) P. Kaplony, 1981, *Die Rollsiegel des Alten Reich. Volume 2: Katalog der Rollsiegel*, Bruxelles: Fondation Égyptologique Reine Élisabeth; and (b–d) E.-M. Engel, 2021, *Private Rollseigel der Frühzeit und des frühen Alten Reiches: Versuch einer Einordung*, Harrassowitz, pages 169–70.

her cult. This is exciting because it is the first sealing found by AERA that seems to have belonged to a woman.

That women had personal seals throughout the Early Dynastic and Old Kingdom period is well-known,[2] but unfortunately they are not well-studied as a corpus. Those that we know[3] tend to be small like 2079, with designs that do not follow the standard, tall, serekh-heavy layouts so familiar[4] from Old Kingdom official administrative seals.

We also know of a few comparative seal examples from priests of Hathor that bear that same "Lady of the Sycamore" epithet (drawings at lower left), but none have a personal name included, as 2079 does. Might this mean the owner of 2079 was a woman of such significance, perhaps royal or royal-adjacent, that she could have her name on a seal? Also based on these comparables, we can make an educated guess that the traces we see in 2079's missing third panel likely contained the hieroglyphic writing of Hathor's name—the Horus falcon (*Ḥrw*) inside the sign for *ḥwt* "enclosure"—which would be an additional indication that the owner of 2079 served Hathor.

The reading on 2079 is quite clear, but the spelling is strange. The 𓊃 ⟨s⟩ in *Ḥtp-ḥr=s* is backwards, an unusual situation. Why, and is it important? Can we tie 2079 to one of the historical royal women named Ḥetepḥeres? There is currently no direct evidence that Ḥetepḥeres I, A, or II were priestesses of Hathor, but we needn't look very far down the family tree to find one (see names in purple above). The earliest known attestation[5] of a priestess of Hathor, Lady of the Sycamore (*ḥmt-nṯr Ḥwt-Ḥrw nbt nht*) is found on a statue base[6] belonging to a princess Neferhetepes, daugher of Djedefre and Ḥetepḥeres II at Abu Rawash—8 kilometers from Giza and site of Djedefre's pyramid. We know also that Khafre's queen, Meresankh III (Ḥetepḥeres II's daughter), was listed as a priestess of



Funerary stela of a 4th-Dynasty Hetepheres found by A. Mariette at Saqqara. Drawing by A. Witsell after *Les mastabas de l'ancien empire* (1885).

Hathor in reliefs in her tomb at Giza.

But what about non-royal women named Ḥetepḥeres? Another early attestation was found at Saqqara and dated by Auguste Mariette to the 4th Dynasty as well. It is a funerary stela of a woman named Ḥetepḥeres (see drawing above, highlighted in red). If this Ḥetepḥeres were one of our royals, we would expect that she would be identified as a daughter of the pharaoh (rather than acquaintance of the king), and have a more elaborate burial. The bottom line of the text records the titles:

rḫ(t)-(nj)-swt
(female) acquaintance of the king
ḥm(t)-nṯr ḥwt-ḥr nb(t)-(n)ht
priestess of Hathor, Lady of the Sycamore
ḥm(t)-nṯr Ḫwfw
priestess of Khufu
Ḥtp-ḥrs
Ḥetepḥeres

This Ḥetepḥeres was also a *ḥmt-nṯr* of Khufu, and the seated king (𓀀) determinative reserved for the deceased king was also used—both are hints that she worked in Khufu's funerary cult and thus lived (at least partially) after he had died. Also, she presumably was working in Giza at Khufu's mortuary complex, in the time we are interested in. But why was this Ḥetepḥeres, a priestess of Khufu, and her stela buried at Saqqara? Saqqara is not far from Dahshur, home to Sneferu's three pyramids and his presumed resting place. Even though this stela was not found at Giza, we are still quite entangled with familiar Giza plateau personalities and not far from the royal sphere. We know that Meretites II, a daughter of Khufu buried at Giza, was also both a priestess of Hathor and Khufu like this Ḥetepḥeres.

However, this stela is relevant to our sealing both because of the name Ḥetepḥeres and the *nbt nht* "Lady of the Sycamore" epithet of Ḥatḥor, and on this stela, this Ḥetepḥeres's name is spelled with that same backwards 𓋴 ⟨s⟩ that we also find on 2079. Thus we know that this was an acceptable writing during the Old Kingdom of *Ḥtp-ḥrs* and we know from both the statue base and the stela that "Lady of the Sycamore" was used as an epithet of Hathor in the 4th Dynasty in the so-called Capital Zone around Giza and Saqqara and was used in conjunction with women in the royal family in their role as priestesses of Hathor. Further, it is suggested that Hathor worship reached new heights during the 4th Dynasty, most especially during the reign of Menkaure (perhaps directly related to the owner of 2079's seal!), whose famous triads[7] depict him with personifications of Hathor and list him as "beloved of Hathor, Lady of the Sycamore."[8]

Where does this leave us? Unfortunately 2079's findspot—in an exterior context, unrelated stratigraphically to any dateable architecture—does not help us narrow it down to a specific Ḥetepḥeres. But we should remember that even royal women destined to be queens were once just princesses. It is possible 2079's Ḥetepḥeres later "married up," and received new titles and responsibilites. Although we cannot say much conclusively, this small box sealing is of great importance to discussisons of the role of royal women (and women named Ḥetepḥeres everywhere) in religious and funerary cults during the 4th Dynasty, and is the clearest evidence of women at the HeG to date.

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1. J. Nolan, 2010, "Mud Sealings and Fourth Dynasty Administration at Giza," Ph.D. dissertation, pages 94–98.

2. J.-P. Pätznick, 2005, *Die Siegelabrollungen und Rollsiegel der Stadt Elephantine im 3. Jahrtausend v. Chr: Spurensicherung eines archäologischen Artefaktes*, BAR International Series 1339, page 121.

3. E.-M. Engel, 2021, *Private Rollseigel der Frühzeit und des frühen Alten Reiches: Versuch einer Einordung,* MENES 8, Studien zur Kultur und Sprache der ägyptischen Frühzeit und des Alten Reiches, Harrassowitz. For example, see feminine names *Nḏt-kꜣ* (page 62), *Snḏmt* (page 65), *Jnnt* (page 69), *Nfrt-Ḫwt-Ḥr(w)* (page 101), and *Nfr(w)t* (page 110). Note also that Engel claims five seals as belonging to *ḥmwt-nṯr* (and thus are seals of women, including several of the examples shown here on the previous page), but none of these are clearly marked with the feminine (*t*), pages 169–170.

4. So-called "Amtssiegel," see J. Nolan, 2010, "Mud Sealings," pages 61–62, and his seal reconstructions from the Pottery Mound corpus. For other examples, see *Aeragram* 22-1, page 5.

5. R. A. Gillam, 1995, "Priestesses of Hathor: Their Function, Decline and Disapperance," *JARCE* 32, pages 211–237, see page 214 especially.

6. Louvre E 12632. https://collections.louvre.fr/en/ark:/53355/cl010010385

7. For more on Menkaure and Hathor, see F. Friedman, "Broken, Buried—And (Often) Bewildering," *AERAGRAM* 20-1, pages 10–14, and "Art and Accounting of the Heb Sed," *AERAGRAM* 23, pages 18–26.

8. G. Reisner, 1931, *Mycerinus*, page 109.

Something Great

by Daphne Sinclaire Myhrvold

Daphne joined the excavation team at AERA in the fall of 2022, and she was hooked—on Giza and on excavation—and returned for the Spring 2023 season. Here she describes arriving for her second season and then takes us through her typical workday at the Heit el-Ghurab site, starting at 5:45 am.

CAIRO AIRPORT, CAIRO, EGYPT

February 2023 began in Moustafa's* car, bumping along the bustling streets of Cairo to AERA's villa. Some 22 hours of travel are coming to an end, and the late-night buzz of the city only adds to my anticipation.

At 1:30 am, the car finally stops in front of the AERA villa and Sayed Salah, AERA's house manager and site *reis* (foreman), opens the gate. As I stumble up the villa stairs, the *bowabs* (doormen) carry my bag as if the giant stash of peanut butter, Sharpie markers, ranch dressing, and dark chocolate espresso beans weigh nothing. I fall asleep to the sounds of Giza—car horns, honking geese, and the villa dogs barking in the courtyard.

*The full names of everyone mentioned are listed at the end.

ONE MONTH LATER, STARTING THE WORKDAY

At 5:45 my alarm sounds, but I've been half awake for an hour at least. Though still dark outside, the sky is slowly brightening; the last stars winking out of sight as the city awakens. My roommate Ellie and I get ready for the day, brushing our teeth, cracking jokes about our all-too-fashionable dig clothes, and smearing on layers of sunscreen.

We leave our room at 6:10, ready for the day, and knock on Sarah's door across the hallway. After the usual morning greetings, we stand at her window and look at the pyramids— it has the best view of them. They loom behind the villa walls, golden in the morning sun. We snap a few pictures—I must have hundreds now—and head downstairs to breakfast.

I'm not a breakfast person, but with a day of digging ahead, I pile up my plate with fresh-baked bread, scrambled eggs, Egyptian cheese, and vegetables. People trickle in, grasping cups of instant coffee. Dan and Chris make cheerful conversation while some of us, not properly caffeinated, focus on the food.

The villa is abuzz as we head back to our rooms at 6:30 and prepare for the morning meeting. Dusty dig shoes and jackets are called into service. We stuff brightly colored canvas bags with binders, trowels, and cameras.

South face of the AERA villa in Giza. Photo by Mark Lehner.

Far right: Sunrise on the plateau, taken out the back of the minibus on our way to site. Photos by Daphne Sinclare Myhrvold unless otherwise stated.

Right: A cat begs for snacks at the AERA villa.

Below: Ben (left), Chris (center) and Daphne (right) excavate Enclosure 1 at the Lost City of the Pyramids. Photo by Sayed Salah.

The team assembles in the courtyard for our daily meeting at 6:45, led by Mark. While the site and lab operate in different places, their roles are deeply interconnected, and these meetings keep everyone informed. We gather around a semicircle of benches, meant for us but occupied by the villa's dogs and a tiny, fierce cat. They weave between errant mugs of instant coffee, relentlessly demanding attention with no regard for the morning meeting.

Ten minutes later we load the minibuses—one for the site and one for the lab—and take off to the pyramids, with bags on our laps and around our feet, and a box of water strapped to the roof of the van. The villa disappears into Giza's street labyrinth behind us.

After clearing the checkpoint at the Giza Plateau entrance, the minibuses whiz past the pyramids. I watch out the back window as the lab bus turns to drop off Ellie, Sarah, and other specialists working in the lab that day, including Egyptian colleagues Emmy (AERA's objects specialist and deputy director of the lab) and Samar (AERA's lithics specialist), near the pyramids, while we continue to the site. We glide along past the ancient tombs, the tourist police, the camels draped in tassels heading up for a day of rides and photo ops. The weather report predicted clear skies, but the sunrise paints scattered clouds a salmon pink, bright and cheerful behind those three dark limestone peaks. After weaving between the pyramids, the road curves around and you can watch all three pyramids line up for a moment, like a set of massive Russian nesting dolls. By the time we head down the plateau toward the site, the pyramids are small again.

ON SITE

At 7:20 we arrive and are greeted by an army of hopeful dogs. With our welcoming party in tow, we unload camera bags and binders from the van, head to the tent where we store finds and supplies, and then set out across the ancient city to Enclosure 1 (see article on page 2), where we have worked since early in the season.

Grabbing trowels from the canvas bags and boxes, Chris, Ben, Kathy, and I get to work on the north section of the building remains. It's not clear yet what was happening in Enclosure 1, but hopefully the next few weeks will solve some of the mystery.

With hip-hop music playing in the background on Ben's phone, we start to work alongside a large team of workmen. Dan comes by to oversee our progress and

make sure the site is running smoothly. Our inspector from the Ministry of Tourism and Antiquities, Basma, comes to see our work too. After clearing some sand, Basma helps Manami map the walls around Enclosure 1, drawing each mudbrick one at a time.

The digging itself never gets old. Scraping with a trowel, you move dirt and silt and wrestle with roots of phragmites, a troublesome reed that grows rampantly across the site. Then suddenly it appears. A pottery sherd! A broken flint drill bit! A worn out abrader! A clay sealing! A stone tool! A worked piece of alabaster! A bone! A shell! A lump of charcoal!

On their own, these objects don't seem like much, just scraps thrown away when they outlived their useful life 4,600 years ago. For almost fifty centuries, these objects lay forgotten. Their stories, and the lives of their creators, remained untold for all that time.

That's AERA's mission at Heit el-Ghurab: finding the details of everyday life and ultimating deciphering how ancient Egyptians were able to carry out the monumental task of building the pyramid complexes. How they mounted a workforce and supported it; how they procured vast quantities of food, supplies, and building materials from all over Egypt and beyond; how they organized and coordinated all the many tasks. The key to these questions starts with the small finds: broken bread molds and beer jars; discarded stone tools; fractured, cut, or smashed animal bone; and cast off sealings; along with the walls, pits, fire hearths, and other features we meticulously excavate and document.

About an hour into the workday, Sammy, who sorts pottery in the tent and helps guard

Top: Kathy, Daphne, and Ben confer with Dan (far left) in Enclosure 1. Photo by Sayed Salah.

Center left: Manami hand-maps a wall in Enclosure 1. Photo by Mark Lehner.

Center right: A chipped stone drill bit.

Bottom left: Basma hand-maps a wall in Enclosure 1.

Bottom right: *Maktafs* ready to be carried to the sieves at Enclosure 1. Photo by Mark Lehner.

the excavations, treks across the site holding a wooden plank. Balanced carefully on top are four steaming cups of instant coffee. We can tell how cold Sammy is by how many coffees he delivers over the course of the day. One particularly windy day in February, he made us each six cups!

As we dig, the finds are collected in bags and bins to go to the lab for analysis. The remaining dirt is piled into black rubber *maktafs* (baskets) and taken to the large sieve, where everything we've missed is filtered out and sorted. While some finds, like beer jars and pounders, are quite easy to spot as we trowel, many bits of sealings, lithics, and bone fragments have to be caught in a sieve.

There are even smaller bits that require special recovery methods, because they are very hard to spot and impossible to pick out: charred plant remains, tiny bones, beads, minute flint chips, and small sealings pieces. So samples of dirt are set aside specifically to recover these minuscule, but informative, artifacts.

The sun rises steadily over the plateau; wispy clouds giving way to pure blue skies. We slowly shed our jackets as the site heats up, and it's time to put on more sunscreen.

At 10:00, the site, buzzing with chatter, abruptly goes silent. It's time for second breakfast. We traipse back to the tent, where Dan unwraps grease-spotted newspapers to reveal our breakfast: the infamous chippy sandwich. The first time I saw one last fall, I wondered if Dan and Ben were pulling a prank on me. An envelope of bread stuffed with a handful of French fries. No sauce, just starch wrapped in starch. Apparently it's well known in the UK, but this was my first encounter. Our other option is *tamiya*, the Egyptian version of falafel, with pita bread and pink and orange pickled vegetables. We sit around the table with another cup of instant coffee and a stunning view of the site and the pyramids rising in the

Left: Adham Hassan Farouk sieves excavated materials from Enclosure 1 at the Lost City of the Pyramids, helping recover many small finds, including sealings, beads, and lithics. Photo by Sayed Salah.

Below: Overview of excavations at Enclosure 1, a structure in the Lost City of the Pyramids, view to the south-southwest. Photo by Mark Lehner.

Above: Ben, Daphne, and Chris write bag labels for small finds, including lithics, pottery, bone, and sealings, to be sent to the lab. Photo by Sayed Salah.

Above right: Daphne ties up wet sieve bags. Photo by Sayed Salah.

Right: Preparing paperwork and bag labels at the Lost City of the Pyramids.

Far right: Boxes of small finds are prepared for lab analysis. AERA's meticulous cataloging system helps us determine where exactly an object was found.

distance. Hazy in the late morning sun, tour buses and lines of camels wrap around the monuments. Sometimes we chat during the break, but some days we're quiet and just watch the world move. Across the plateau, visitors swarm around the pyramids and tour buses clog the narrow roads.

Towards the end of breakfast, I pull a handful of Snickers out of my bag. What began last fall as a bid to get rid of leftover candy has become a daily ritual, and we all eat some chocolate before heading back to dig.

I've spent most of March in Room 1, the big room in the northwest corner of Enclosure 1 (map on page 3). During the 2005 season, field school students concluded that part of this room was a bakery late in its occupation. But Kathy and I keep finding bits of worked Egyptian alabaster. Each time we find one of these pieces—most smaller than your palm, some the size of a fingernail, smoothed on at least one side, and slightly translucent when held to the light—we put it in its own bag, make a label, and take a GPS point with the Total Station. The point will be used to place it on the site map in our GIS. By the end of the season Kathy and I will have recovered over 500 pieces. It almost feels silly to keep taking GPS points, but, as Mark reminds us, we're digging for information, not treasure. All of this data could be invaluable to future researchers.

It's quitting time at 1:00 for most of the Egyptian workers, and as they leave, the site falls relatively silent. For the rest of the day, it's the five of us foreigners, *Reis* Sayed, and a handful of workers.

Everything moves faster in the afternoon, especially as the end of the workday nears. There are empty flour sacks to lay out to protect delicate structures from the elements until we return. Bag labels with bag numbers must be made—new ones for each bag of pottery, each box of lithics, charcoal, bone, and shell, and one for each object we find. Some days, we spend almost an hour just making labels.

At 3:00 Dan gives the signal, and we start packing up. The paperwork—feature logs, bag registers, notes—and Nikon cameras go in canvas bags, while the rest is destined for the tent. We stroll back across site, passing the Royal Administrative Building excavations, trailed by a few dogs hoping for last-minute snacks.

Above left: Ben and Ellie at a post-work paperwork party.

Above right: The synoptic holds all information on excavation for the season. Photo by Mark Lehner.

Chivalry is alive and well on the Giza Plateau. At the end of the day, I start across the site with several bags, and immediately some of the workers run to help. It's become a bit of a game to see if Kathy and I can make it to the tent with the bags. As kind as their help is, I don't like feeling unhelpful, and I don't want people to think I can't lift or carry things (especially my own purse!). I've managed to convince them to let me carry a few things, but Sayed Gamel still bargains with me for a bag and one of the toolboxes. If I get by with all my bags, he rushes to help Ben and Chris with theirs. Smiling and laughing, he walks ahead of us, carrying three chairs, a bag, and a box!

HEADING HOME

Back at the minibus, the workers load the bags into the backseat and usher us in; everyone's eager to go home. As the minibus lurches out of the site gates, we watch the tent and Heit el-Ghurab disappear behind us.

We slowly wind closer to the pyramids. The Giza Plateau baking in the afternoon sun and crowded with tourists looks a world away from the early morning plateau. Camels and horses veer into traffic with tourists posing on their backs. Our small bus weaves between the crowds towards the main entrance.

BACK AT THE VILLA

We unpack the bags and head into the archive/library to do paperwork. What the movies and history books don't tell you is how much paperwork is involved in modern archaeology. There are photologs and bag registers to enter into the database, feature forms to type into the synoptic (a running list of every feature we've dug, and how it relates to the other layers), stratigraphic puzzles to be unraveled, and countless pages to be prepped and printed out to fill in the next day.

It's here in the archives that the information we uncover every day enters the permanent record. The data is essential for developing an understanding of the site and synthesizing what we have learned. It's essential for our specialists when they analyze their results. And it may be useful for future researchers. You can't excavate a site twice, at least not for the first time. But with the clicking of our keyboards, Heit el-Ghurab enters the digital record, its artifacts and mysteries preserved for the future.

TIME TO RELAX

Dan goes home at 5:00, so the rest of us decide that work is over. It's only two hours till dinner, so we change and go to a nearby gym, along with Ellie and Sarah, who are just back from the lab. It's a short walk along the road, and trucks filled with cows and massive clusters of garlic zip by, their drivers shouting greetings. Everything in this neighborhood has "Pyramids View" in the name, because even at the gym, the pyramids are front and center on the horizon.

We return home at 6:00, with just enough time to shower and catch the sunset before dinner. We cart boxes of corn nuts and beers in cold green bottles up to the roof and watch the sun paint the sky red in the distance, fading rays splashing the pyramids a bright sandy gold. I take photos, as usual, and Ben, a Brit, asks if we don't have sunsets back in the US. Yes, but not like these.

As the sun sets, bright lights illuminate the pyramids, stark and massive against a graying sky. By the time the dinner bell rings at 7:00, the sky is dark, and a few winking stars begin peeking out from behind the clouds and Cairo smog.

DINNER

While breakfast is a bit staggered, everyone sits together for dinner and talks about the day. Vicky and Brendan discuss the *Book of the Dead*. Mark tells stories about old excavations, interesting people he's met, and one night he even shows us how to play the spoons. Fran and Mark's puppy, a golden dachshund named Newbie, sniffs around our feet. Occasionally we end up in discussions about Immanuel Kant or quantum theory. Once a week, there's a dessert, usually Umm Ali, which is a bit like bread pudding.

After dinner, we move to the library and play cards, do one of Fran's 1000-piece puzzles, or watch a show. Ellie, Sarah, and I are crocheting granny squares to make a blanket.

BEDTIME

By 9:30 we're all exhausted, and everyone starts heading back upstairs to bed. The stars are out. I go up to the roof for a last look. If you stand by the right corner of the villa roof, you can watch the giant Egyptian fruit bats flitting about the mango tree. Occasionally they swoop just over my head. I've probably spent too much time on this roof, but there's something almost magical about it: the way the pyramids merge into the horizon, how permanent they feel against an ever-changing urban landscape. Life has continued around these monumental tombs for thousands of years, ebbing and flowing and changing with the centuries.

SOMETHING GREAT

The Giza Plateau never looks as pristine and lifeless as shown in the documentaries I watched as a child. The landscape is alive today, and every day we return to the site to resurrect a bit of the forgotten ancient world, to delve into their routine, hoping to uncover the secrets of their daily lives.

It's easy to forget how ordinary and "normal" these long-dead Egyptians were. In the pages of history books, the ancient Egyptians are mysterious and foreign, their motives and routines cloaked by the wear and tear of millennia gone by. It's easy to think of them as so different

Ellie, enjoying sunset on the villa roof, poses in front of the view of the pyramids.

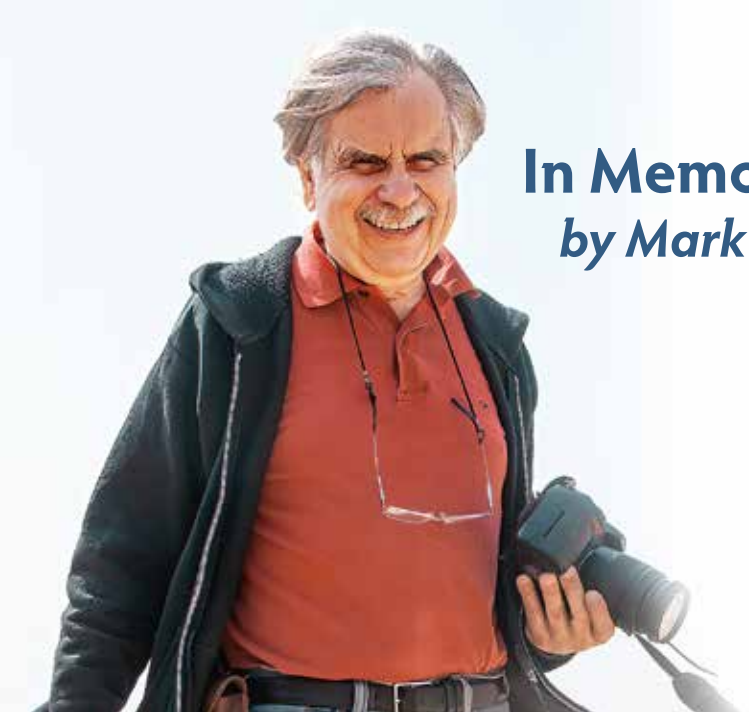
from us, but a day on site will fix that assumption. Digging through the cast-offs of the 4th Dynasty pyramid-builders, one realizes that they're just people, with some of the same emotions and needs, maybe even similar dreams and frustrations, as people today.

In the midst of their garbage, you can almost see the city as it must have been all those centuries ago—crowds moving through tightly packed lanes, a craftsman tossing away in frustration a fractured piece of alabaster after an errant strike with a drill bit. Glowing hot embers in an open-air bakery. Wood smoke wafting over the town. Fiery red bread molds stacked over the hearth flames. The braying of sheep and lowing of cows being unloaded from boats in Lagoon 1 to their new home in the OK Corral (map on page 14). Sacks of grain, possibly fastened with clay sealings, being hauled in and out of the Silo Court. All these sorts of ordinary activities, sights, and sounds went into creating the pyramids of Giza.

Though the remains the builders left behind—stone tools, bones, seeds, smashed pottery, and alabaster chips—may seem small and insignificant bits and pieces on their own, they tell a story that has intrigued the world from the ancient Greeks to modern day scholars for thousands of years. And we get to uncover that story, quite literally peeling back the sands of time, finding the magical in the mundane to tell the story of the pyramid-builders.

It is, without a doubt, something great.

* People mentioned in the text: Ellie Westfall, Sarah Hitchens, Frances Dilks, Mark Lehner, Dan Jones, Sayed Salah Abd el-Hakim, Ben Bazely, Kathy DeRue, Daphne Sinclaire Myhrvold, Brendan Hainline, Victoria Almansa-Villatoro, Manami Yahata, Chris Clark, Basma Abdullah, Samar Mahmoud, Emmy Malak, Adham Hassan Farouk, Moustafa Adel (driver), Sammy Khamis, Sayed Game Ifawzi.



In Memoriam: Richard Redding

by Mark Lehner

As I write, it's been five months since Dr. Richard W. Redding, dear friend, mentor, colleague, and fellow team member, passed away on May 22, 2023. Still reeling, as we push on with fieldwork, we are becoming ever more aware of the vast hole that Richard left. I think we will all especially miss Richard's steady, reassuring presence, and unbounded optimism. Always ready to help in any way he could and always the adult in the room, wise, thoughtful, and calm. I never once saw Richard get angry, uptight, or stressed out—not once!

Richard played many official roles at AERA: faunal analyst, Chief Research Officer, field school teacher, AERA board member, and eventually its Chair and Secretary, as well as generous donor and fund-raiser. And those titles and descriptors only begin to cover the breadth of Richard's contributions. There was so much more. Every season he would help with tasks, like assigning and managing rooms for team members coming and going through the AERA Center at Giza. In the absence of lab director, Claire Malleson, he ran AERA's field lab. When he saw a need he took on the job, such as rehabbing the long-abandoned, rundown villa near the Pyramids that we bought in 2009 to serve as our permanent base in Egypt. Richard stepped up as advisor, sometime overseer, and active designer in the renovation. He selected materials, helped reconfigure the space to work for our needs, and assured that all work was done properly. Later when it was clear that we needed more bathrooms and classroom space at the villa, Richard designed and oversaw the construction of an accessory building with a rooftop meeting space and two bathrooms.

When Wilma Wetterstrom needed photos to help illustrate an article about archaeological plant remains in *AERAGRAM,* she immediately thought to ask who else but Richard? Within a couple days of the request, he left his bench in the Giza lab and was on site photographing our skilled "flotation expert," Abdel Latif, using this water separation technique to recover plant remains from dirt samples. Richard was also the go-to guy we could always call on when something didn't work. Indeed, when Richard came to work with AERA in 1991, the first thing that impressed me was how he could fix things. It started with a malfunctioning dumpy level. Richard fixed it on site with his Swiss Army knife. He went on to fix shower heads, water tanks, toilets, creaky doors, and even interpersonal team relations.

I first met Richard in 1982 when he came through the American Research Center in Egypt (ARCE) Cairo office as a team member of the Fayum Archaeological Project (FAP), directed by Robert Wenke and Mary Ellen Lane. Richard personified the "New Archaeology" I had been reading about in my undergraduate courses. Practitioners applied scientific methods to test hypotheses by excavating human settlements and by retrieving and analyzing every scrap of "material culture," including ancient plant remains and animal bone. Richard firmly believed in a real, empirical world and a hard, natural science approach. He would challenge team members to articulate their paradigms, even if they didn't share his. If they replied, "I don't have a paradigm" (or model), he would say, "Yes you do; you just haven't articulated it." Richard framed his excavations, surveys, and analyses in big questions about the origin of food production and the "evolution of complex societies." And he drew from a deep well of experience as well. He had excavated and surveyed in Iran, Iraq, Turkey, Kenya, Tanzania, Armenia, Georgia, China, Israel, Mexico, Wyoming, and Michigan, as well as other sites in Egypt. Richard's thesis, for his doctorate in Anthropology and Biology at the University of Michigan in 1981, was on modeling how ancient pastoralists in Southwest Asia might have structured and used their flocks for subsistence.

As our faunal analyst, Richard brought great skill and knowledge, but the title does not encompass the depth and breadth of his research. He always put his results in a wider context of the societies and economies of ancient cultures. When we exposed a large enclosure with rounded corners formed by a fieldstone wall that loops in a paper-clip pattern, Richard could spot it as an "OK [Old Kingdom] Corral," a stockyard where pyramid builders stored protein on

Above: Richard teaching students in the AERA-MoTA Field Lab. Upper inset: Matching an archaeological sample (dark brown) with the same bone from his modern comparative collection. At right: A favorite adage of Richard's, with an addition in Arabic from his students. Photos by Mark Lehner.

the hoof. Although Richard was not trained as an Egyptologist, he addressed Egyptological questions. With his work at the 4th Dynasty site of Kom el-Hisn in the 1980s and HeG, he helped us understand how central authorities fed the workers' town by drawing livestock from the provinces and how they then distributed meat according to rank and status. I hope that one day someone will pick up on a question Richard thought about to the very end—the possible relationship between the gestation, birthing, and growth patterns of cattle and the biennial "cattle count," a census for taxation, so important to Egyptologists who study Old Kingdom chronology. Did the Old Kingdom state count cattle every two years because of some natural cycle?

Richard was a favorite field school teacher in our comprehensive program for young archaeologists with the Ministry of Tourism and Antiquities (MoTA). Every student spent time with Richard, seeing the difference between human and animal bone and learning the basic identification of cattle, sheep, and goat, or the varieties of fish and birds that people raised or caught and consumed in the pyramid city. He took his students on field trips to the Cairo fish market to see and learn about the relative value of the different fish that were eaten at Heit el-Ghurab. Using fish purchased during their field trip, students learned to prepare specimens for their own reference collection. The most important lesson Richard taught was the "why" of studying animal bone—that is, what information did animal bones convey. Richard embodied AERA's field school motto: "We are not looking for things, we are looking for information." Students who went on to advanced faunal analysis practiced on samples critical to the questions driving research. This was no "make work." With gentle guidance and patience, Richard inspired students to think critically. At the end of a class, when he erased his notes and sketches on his white board, he rewrote his favorite maxim (by Thomas Henry Huxley): "The great tragedy of science" is "the slaying of a beautiful theory by an ugly fact." The last time he wrote this his students added below, in Arabic, "Thank you very much for teaching us this useful science, from our hearts we thank you!" In Richard's article for our last *AERAGRAM*, 23-1 & 2,[1] he addressed the challenge our most recent findings presented

to his OK Corral hypothesis. They did not slay his slightly wounded theory, but gave us a more nuanced picture over time.

Richard leaves a great legacy that is hard to match: what may be the world's largest corpus of archaeological faunal data compressed into the briefest of archaeological periods (the fifty or so years of pharaohs Khafre and Menkaure). He leaves an invaluable reference collection in Giza that he amassed over the years and generously shared with other projects for use at their sites. He also leaves the legacy of the many students he trained. Thanks to Richard, a cadre of Egyptian zooarchaeologists are now doing faunal analysis with Egyptian and foreign missions, while former student Mohamed Hussein heads a special program in zooarchaeology at the MoTA Training Center in Saqqara.[2] "(Richard's) work in Giza really put the importance of zooarchaeology for Egyptology on the map."[3]

Richard in his element in the AERA-MoTA Field Lab. Archaeological samples are on the brown table, a portion of his world-class comparative collection in white boxes to his front. Photo by Mark Lehner.

Finally to top off all of his achievements is Richard's book *A View from the Herd: Cattle, Sheep, Goats, and Pigs in Pharaonic Egypt: A Primer for Egyptologists and Archaeologists*, which he submitted to Lockwood Press just a few days before his death.[4] A culmination of many years work, it combines animal ecology, archaeology, evolutionary theory, and ethnological studies of modern herds. "This capstone of Richard's long career of innovative interdisciplinary research on animal economy will serve as a critical reference to researchers and a reminder of what the discipline has lost with his passing."[5]

The many expressions of appreciation for Richard's life, work, and legacy say it best: Richard was "an irreplaceable, generous spirit;" "a positive, enthusiastic, and dedicated professional, a force of nature;" "a wonderfully positive and supportive person and a great scientist." Richard lived with "kindness and dedication to his work and his trainees."

I will miss Richard at breakfast and morning meetings during the field seasons. I will miss Richard on the site, offering his seasoned appraisals of what we are finding, with parallels from around the Near East. I will miss sharing a glass of wine with Richard on Thursday evenings, the eve of our one-day weekend. Most of all, with his students, I will miss Richard's avuncular presence in his corner of the AERA field lab behind tables arrayed with cattle skulls, sheep jaws, and tibia fragments.

1. R. Redding, "Showdown at the OK Corral? Testing the Hypothesis," *AERAGRAM* 23 1/2, 2022, pages 10–11.

2. M. H. Ahmed and M. R. Badran, "Learning Animal Bone: AERA-ARCE Field School Training," *Aeragram* 19-1, 2018, pages 22–27.

3. W. Wendrich, President of the International Association of Egyptologists.

4. M. Zeder, "Richard William Redding 1947–2023" ICAZ Newsletter 23:2, page 66.

5. We are pleased to announce Richard's book was made available for purchase as this issue was in final publication (https://www.isdistribution.com/BookDetail.aspx?aId=170759).

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From Giza: A Rock Like No Other. Artifact of the Issue

This issue's special artifact is Object 3533—a dark gray porphyritic basalt rock recovered in 2008 from the area between the Khentkawes Town and the Menkaure Valley Temple. It was originally classified as a stone tool—a pounder—but AERA's specialists quickly realized that the rock possessed unique features. The trait that set it apart from the ocean of stone pounders recovered during our excavations are the large white crystals embedded in a fine-grained matrix.

Porphyry forms when magma consisting of large crystals cools down quickly, resulting in a fine-grained matrix. This specimen's matrix is accented by a triad of distinctive minerals. It contains mildly translucent, porcelain white feldspar laths, 1 to 2 centimeters long, which appear as "bundles of straw" in polished sections cut from the rock. This particular type of feldspar, albite/sanidine, is accompanied by a pistachio green mineral called epidote, in distinctive crystals that are multi-branching like a tree and 1 to 3 centimeters long. The third mineral component is a pigeon's blood red garnet, which peers out from the dark gray matrix as transparent crystals, 1 centimeter long.

Although to the lay person this combination might not be impressive, it is unique and recognizable to a geologist working in Egypt. This particular type of porphyritic basalt is found only in the quarries of Mons Porphyrites, a series of sites on the northern frontier of the Eastern High Desert, above the Red Sea.

Mons Porphyrites is known for Roman-era quarries used from the 1st through 5th centuries CE; they provided stone to Rome and even Constantinople. The stone was valued for its unusual purple color—porphyry is itself a Greek word meaning purple. What was this sample doing at the Giza Plateau, a site largely dating to the Old Kingdom? Its findspot in a deposit near the surface is unfortunately not very helpful for dating. The excavation team interpreted it as a recent deposit, as it contained modern inclusions of paper, cardboard, and dried roots. However, pottery sherds recovered from the same feature were dated by our ceramicist as being post-Old Kingdom in date. We know Romans visited the Giza Plateau, and a Late Period cemetery that possibly continued in use in the Graeco-Roman era covers part of Heit el-Ghurab site. Although this feature cannot be placed stratigraphically in a sound Old Kingdom (or Roman) context, to find this particular rock at the plateau is still an important contribution to discussions of Red Sea trade and a wonderful connection to make between Giza and Mons Porphyrites.

What was this special rock, if not a pounder? It was most likely a chunk (22. 6 centimeters long, 6600 grams in weight) of raw material meant to be formed into a fine object. It is ground on all sides and tapers upwards into the form of a cylinder. The finished product might have been a bowl, tumbler, or cup. The choice of raw material is important, as the porphyry could easily withstand considerable fine abrasive work. This particular rock type is composed of mineral grains that were welded together very tightly at approximately 950 to 1150 °C. Due to its fiery origin, the dark basalt matrix can withstand grinding and polishing to extreme thinness (<4 millimeters). The resulting vessel would be nearly transparent. At the achieved thinness, the dark gray, fine grained basalt emerges as a highly translucent soft lavender—a color held in high regard throughout history. The porphyritic grains would have stood out in direct contrast to the fine grained matrix. The epidote grains would appear as light olive green clouds, or a cast blending with the lavender matrix. The garnet would appear as brilliant ruby red stars in a lavender sky.

~ Philip LaPorta
AERA Geologist

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