



## Searching for a Royal Building Under the Soccer Field

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Emad Shaaban Hendawi (right) pounds bricks out of the old soccer club wall, while Sayed Salah braces the upper crossbar. See story starting on page 2 to learn why they are smashing a hole through the wall. Photo by Mark Lehner.

# Soccer Field Sondages, Palace Promises *by Mark Lehner*

We waited 20 years to excavate under a modern soccer field that lay right on top of the 4,500-year-old Royal Administrative Building (RAB) on the southeast part of the Lost City of the Pyramids. It wasn't just a soccer field, but also the enclosure wall, support buildings, and light towers of the Abu Hol ("Sphinx") Sports Club, belonging to the youth of the Kafer Gebel township that presses against the east side of the site. After the Ministry of Tourism and Antiquities (MoTA) built them a new club, far to the south, the Ministry of Youth and Sports returned the land to the MoTA for archaeology.

How did we know the RAB lay below? In 2001, as we cleared sand and rubbish that covered the ruins of this 4th Dynasty (c. 2600 BC) city of the pyramids, we came upon the rounded northwest corner of two parallel thick limestone walls. The inner wall encloses a rectangular area stretching 45 meters east to west. Between 2002 and 2007 we excavated 30 meters of the RAB that stuck out of the northern side of the club.

From apartments built inside this northwest corner, we found more clay sealings than anywhere else on the site, up to that time. Sealings are small dabs of clay that dry hard. Administrators would wrap these clay dabs around string locks and ties on bags, boxes, jars, and doors. Before the dab dried, they would use stamps or small cylinders to make an impression that bore hieroglyphic names of institutions and official titles. Sealings served as security measures to keep unauthorized individuals from opening the container or door. Archaeologists understand sealings and clay tokens—which we also found—as signs of administration, of accounting for openings and closings and distribution of commodities. So, I dubbed this huge enclosure the "Royal Administrative Building" (RAB).<sup>1</sup>

We discovered a court, sunk 1 meter lower than the floor that surrounded it, terrace-like. Rows of large mudbrick silos, most probably for storing grain, lined the sides of the court, and were founded on the lower floor level, so people could fill them from above.

In 2003 an electromagnetic (EM) conductivity survey suggested the west wall of the RAB stretched 150 meters under the soccer field.<sup>3</sup> But it was not until August 2021 that we were able to excavate farther south.

## Palace Hypothesis

The RAB is big and certainly royal. It was a storehouse of the pharaoh. Could it have been a palace? Or part of a palace city?

It is an old idea in Egyptology, an idea that I took into our first excavations at Heit el-Ghurab (HeG), that kings built a residence near their pyramids. After we found bakeries and other production facilities from 1991 to 1997, I hypothesized that these facilities

attached to the rear end of a palace that lay buried under an immense cover of sand and modern trash that covered the 150 meters between our excavations and the Wall of the Crow to the northwest.

Why did I think, 25 years ago, that we might find a buried palace? First, an article by Rainer Stadelmann<sup>4</sup> resurrected the idea that a king's residence would have been part of the pyramid town and valley temple complex at the base of each pyramid causeway. The HeG site lies south of the valley temples of the Second Pyramid of Khafre and the Third Pyramid of Menkaure.

Then, an article by David O'Connor<sup>5</sup> suggested that palaces lay to the right front of temples. O'Connor pointed to evidence that New Kingdom palaces at Thebes (modern Luxor) lay to the right front of the east-west axes of temples.<sup>6</sup> The east-west temple axis and the north-south palace axis symbolized the axes of the world, along which god and king would emerge from their respective houses and intersect for festivals, so O'Connor thought.

At Giza, the pyramids were the state (Horus) temples of their time, so my thinking went. A palace complex at Giza might lie to the right front of the pyramid complexes, with their long alignments on an east-west axis from the pyramid and upper temples to the causeways and valley temples. And just so, to the right-front of the pyramid complexes stretches the HeG site, marked by its namesake, the 200-meter-long stone Wall of the Crow, with its monumental gateway. O'Connor cited monumental gateways and elevated facades as hallmarks of palaces.<sup>7</sup>

Below: The silos in the Royal Administrative Building shortly after being exposed during the 2001 field season. View to the northwest.

Right: The Royal Administration Building during the 2005 field season. The soccer field lies behind the wall in the background. Horseback riders used the roadway in front of the wall. In 2007 the road was removed and the area excavated up to the wall, allowing us to follow the RAB enclosure wall up to it and determine that it continued on underneath. View to the southeast. Both photos by Mark Lehner.





Map of the Heit el-Ghurab site before sondages were excavated in the soccer field. Map by Rebekah Miracle, AERA GIS.

I was influenced as well by the palace of the 18th Dynasty pharaoh Amenhotep III at Malqata, site of a ceremonial city on the west bank of the Nile near Luxor that his builders laid out at the northwestern corner of the Birket Habu, a huge harbor-basin that measures 1 × 2.4 kilometers. Kitchens, bakeries, and magazines lay to the south of the palace proper. To enter that palace, one proceeded through a long corridor and ramp that ran from a kind of large gate house on the northwest.<sup>8</sup> I imagined the ramp through the prominent gate<sup>9</sup> in the Wall of the Crow as an equivalent in our site.

As we cleared and mapped the HeG, we did not find a place where the king or queen could ceremonially appear to their people, nor royal private quarters. These are principal parts of other known palaces, especially a place of royal appearance and display. After we found the Gallery Complex between the bakeries and the Wall of the Crow, the palace hypothesis faded in my mind. The barracks hypothesis took its place. This made “workers’ town” a far more anodyne characterization of the site than “palace.”

### Palace Persuasions Persist from Pottery Mound

But the palace hypothesis would not go away. It resurfaced after John Nolan and Ali Witsell studied the numerous sealings we found in Pottery Mound, the dump next to the large House Unit 1 in the Western Town.

With the patience of Job, Ali and John reconstructed theoretical seals that people, presumably officials, used to make these impressions on clay dabs. These cylindrical “seals” had been etched with some of the highest-ranking scribal titles of the reigns of Khafre and Menkaure: Scribe of the Royal Documents, Keeper of the Royal Instructions, Scribe of the King’s Writing Case, and Scribe of the Royal Documents for all Royal Works. These titles belong to the state administrative apparatus, linked closely with the office of the Vizier. Such scribes “were important members of the central administration during the Old Kingdom and were typically drawn from the highest-ranking families of the Fourth Dynasty, sometimes as young men.”<sup>10</sup>





The eastern section of Pottery Mound during excavation in 2007. This large trash dump draped over the walls of House Unit 1 in the Western Town. The sealings and faunal remains indicated that those who produced the trash were of higher status than most. The sealings from Pottery Mound are very similar to those from House Unit 1 itself. View to the east. Photo by Yukinori Kawae.

Certain features of the Pottery Mound sealings indicate they were produced in or near House Unit 1, and not unsealed and broken from string locks on boxes, pottery, bags, or documents brought in from elsewhere. Ali and John found door sealings, broken during opening and closing string locks on doors. Door with clay sealings must have been close by. They found lumps of raw clay for making sealings, and other sealing-related objects.

John suspected that a group of scribes produced these seals and sealings, and that members of this group convened in House Unit 1, adjacent to Pottery Mound. He envisioned a facility to teach young scribes. House Unit 1 contained unusually broad rooms with painted walls. One large room featured an L-shaped bench along the western and southern walls where we imagine teachers and students sitting and writing.<sup>11</sup>

He suggested that the scribal and administrative functions attested by these sealings hinted at a royal residence nearby and believed the sealings showed that this residence of the king and the Scribes of Royal Documents for Royal Instructions played a role in the education of royal and noble children in the palace.<sup>12</sup> John imagined this local residence served as “a sporadic, periodic royal presence ... rather than a permanent, on-going residence ... more in common with a temporary royal ‘rest house’ rather than a permanent, central palace.”<sup>13</sup>

Given what John could suss out of sealing fragments from Pottery Mound, I began to think that if the HeG site does not show the architectural pattern of a palace, it could be a matter of scale. The HeG altogether might form part of a greater layout of a palace city, with royal domestic and audience parts now under the modern urban sprawl.

### Clues from Kromer

Most of what we have mapped and excavated of the HeG site

dates to the reigns of Khafre and Menkaure, who built the Second and Third Giza Pyramids. But we see glimpses of a lower, earlier phase that includes older galleries under Gallery Set I at the end of the Wall of the Crow, and an older phase of the RAB in its northwest corner. Most of the earlier architecture was razed when the site was remodeled, probably under Khafre. This lower phase may date to Khufu.

When Khafre’s workers removed most of the older architecture, for reasons not entirely clear, they carried the mass of debris up and over the western escarpment and dumped it behind the Gebel el-Qibli (“Southern Mount,” the Maadi Formation knoll), leaving a huge deposit 6.5-meter-thick spread over 5 hectares.

From 1971 to 1975 an Austrian prehistorian named Karl Kromer excavated 1,550 cubic meters of this debris.<sup>14</sup> Kromer found sealings of Khufu and Khafre, but none of Menkaure. From the HeG we have sealings of Khafre and Menkaure, but none of Khufu. In 2018 we excavated in the Kromer site (KRO) on the idea that the debris might contain information about the early phase of the HeG.

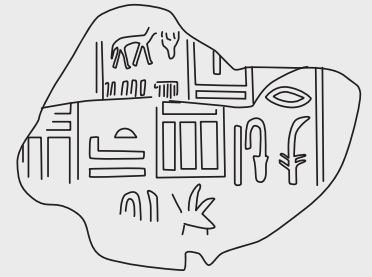
A deeper, older phase of dumping came from the east, the direction of HeG. The tip lines all slope from east down to west. As Kromer recognized, these layers came from a massive demolition of buildings in a single event. They contain fragments of mudbricks and painted plastered walls, roofs, floors, corners, and hearths. Some of the demolished buildings must have housed people of high status. Plastered wall fragments showed bands painted in various colors—deep red, orange, black, light and darker gray, beige, and lighter shades of red or orange. The dump also yielded objects of everyday life—copper needles, spatulas, fishhooks, and faience beads, as well as small figurines and even organic material including wood, palm fiber, and cloth.

*(continued on page 6)*

## HEIT EL-GHURAB TIES TO KROMER'S DUMP

As indicated at left, AERA has found convincing evidence of a connection between the HeG site and the Kromer dump (KRO), over the Gebel el-Qibli from HeG (see map, page 6). Thus far, this connection is strongest in the clay sealings evidence of House Unit 1 and Pottery Mound (PM), both of the Western Town, west of RAB. The sealings from this area are largely scribal in nature and date to the reigns of Khafre and Menkaure. The sealings found by Kromer date to Khufu and Khafre. While we suspected ties to PM based on Kromer's drawings of his excavated material (now largely held in Vienna, see drawing at right), our suspicions were confirmed when AERA reopened Kromer's area in 2018 and recovered further sealings we could examine ourselves and compare to the PM examples.

The newly excavated KRO sealings confirm direct matches between seals that were in play in PM and the still-unidentified building from which the KRO debris came, following its demolition. They are also a strong indicator of the continuation of tradition in the official seals that were issued to scribes during the reigns of Khufu, Khafre, and Menkaure. These seals were highly predictable and repetitive in the carving style, layout, and the motifs, titles, and epithets present, such that patterns are easily observable. For more on official seals and how we piece together sealing evidence, see page 30.



Drawing by P. Kaplony (49, Taf. 23) of a sealing found by Kromer. Although it has not been seen by AERA staff, it is highly likely to be a match to Seal 1 of Pottery Mound. This sealing in particular was one of our earliest indicators of a strong connection between PM and the KRO dump.

### Seal 1 from Pottery Mound of HeG



Left: Sealing Number (SN) 5804 from KRO. It has one partial impression (the blue shading shows the extent of the impression) from Seal 1 of PM (drawing at left) and represents a direct match between HeG and KRO. The seal owner was a Keeper of Royal Instructions, Scribe of Royal Documents. This sealing also adds additional detail to the lower edge of the theoretical seal that was not known from the HeG examples.

### Seal 2 from Pottery Mound of HeG

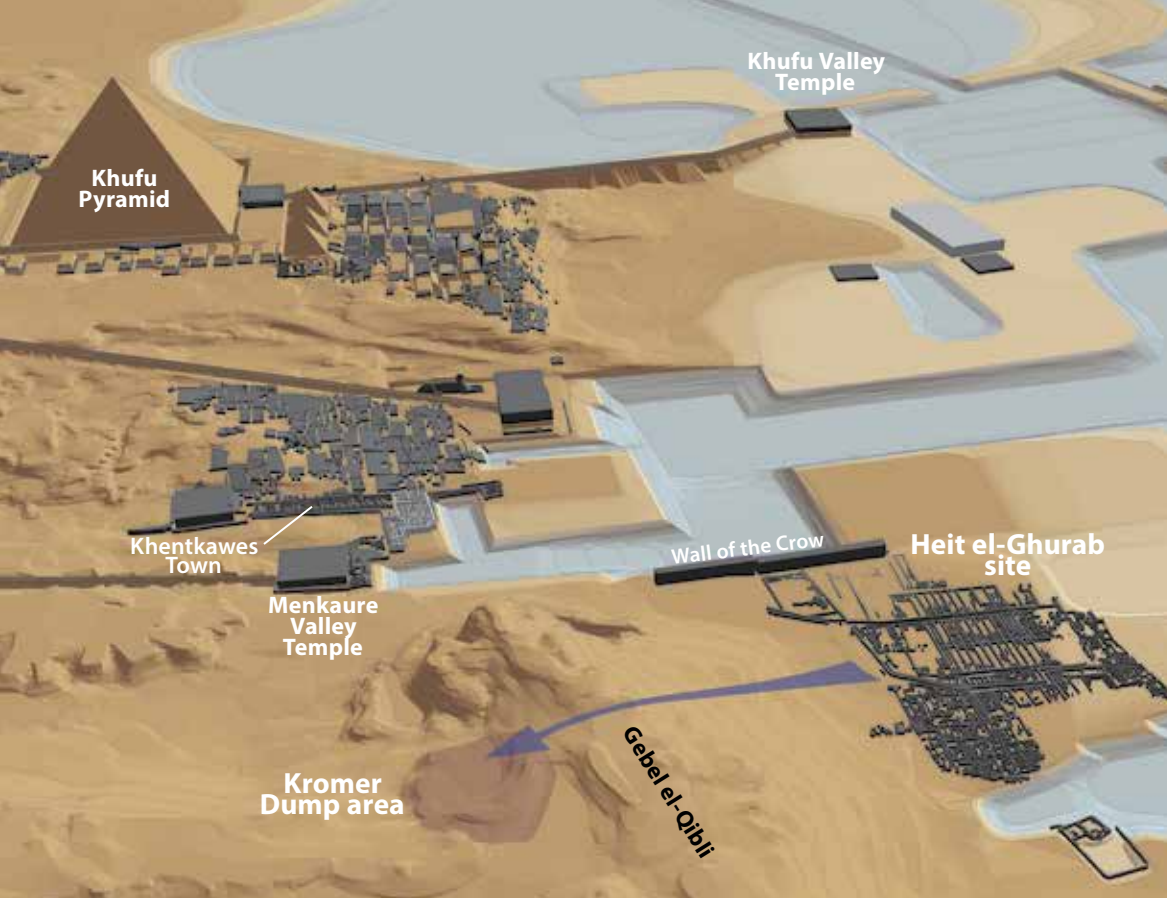


Left: SN 5849 from KRO. It has two partial impressions from a formal cylinder seal that includes the title Scribe of Royal Documents. This is very similar in design and layout to Seal 1 from PM (drawing above, left, red dashed area shows approximate area of similarity), bearing some of the same titles of Seal 1's owner, but it is not a match.



Left: SN 5795 from KRO. It has three partial impressions from a formal cylinder seal that includes the title Scribe of the King's Writing Case. This seal had very strong parallels to Seal 2 from PM (drawing at far left, red dashed area shows approximate area of similarity), but Seal 2 dates to Menkaure. SN 5795 dates to the time of Khafre.

Not shown to scale. Photos by David Jerabek. Drawings by Ali Witsell based on originals by John Nolan.



Left: Map of the Giza Plateau showing the relationship between the Heit el-Ghurab (HeG) site, the Kromer dump (KRO) site, and nearby plateau buildings. Map by Rebekah Miracle, AERA GIS.

Right: Fragment of Merer's daybook in the Wadi el-Jarf Papyri. Photo courtesy of Pierre Tallet.

Below: Sealing Number (SN) 5848 from the Kromer dump. It has two overlapping impressions from a cylinder seal and bears the words "setep za." Photo by David Jerabek.



In this lofty garbage, one Khafre sealing matches a seal, Seal 1, that John Nolan and Ali Witsell reconstructed from fragments in Pottery Mound and House Unit 1—the hypothetical scribal workshop. The same official(s) who administrated from House Unit 1 and who gave their stamp of authority, were active in the older settlement that produced the garbage dumped at the Kromer site (see sidebar, page 5).

Yet another sealing from the Kromer dump reignited our interest in the palace hypothesis. Sealing Number 5848 (above right), a small fragment that came from the bottom of the oldest phase of the dump, bore an impression of an adze (*setep*) and cattle hobble (*za*; a rope device with a set of loops, each one attached to the leg of a cow to hold the group together), under the remains of a *serekh* (paneled palace facade) and beside the figure of a running king wearing the tall crown of the south. As a verbal noun, *setep za*, literally, “the choosing a *za*” (or phyle, a team involved in royal projects), was one term for “guarding,” “following,” or “entourage.” With the house hieroglyph, *Setep Za* was one of the terms for “palace.”<sup>15</sup> Did the galleries house elite troops of the royal entourage?

Could this little sealing 5848, along with the other high-status indicators, be telling us that the Gallery Complex and Heit el-Ghurab hosted that part of the *Setep Za*—the barracks—that accommodated royal crews and troops organized into work-gangs? As Austrian Egyptologist Manfred Bietak has noted, Egyptian palaces, in addition to their large features of public display, “also included offices, especially of the chief administrators of the state” (HeG’s Western Town houses?), “barracks and arsenals for troops” (HeG’s Gallery Complex?) “and ...

considerable storage areas for collecting and distributing commodities”<sup>16</sup> (the RAB?).

Kromer suspected the lower demolition debris came from a royal building, lying somewhere nearby at Giza. He called it a “*palastähnlichen Bauten, königliches Rasthaus,*” and a “*kleinen königlichen Palast*” (a palace-like building, a royal rest house, a small royal palace).<sup>17</sup> He also called it a “*königlichen Verwaltungsgebäude,*”<sup>18</sup> that is, a royal administrative building! And now we can excavate the greater part of our Royal Administrative Building from under the soccer field. Could this be the missing palace?

### Giza North—Khufu's *Khenu* Palace

Papyrus D in the Wadi el-Jarf Papyri, discovered in 2013 at a port of Khufu on the Red Sea coast, refers to Khufu's palace under the general term *Khenu* (*hnw*).<sup>19</sup> This was the most common term for “palace” with the widest range of meaning. It might be summed up as “the king's location,” and the “state,” indicating the king's presence, that is, where the king stayed.<sup>20</sup> From contexts within the texts themselves, Khufu's *Khenu* Residence must have been in the northern settlement, near his valley temple. The papyrus names the place *Ankhu Khufu* (Khufu Lives!).

Papyrus D makes reference to other administrative institutions, such as the royal archives, where a *za*-team leader named Merer and his *aper*-crew boss, Dedi, may have filed their log-books. We read of a granary (*shenut*), where a variety of products, including natron (a naturally occurring type of salt), were



stored. Here, in the vicinity of Khufu's *Khenu* Palace, according to one broken-up passage, Dedi gave textiles as payment or reward to Merer, whose *za* is recorded as performing ritual in Khufu's "portal," probably Khufu's valley temple. In a snippet, we glimpse Dedi going to "the granary" (or storage magazines) to bring natron, the sacred salts used in embalming.<sup>21</sup>

Pierre Tallet, who discovered and translated the Wadi el-Jarf Papyri, has suggested that here to the north, in the vicinity of Khufu's valley temple, lay the same kind of layout as we have mapped at the HeG site, 1.2 kilometers south of Khufu's valley temple.<sup>22</sup> In fact, we have found a granary and a scribal workshop (House Unit 1), if not an archive. If the whole royal house moved south, with all these components, then we, too, should expect that a *Khenu* palace lay in proximity to the HeG. Could the RAB be the *Khenu* palace?

I am increasingly prone to the other possibility. All the major structures in HeG, including the barracks and bakeries, could have belonged to that palace part called the *Setep Za*. Along with the administrative structures attested in the Wadi el-Jarf Papyri to the north, near Khufu's valley temple, the HeG hosted different sections of one gigantic palace layout, a kind of Old Kingdom Egyptian equivalent of Versailles, or, better, New Kingdom Amarna, or Malqata in Thebes, and like those palace-cities, the one at Giza included various royal apartments, halls, and institutions.

### The Soccer Field Becomes Available: Sondage 145

With visions of palaces prancing in our heads, again, we launched our first excavations into and under the soccer field in Fall 2021. On August 15, 2021, Ashraf Mohi, Director of Giza, informed me and Mohsen Kamel, Executive Director of AERA

Egypt, that after a long negotiation between MoTA and the Ministry of Youth and Sports, the soccer field land had finally been returned to the MoTA. Ashraf implored us, "now put your hand on the soccer field" by doing some archaeology within its confines. So, on September 25, 2021, we opened our first trench, Sondage 145 (see map, page 8), where the 2003 electromagnetic conductivity survey showed a corner-like feature at 1 meter below the surface. Here, we expected to find the southwest corner of the RAB.

The soccer field pitch lies at just under 18 meters above sea level (asl). After digging through its 60-centimeter-thick dark clay, we found only clean sand down to groundwater at 14.38 meters asl. What happened to the southwest corner? For that matter, why didn't we find anything of the HeG settlement, which lies between 15 and 16.5 meters asl?

### Where Did the HeG Site Go? Sondage 146

We should have known we would find nothing. When we mapped the "Lost City" to the east and west of the soccer field in 2004, we lost the settlement at a sand-filled depression that extends under the soccer field. Because the sand soaked in ground water filled the depression, I dubbed it Lagoon 1. We sunk Sondage 145 south of that line.

So, moving 32.50 meters to the north, we tried Sondage 146. Now we should have been well within the ancient city. But our workers still descended through clean sand down to ground water. No site, just sand!

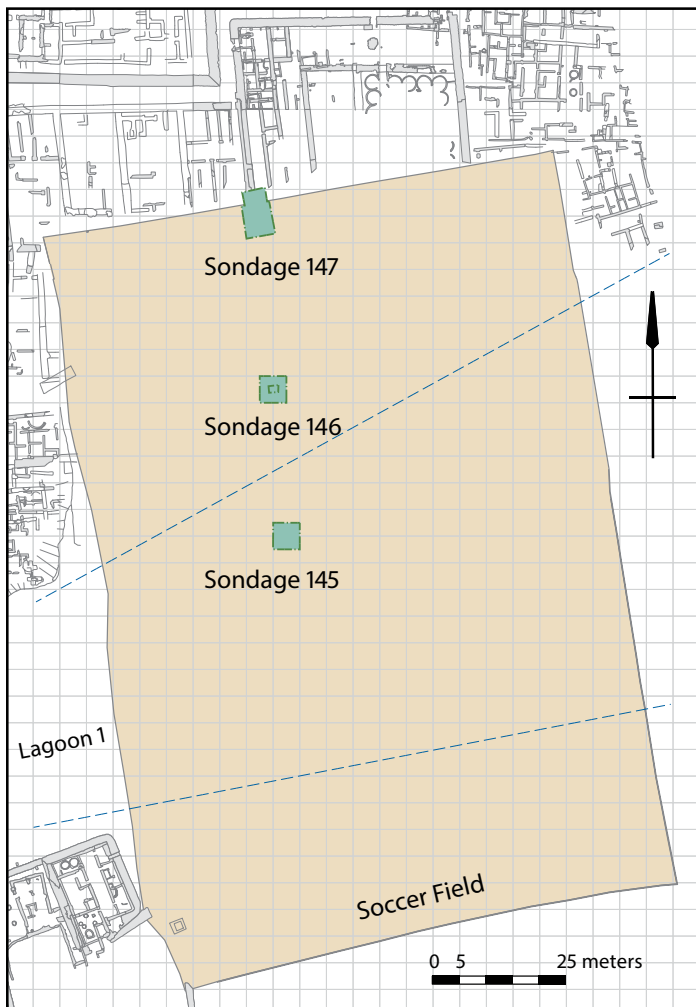
As our workers continued to plunge deeper in a smaller probe, nearly 4 meters down, at the bottom of Sondage 146—dangerously deep so we had to sandbag the sides—we started yet another trench, Sondage 147, about 25 meters to the north. This put us inside the northern wall of the Sports Club. Workers had to use jackhammers to break through a cement and iron-rebar dance floor. Our workers also punched out the red bricks between cement uprights of the Abu Hol Sports Club north wall, giving us an open, framed view of the RAB west wall.

Then word came from those digging the deep probe back in Sondage 146 that they found a wall of fieldstone and mud-brick—probably the southward continuation of the RAB west wall—but way down at elevation 14.25 meters asl! At this level, they were bringing up Old Kingdom pottery.

### Harbor Hypothesis

Sondages 146 and 147 showed that the RAB west wall steps down 2 meters, to around 14.25 meters asl, over a span of 25 meters. Why would the RAB wall take such a deep dive? Suddenly, our sondages made sense, because they confirmed a hypothesis I had been visualizing for several years.

I saw Lagoon 1 as a back-door service harbor or track for delivering grain up into the RAB on the north, and cattle into the "OK Corral," which we found on the other side of Lagoon 1,



Above: Location of Sondages 145, 146, and 147 in the soccer field. Dashed blue lines mark the approximate boundary of a depression, Lagoon 1, filled with clean sand down to ground water at elevation 14.60 meters asl in 2004. Map by Rebekah Miracle, AERA GIS.

south of the Western Town. I imagined it might have been dry during low-Nile but received Nile water during the six- to eight-week inundation season (August–October). The RAB would need to step down, from 16 meters to 14 meters asl, to reach the level of Nile water during the peak of the flood peak.

Other 4th Dynasty structures at Giza step down to meet the Nile flood level. At the Khafre Valley Temple, ramps descend from the front terrace at 17.54 meters asl to 12.9 meters asl over 31.5 meters.<sup>23</sup> At the eastern end of a causeway leading to the tomb of Khentkawes I at the west end of the town, lateral ramps, a terrace, and stairs step down 3.5 to 5 meters into a deep basin over a span of 10 meters.<sup>24</sup>

The descent of the RAB west wall from Sondage 147 to Sondage 146 is not exceptionally steep—2 meters over a span of 25 meters. Just how did the ancient infrastructure step down?

To find out, first we had to demolish and remove the modern structures of the abandoned sports club.

### Demolishing the Old Soccer Club

On New Year's Day, 2022, we took up that task. It was a cool, foggy day. It was a sledgehammer day. Our workers started by breaking down the upper story of the main building of the abandoned sports club. At the end of demolition day 1, our contractor called in the heavy machinery—two hydraulic hammers (*daqaq* in Arabic), a front end loader, and a hydraulic excavator (*hafaar*). In 10 days, all the trees, perimeter wall, buildings, and cement foundations were gone.

### Sophisticated Port Structures

Because of a lag we can still blame on the Year of COVID,

by the time of this writing, Fall 2022, we have seen how the site descends to ground water level, thanks to our clearing of the northwest corner of the soccer field during Winter-Spring 2022. It is the only reason that we are able to give a preview.

The deep cement and rebar foundations of the modern buildings cut through the thick blanket of clean sand but stopped just short of the ancient settlement ruins. Saving the RAB for a

Far left: Sondage 145 in the former soccer field. Here we expected to find the southwest corner of the RAB. Instead we dug out a lot of clean sand, only to hit groundwater at elevation 14.38 meters above sea level. View to the north.

Left: Sondage 146, to the north of 145 in the former soccer field. The top of a fieldstone and mudbrick wall shows in a deep probe, at elevation 14.25 meters asl. View to the north. Both photos by Mark Lehner.





The hydraulic hammer (*daqaq* in Arabic) bashes down the bath building at the northwest corner of the Abu Hol Sports Club. View to the west. Photo by Mark Lehner.



Above: Workers take sledgehammers to a wall of the upper story of the derelict main building of the Abu Hol Sports Club. Photo by Mark Lehner.

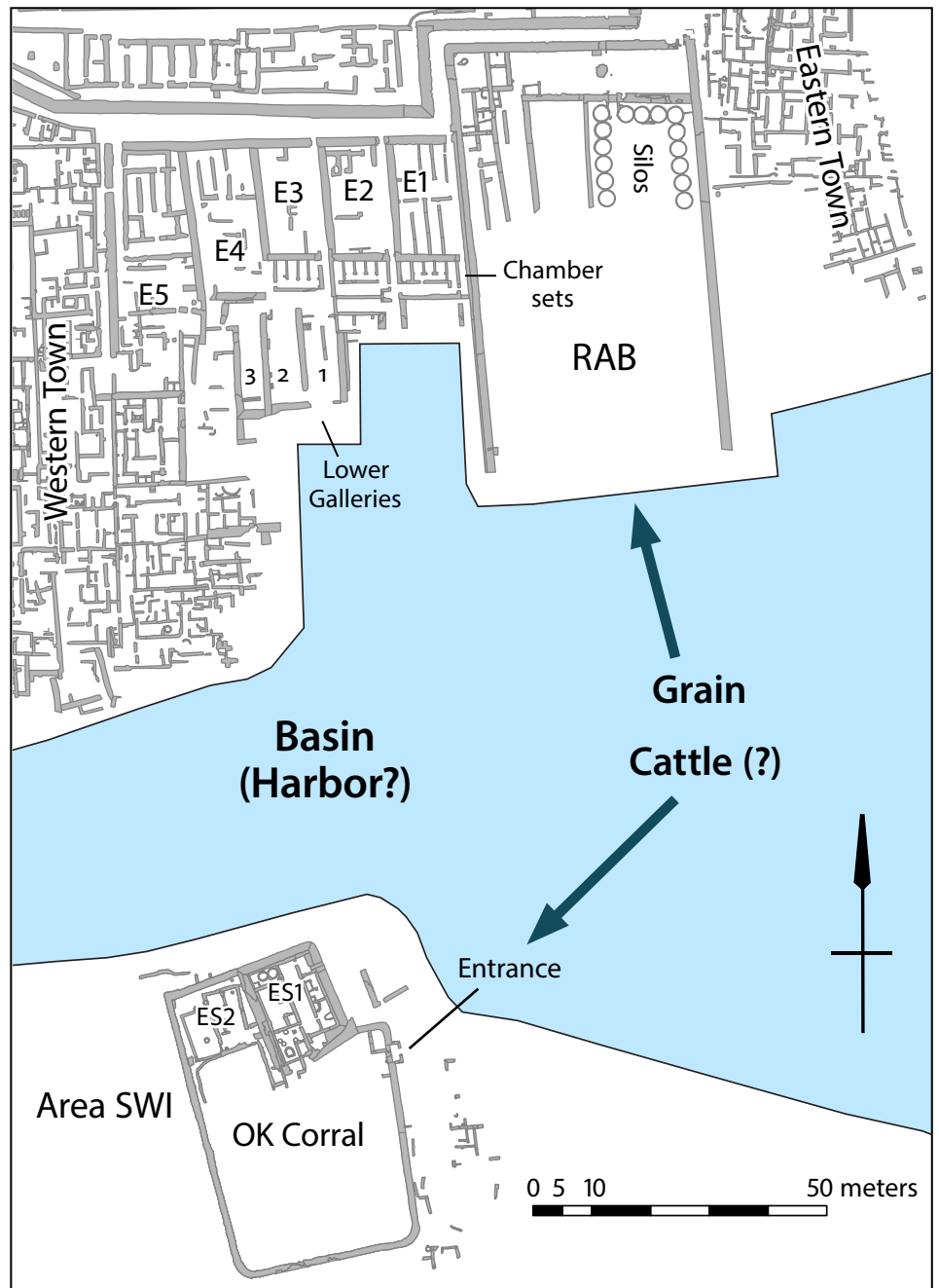
longer excavation, to be filmed for National Geographic, we cleared the RAB west wall and the area immediately to the west. Here we had removed the foundations of a bath and shower house. When we cleared what remained of the underlying clean sand, we saw for the first time since 2004 the “mud mass,” the surface of the settlement ruins that shows ancient walls.

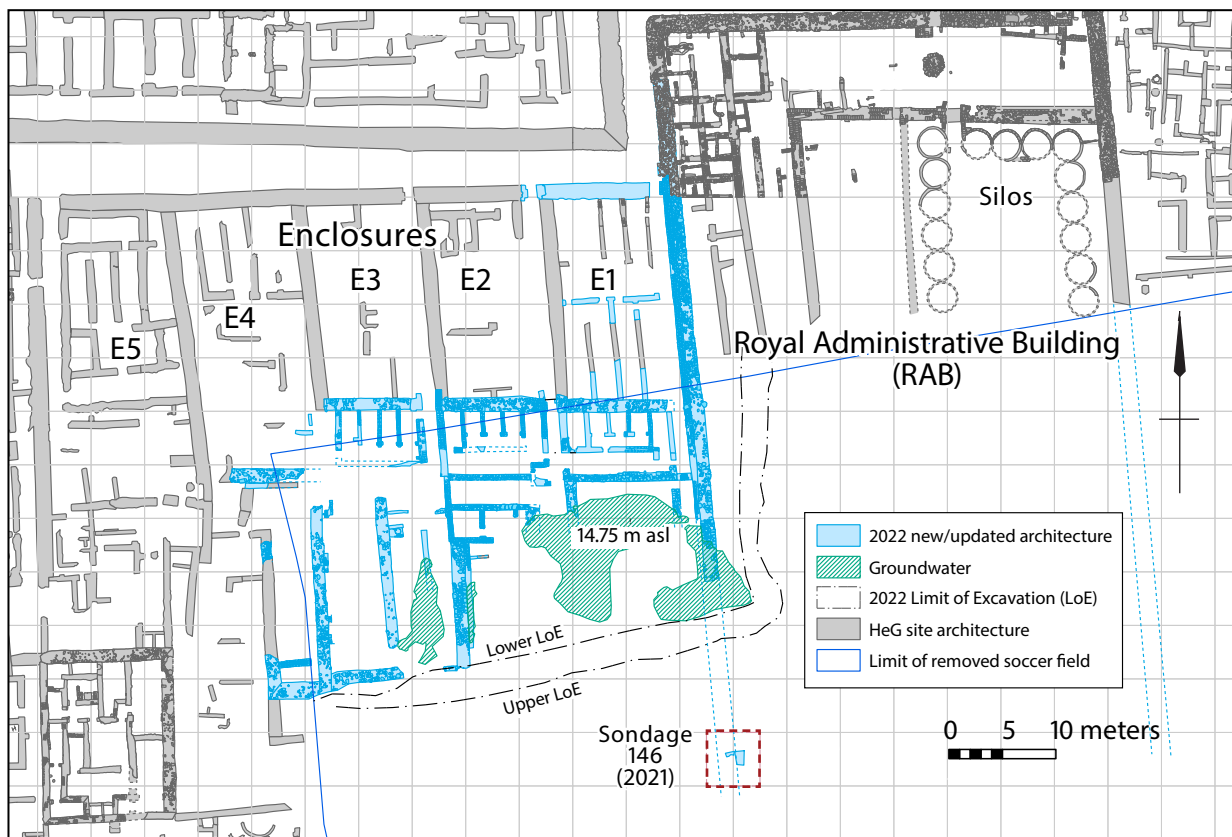
Now we could see the southern ends of five large enclosures, E1-5, which were extensions of the RAB to the west (see page 10). In 2004, the southern ends ran under the Sports Club. Now we could see ramps leading from the southwest corners of Enclosures 1 through 3 down into sets of four smaller chambers on a lower terrace. Two or three corridors run east-west along the fronts of these chamber sets. At a second lower level, three large galleries stretch south of Enclosure 3 and its chamber set. Enclosures 1 and 2 end at a large, rectangular depression, perhaps an extension of the Lagoon 1 harbor basin. Here ground water prevented us from going deeper and farther south. The standing water reinforces the image of a harbor basin.

*(continued on page 10)*

Plan of the Heit el-Ghurab settlement, with a delivery bay (blue, Lagoon 1) that could have been filled with water during the peak of the annual Nile flood (mid-August into October). Grain could have been delivered from the bay, either flooded or dry, up into the Silo Court of the RAB. Cattle would have been driven into the OK Corral.

Because of our clearing and excavation in early 2022, we will modify our model of a back-door service harbor, with complex highly structured storage and processing facilities on the north and the OK Corral on the south.





Walls added to the HeG map as of April 2022 show a sophisticated port structure of enclosures, corridors, chamber sets, and galleries on terraces that step down around a rectangular basin, an extension of the Lagoon 1 harbor. Map by Rebekah Miracle, AERA GIS.

This appears to be a sophisticated (port?) structure, with enclosures, corridors, and chambers within chambers. Arrayed in rows and columns, the layout looks like an ancient, architectural Excel spreadsheet, a kind of architectural equivalent to

the Wadi el-Jarf account papyri. The west RAB wall continues strong down under the water. Soon we will see how the whole of the RAB continues to the south, and how it articulates with our hypothetical harbor.

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6. O'Connor 1989, p. 79.
7. O'Connor 1989, pp. 76, 83.
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10. Nolan, John, 2010. "Mud Sealings and Fourth Dynasty Administration at Giza." Ph.D. dissertation, Dept. of Near Eastern Languages and Civilizations, University of Chicago, p. 402.
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## Sculpting Bedrock on the Scale of Acres by Mark Lehner

When Khufu’s builders constructed his Great Pyramid on the Giza Plateau, they sculpted into hard limestone bedrock the whole ensemble of the pyramid, surrounding court, enclosure wall, temple causeway, and extramural esplanades over more than 70,000 square meters, using hammerstone pounders, wooden mallets, and copper chisels.

Previous generations of pyramid builders never faced such a challenge. They built gigantic pyramids at Meidum and Dahshur for Khufu’s father, Sneferu, on desert sand and gravel and, in part, on a much softer, clay-like limestone bedrock. Their predecessors could have pounded wooden stakes into these softer desert surfaces for carrying lead-lines and reference lines for quarry workers and masons. Building bigger and better on bedrock, Khufu’s crews needed to chisel postholes into hard limestone.

Khufu’s Great Pyramid required much more than post-holes. To level the hard surface, to survey the baselines for the pyramid and its surrounding court, and to maneuver and lay massive stone blocks, they cut and chiseled postholes and lever sockets, as well as a patchwork grid of quarry channels. They also cut and chiseled temporary sockets for huge wooden levers

Above: Mark Lehner maps holes on the surface of the Giza Plateau bedrock by the Great Pyramid Temple. He stands next to the “draft” northeast corner of the Great Pyramid Temple. Note the many holes in the bedrock. View to the east. Photo by Sayed Salah.

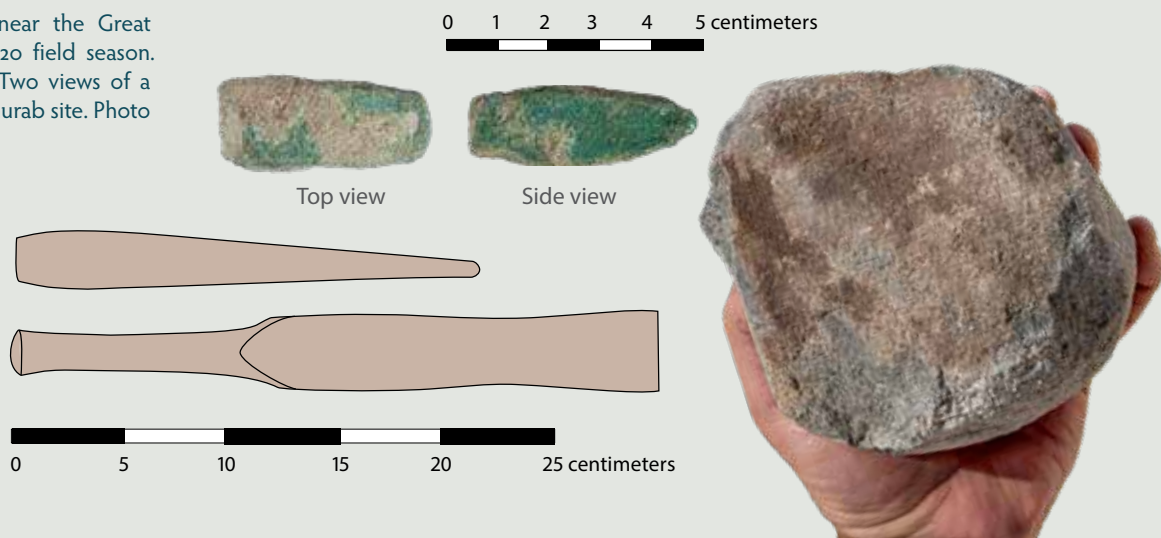
to pry up blocks, and they inscribed reference notches and guidelines.

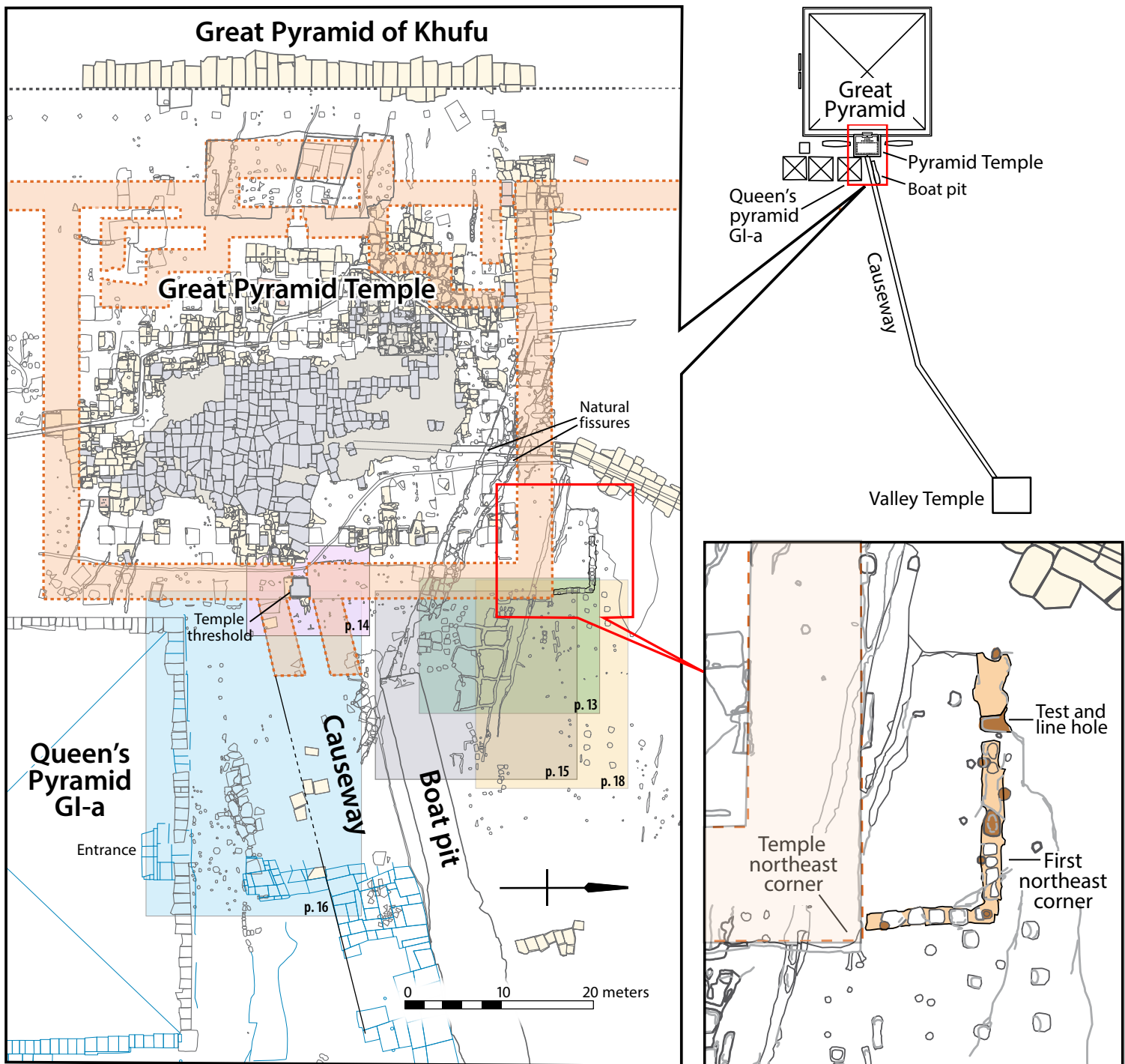
When people visit the Great Pyramid, they look up, not down at this plethora of holes, cuts, and lines on the floor. Even Egyptologists, for the most part, have shown little interest in these markings on the bedrock. But the overall set of “tracks” reveal much about the builders’ movements and *modus operandi*. They offer insights into building methods. They reveal the designers’ mind, and how they could change their mind, even as they built.

We mapped the marks as part of the Great Pyramid Temple Project (GPTP), with the goal of preserving every detail that carries information, and the goal of making a walkway to define the temple perimeter, to control visitor traffic, and to inform about the importance of this unique building that encoded the central focus of the whole pyramid complex for the worship of Khufu as a god-king.

Far right: A hammerstone found near the Great Pyramid Temple during the Fall 2020 field season. Photo by Mark Lehner. Right top: Two views of a copper chisel tip from the Heit el-Ghurab site. Photo by Amel Eweida.

Middle and bottom left: Drawings of copper chisels found in the tomb of Queen Hetepheres at Giza, after Reisner, G. A. and W. S. Smith. *A History of the Giza Necropolis 2: The Tomb of Hetep-heres, the Mother of Cheops*. Cambridge: Harvard University Press, 1955, fig. 37. Color added to the drawings to suggest copper.





Map of the Great Pyramid Temple and adjacent areas. Orange walls and red dotted lines show Mark Lehner's probable reconstruction based on the work of the Great Pyramid Temple Project. Colored rectangles indicate areas shown on detail maps. (Pages where maps appear listed in bottom right corner of rectangles). Map by Rebekah Miracle, AERA GIS.

Detail of the draft northeast corner of the Great Pyramid Temple. Map by Mark Lehner.

### Making a Massive Task Tractable: Quarry Patches

With September temperatures between 90–105 degrees Fahrenheit, it was hard-enough-work for us to hand-map Khufu's builders' marks across the broad, sun-drenched bed-rock surface northeast of his temple. We could only wonder at the experience of workers breaking rock in the hot sun.

How could supervisors make the massive task of sculpting the whole pyramid perimeter into hard bedrock tractable? Across the pyramid plateau we can find crude grids of narrow "removal channels" that quarry workers cut into the bedrock to

define rectangular patches that were to be cut away, either as building blocks, or simply pounded away, to lower the surface.

We see channel grids at all scales, whether they were for isolating "core blocks" that weighed many tens of tons for the temple walls, for smaller blocks of two and a half tons or less, or for just working the stone down to achieve a lower, level surface. To gain advantage, they would sometimes work off-grid from a natural fissure to remove large pieces of bedrock.

To make an immense task tractable, supervisors would organize workers in teams, and assign a team to a patch. It was

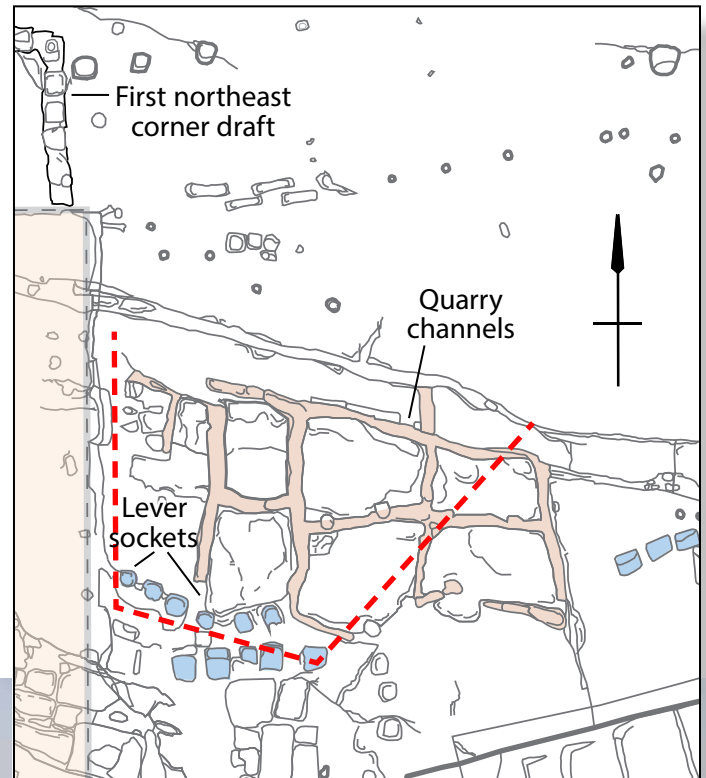


First northeast corner draft

Left: A worker cleans out the test hole at the far west end of the trench for the northeast corner draft of the Great Pyramid Temple. It is deeper and wider than the other holes and would have also served as the lead for deepening the trench. Photo by Mark Lehner.

Bottom: Some of the remains of what was probably an initial effort to prepare the plateau for the causeway that would run from the Great Pyramid Temple northeast to the valley temple. The starter holes and removal channels were the first steps in taking down the bedrock. When plans changed, the work was abandoned. View to the north-northeast. Photo by Mark Lehner.

Below: Detail map of the area shown in the photo. The red lines roughly encompass the area shown in the fore- and middle ground of the shot. Note that north is to the top, unlike the other maps here, in order to duplicate the direction of the view in the photo. Map by Mark Lehner.



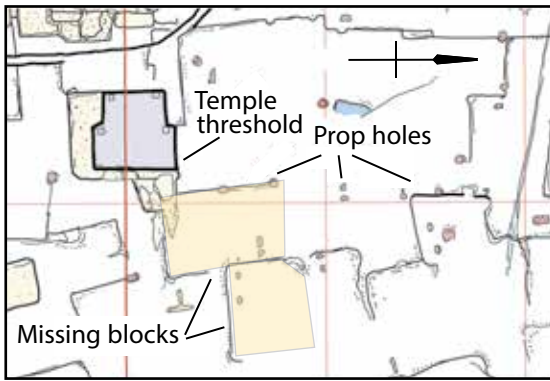
easier to say, “do this one patch” over some time interval, than tell hundreds or thousands to pound away a plane the size of a football field.

Close to the temple, Khufu’s workers left their crude channel-patch grids immediately east of the eastern side of the temple, beside the boat pit that flanks the causeway, and at the middle of the southern side of the temple, between it and the southern boat pit.

### Catalog of Holes

No matter how big the job, Khufu’s pyramid builders always started with a simple hole, chopped into rock. Each hole served a function: as sockets for wooden levers as thick as railroad ties, as lead holes and proofing or leads for deeper and wider cutting, as emplacements for wooden posts to mark lines and orientations, or to secure wooden props, or for securing chocks (“a block or wedge of wood used to prevent





Above: Map showing prop holes next to the threshold at the entrance to the Great Pyramid Temple on the east side. Map by Mark Lehner.



Right: Holes in pairs in the northern Great Pyramid court were probably pavement props that helped workers trim limestone pavement slabs to fit. Photo by Mark Lehner.

the sliding or rolling of a heavy object”’) to support heavy pavement slabs before flat-bedding them into place in complex jigsaw patterns.

### Lever Sockets

Sometimes, instead of pulverizing the rocky surface with heavy hammers to work it down, they would pry it off with heavy wooden levers the thickness of railroad ties. First, they cut sockets (photo at right) in and under the edges of limestone layers separated by natural horizontal fissures. The profile across one lever socket is a downward slope. The individual holes range in depth from a few to 50 centimeters. Workers would insert the ends of the levers, sometimes three, four, or more in a row, and altogether pull down on the levers to snap off a block, or sometimes to break off a thinner layer. That is why lever sockets and quarry channels often occur together. We see rows of lever sockets along the patches defined by quarry channels east and south of the temple.

But we also find other sets of lever sockets on flat surfaces where workers used levers to move heavy stones. They cut the surface to “get purchase” for the ends of the levers to lift and move the stone. We see the sockets on the lower edges of some multi-ton limestone blocks in the walls of the Sphinx Temple, and walls of the Khafre and Menkaure pyramid temples, showing where quarry workers snapped them off from the bedrock.

### Starter Holes, Proofing Holes

Workers began their more extensive bedrock work by chiseling holes as a starting point, or as a lead to “proof” the rock to the depth they wanted to lower the surface. A deep hole at the west end of the draft northeast temple corner (see below) gave workers a preview of the quality of the bedrock (photo, page 13 top) and served as a lead for deepening this corner. When they moved the corner, they sunk another lead hole that still shows on the north edge of their final cut for the temple foundation.

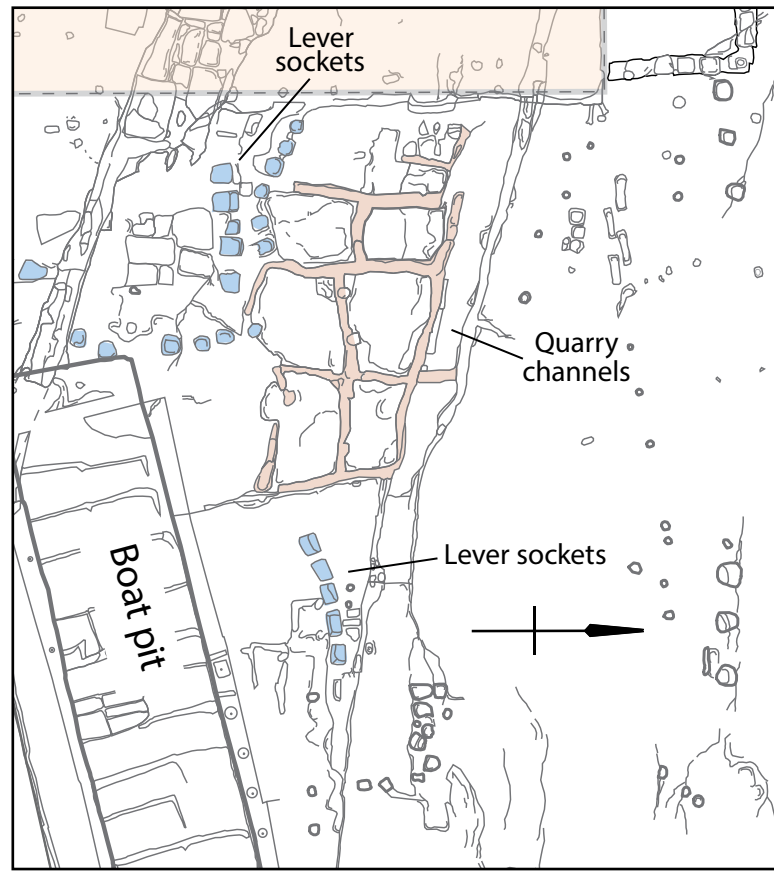


Lever sockets on the map, page 13, and at the lower right hand edge of the photo at the bottom of page 13. Workers pushed the ends of thick wooden levers into the sockets to pry and snap off thinner layers of bedrock in order to work the surface down. The fence in the background surrounds a boat pit. View to the east. Photo by Mark Lehner.



Above: Workers clear a row of lever sockets on the north side of the boat pit. The location suggests that workers moved some heavy object, such as broad slabs or beams, to roof the boat pit. But the lever sockets here slope in the opposite direction, down away from the boat pit. Photo by Mark Lehner.

Right top: Map showing location of lever sockets near the boat pit. Map by Mark Lehner.



### Line Holes

It would have been common practice for Khufu's builders, like traditional builders everywhere, to stake out the structures whose foundations they formed into bedrock. But here (unlike at Meidum and Dahshur), they could not just pound stakes into the ground to tie a reference line for a temple wall or pyramid casing. They had to chisel out a hole.

We have found holes offset a short distance from the northwest corner of Queen's Pyramid GI-a, and in line with its northern and western sides. Remarkably, plaster at the bottom of the hole still retains the shape of two wooden stakes—a larger, main stake that served as the marker, and a smaller stake that served as a wedge to secure it. We could call these “line holes” for the base of GI-a. Similar holes, but larger, are found offset from the northwest, northeast, and southeast corners of the Great Pyramid, and online with the northern, eastern, and western sides.

The most significant “line holes” form a series that runs parallel to the sides of the Great Pyramid 3 meters from the foundation platform.<sup>2</sup> We think they held thick wooden posts that could carry a line of string or thin rope from which the builders took perpendicular offset to the setting line for the pyramid platform. They could untie and remove sections of the reference line, as they dragged in and set heavy slabs, and reestablish the reference line by retying the string.<sup>3</sup>



The ridge of bedrock left along the north side of Queen's Pyramid GI-a, view to the east. A line of four holes marked the limit for quarry workers to cut the bedrock down for the causeway. As they worked opposite the pyramid entrance, they cut farther south of the line, and cut the easternmost “line hole” in half. Photo by Mark Lehner.



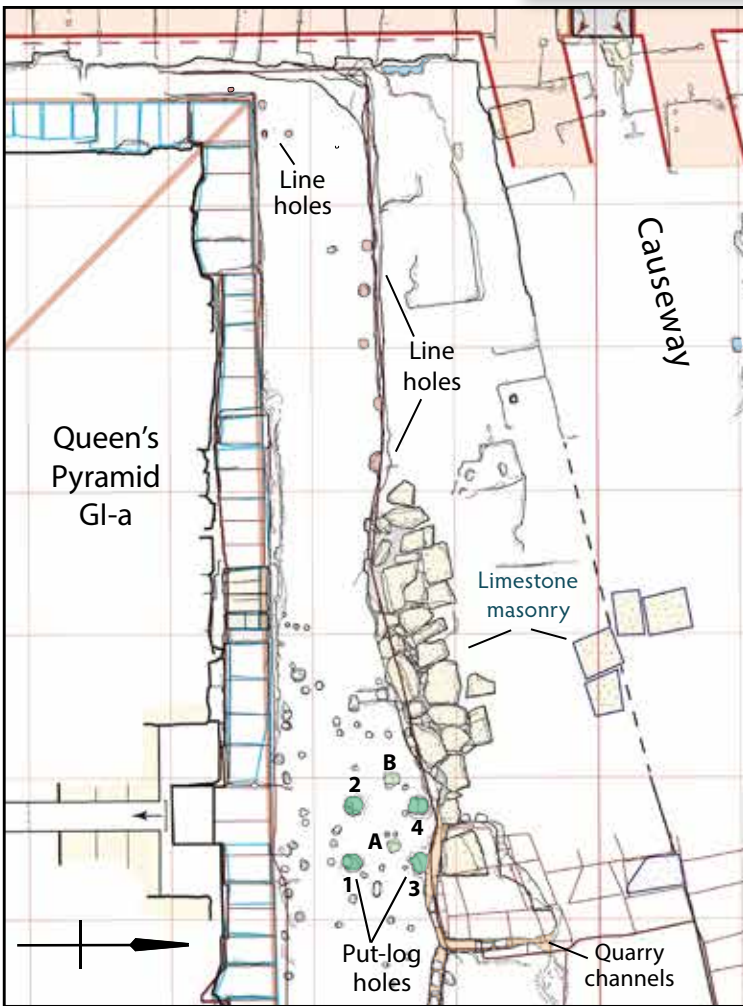
Dan Jones and Sayed Salah examine traces of the original northwest corner of Queen's Pyramid GI-a. A thin etched line (inset) remains as a guide for the exact edge and baseline of the pyramid casing of long-missing fine Tura limestone. Wooden stakes set in two holes (bottom of photo) served as crude markers for where quarry workers should cut down the bedrock to form an emplacement for the corner casing block. Plaster at the bottom of the hole retains the shape of the bottoms of the wooden marker stake and a wedge to hold it firmly in place. Photo by Mark Lehner.



We mapped more "line holes" along the southern side of Khufu's causeway. These must have held wooden stakes that showed quarry workers where to cut the bedrock down for the causeway foundation. In this case the stakes marked a cut-line, more than a reference line for measuring. At the Unfinished Obelisk in Aswan, "line-holes," or "outline holes," tested the bedrock (in that case, granite) ahead of the major work, and along the builders' cut line (in that case the outline of a gigantic obelisk).<sup>4</sup>

Inset below: Plaster at the bottoms of Hole 1 in the group of four large holes in front of pyramid GI-a retains the form of the ends of round wooden logs. Smaller holes accompany the larger ones, outside or inside. Photo by Mark Lehner.

Below: Dan Jones documents a series of holes cut into bedrock in front of the entrance to Queen's Pyramid GI-a. View to the southwest. Holes 1, 2, 3, and 4 are slanting put-log holes. A and B are put-log holes (see at right), but do not slant. Photo by Mark Lehner.



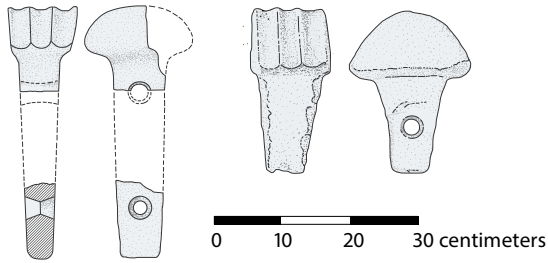
Map of the area on the north side of Queen's Pyramid GI-a. Around the base are traces of missing casing stones shown in blue lines as mapped by Dan Jones and Mohamed Helmi. Dark red lines were mapped by George Reisner in 1920. Map by Mark Lehner.





## Menkaure Valley Temple

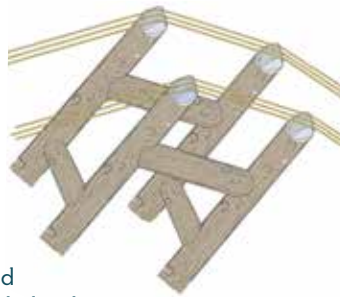
## Khentkawes Town



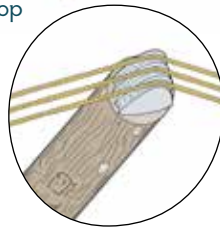
Above "bearing stones" shaped in hard granite, basalt, or schist, front and side views. Left: After Reisner, G. A., 1931, *Mycerinus, The Temples of the Third Pyramid at Giza*. Cambridge: Harvard University Press, pl. A, no. 6. Right: After Hassan, S., 1943, *Excavation at Giza, Vol. IV, 1932-1933*. Cairo: Government Press, pl. 18A-B. Drawings by Mark Lehner after Arnold, D., 1991, *Building in Egypt: Pharaonic Stone Masonry*. Oxford: Oxford University Press, fig. 6.45.

Top right: Dan Jones stands next to the set of "boxcar" holes closest to the Great Pyramid Temple. Photo by Mark Lehner.

Right: Hypothetical framework of timbers, with bearing stones set into the top and fixed by peg and dowel to guide ropes and change the direction of pull. The framework could have been socketed into the large slanting holes in front of Queen's Pyramid GI-a.



Right inset: Detail of the hypothetical frame suggests how a mushroom-shaped bearing stone might have been embedded in the top of a round wooden log, set at a slant. Drawings by Mark Lehner.

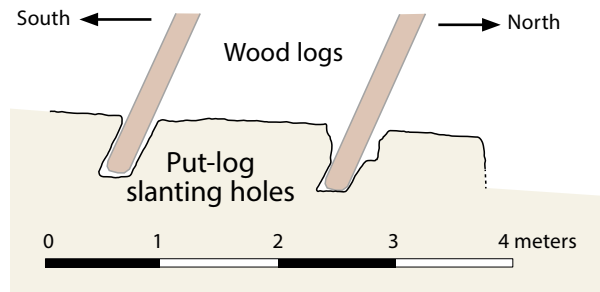


## Pavement Props

All around the pyramid and temple we see curious little holes, almost always in pairs (photos and map, page 14 top). We don't know what the builders did with these little holes, but they seem to relate to the cuts the masons made in the bedrock floor to lay in the thick limestone slabs of the court pavement and foundation for the outer temple walls and causeway. The pavement slabs were odd shapes and sizes, and nearly half a meter thick. Khufu's stone masons custom-trimmed one pavement slab to fit next to its neighbor, creating complex jigsaw patterns. Stone masons could not have cut the multiple sides of one slab to fit its neighbor so precisely after they had set the slabs down upon the bedrock surface. The slabs needed to be raised on props. I hypothesize that they inserted short wooden props into the pairs of small holes to keep the slab tilted up over its place, as they cut its matching emplacement into the bedrock floor, and made final trims to one side or corner, so that when they laid the slab down, it would join flush and tight with the slabs next to it.

## Put-Log Holes: Hints of an Ancient Apparatus

As the name implies, "put-log" holes received a wooden log, Most of the holes so far reviewed received a wood log of some



Above: North to south profile of a pair of slanting holes in a put-log set of six deep lever sockets. The northern hole shows a ledge or step on the northern side. From a field drawing by Dan Jones.

size. We see so many holes in front of the entrance to Queen's Pyramid GI-a, workers must have used them for a variety of tasks, at various stages.

They might have used some for posts of a crane-like device to help move the heavy lintels above the entrance, or to perhaps lower the queen's sarcophagus down the passage.

Four large holes of about the same size slant down from north to south, and some of them show a step or ledge on the northern side (photo, bottom facing page). Plaster at the bottom of Holes 1 and 2 retained the form of round, wooden logs (bottom inset photo, facing page). Holes A and B are not quite as large or deep, and they do not slant.

The plaster shows these large holes held logs, what would have slanted up to the north. If workers rigged ropes over the top, it would have allowed them to change or angle the direction of pull, like a modern crane. Poles set upright in the small holes (A and B) might have been part of the contraption.

To work as a primitive crane, the rope would need to be guided over grooves that reduced the friction, perhaps with the help of a plant-oil lubricate. George Reisner and Selim Hassan found examples of "bearing stones," shaped like flattened mushrooms in hard stone (illustrated above). Dieter Arnold noted that these "bearing stones" acted as proto pulleys. (True pulleys did not yet exist in heavy stonework.) "By the shape of the head of the stones, one may conclude that they were made to change the direction of ropes by 45 to 90 degrees. The object

into which the stones were inserted must have been a pole, the head of a scaffold, or a kind of trestle.”<sup>5</sup> Sailors may have used such bearing stones at the top of A-frame masts. Small holes running through the stems of the bearing stones allowed workers to secure them to the top of poles and masts by peg or dowel. In the drawing on page 17, I have suggested how a mushroom-shaped bearing stone might have been embedded in the top of a round wooden log, set at a slant, stuck into one of the four large holes outside the entrance to GI-a.

Khufu’s workers might have used a rig of ropes and timbers to move the two huge limestone architraves, or lintels, one above the other, at the entrance to GI-a. The lower block is larger and forms the ceiling of the passage. More architraves, superposed, might lie behind these, in which case workers would have had even greater need for a system that would give them mechanical advantage in lifting and lowering massive weights. The queen’s sarcophagus was nowhere near so heavy, but the apparatus could have helped lower it down the passage.

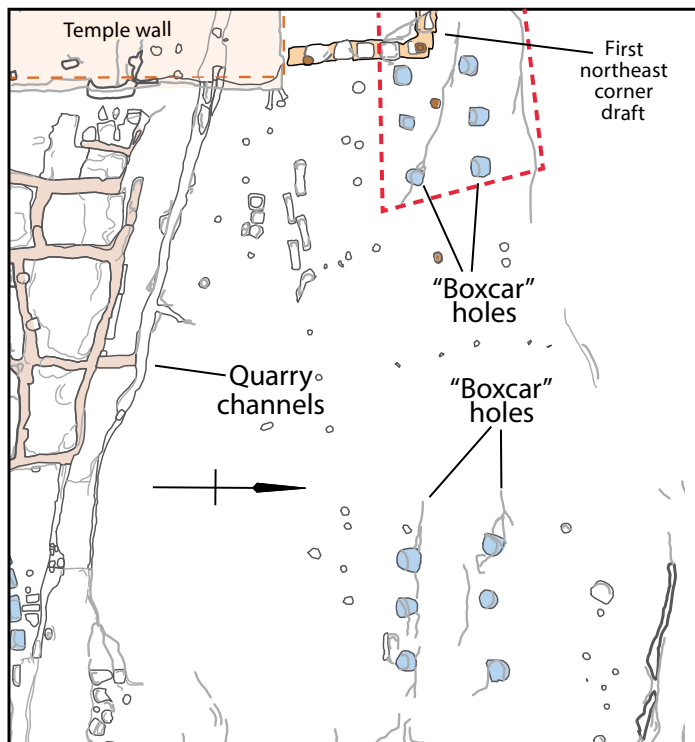
### Unsolved Mysteries: “Boxcars”

These four slanted holes in front of the entrance to pyramid GI-a may have belonged originally to a group of six. When quarry workers cut the ledge along the north side of pyramid GI-a, for the Khufu causeway, they clipped away part of the northeastern hole. They cut away another pair on the north, making this a set of six large, slanted holes, like two sets of six holes we found to the east.

We are still trying to figure out why the temple builders cut two sets of six deep, angled holes into the bedrock and how they used them. Would they work as sockets for the kind of proto crane described above?

Each set consists of two rows of three, so that each set looks like the six pips on dice. Dice rollers call two sixes “boxcars.” One set of six lies immediately east of the temple’s northeast draft corner, the other, 10.80 meters to the east, down slope (map above). The holes, ovoid to sub-rectangular, are among the deepest holes we have recorded in the temple area: 38 to 72 centimeters deep. Inside they all slope down from north to south, and some in the northern rows have a kind of step or ledge on their northern sides, like the “put-log holes” in front of pyramid GI-a (map, page 16, bottom left).

We first wondered if workers used these “put-log” holes to secure an A-frame from which they suspended a copper drag saw to cut stone. Many of the basalt pieces that paved the temple court show saw cuts, some semicircular, which could be from a drag saw, pushed and pulled from either side. In this case the parallel sets of three holes would slope in opposite directions, away from each other. Also, they are too close to leave room for a drag saw. The two sets of six are too far part, 10.80 meters, to have worked to suspend a drag saw.



Detail map of the area northeast of the Great Pyramid temple. The red lines roughly encompass the area shown in the photo on the facing page. Note that north is to the right to match the view in the photo at the top of the facing page. Map by Mark Lehner.

But the holes could have functioned, somehow, with a slideway on the hard surface immediately to the south. Builders must have used this slideway before they made Khufu’s causeway (photo, bottom facing page). They could have dragged heavy stones and materials up from the east. Projected east, the axis of the slideway hits the edge of the plateau at the same place as the causeway. Here Khufu’s builders raised a huge stone bridge-ramp down to the level of the floodplain. Small holes running west toward the northeast corner of the temple seem to define this older trackway. The two sets of six holes might have served as sockets for wooden beams and rope in some apparatus that helped workers pull their loads.

### Change of Mind: Designing as They Built

Workers cut holes in the Giza Plateau bedrock for a number of reasons. I have proposed hypotheses for the purpose of eight types. There are yet others that we mapped as part of the Great Pyramid Temple Project, as well as many more across the Giza Plateau. These enigmatic holes, ignored up until now, should become an important dataset for the study of 4th Dynasty construction methods. They even hint at the minds of the designers, and how they changed their designs mid-course. Was it the mind of a single master builder, or perhaps a collective mind of a royal house design committee?

We see an example in a first draft for the northeast corner of the temple. Told that the temple should have its northeast corner just about here, but apparently before Khufu’s surveyors

Top right: Sayed Salah and Dan Jones insert wooden boards into the holes of the western set of put-log holes. View to the west.



Right: View to the east from the top of the Great Pyramid, showing the temple ruins and the plateau surface, including traces of the causeway foundation and a possible track or slideway across a sheet of bedrock. Builders may have used the slideway and the causeway to bring blocks of stone to the temple site before they added pavement and walls to the causeway and created the boat pit and the Trial Passages (models, cut as tunnels in the bedrock, of passages built inside the Great Pyramid). Photo by Sayed Salah.

laid down the final lines, stoneworkers started to define the corner with a narrow, shallow, L-shaped trench. This would be what masons call their “lead” to extend the line of the eastern and northern sides of the temple and cut it down to create a level foundation. At some point the supervisors changed their mind and decided the temple corner should be 4.2 meters farther south and 84 centimeters more to the east.

This “draft” corner left a record of the stoneworkers’ methods. The photo at the top of page 11 show the draft: a lumpy-looking irregular, narrow trench forming a right angle. They first cut small holes, perhaps to hold wooden stakes at the ends of the two lines and another hole where the lines would meet at the corner. West of the northern line, they cut a deeper hole to check the quality of the bedrock below and as a “lead” for deepening their cut.

Once the mastermind decided on the final north-east corner of the temple, which implies a decision for the size and position of the whole temple, they cut the foundation half a meter deep, obliterating their “lead” trench here. But we can still see how they used small notches and large notches to mark the approximate position and alignment of the temple wall.

This draft of the temple corner is but one example of how the designers changed their mind. We see evidence of larger changes, perhaps even for the course of Khufu’s causeway, as his builders finished his pyramid, and then began his eastern temple, boat pit, queens’ pyramids, and mastabas for royal family members. We save the larger mind-changes for another issue.



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 4. Engelbach, Reginald, 1922. *The Aswan Obelisk, with Some Remarks on the Ancient Engineering*, Cairo: l’Institut français d’archéologie orientale, p. 6, pl. I; Engelbach, Reginald, 1923. *The Problem of the Obelisk, From a Study of the Unfinished Obelisk at Aswan*, London: T. F. Unwin, p. 35, fig. 38.  
 5. Arnold, Dieter, 1991. *Building in Egypt: Pharaonic Stone Masonry*, Oxford: Oxford University Press, pp. 144, 282–283.

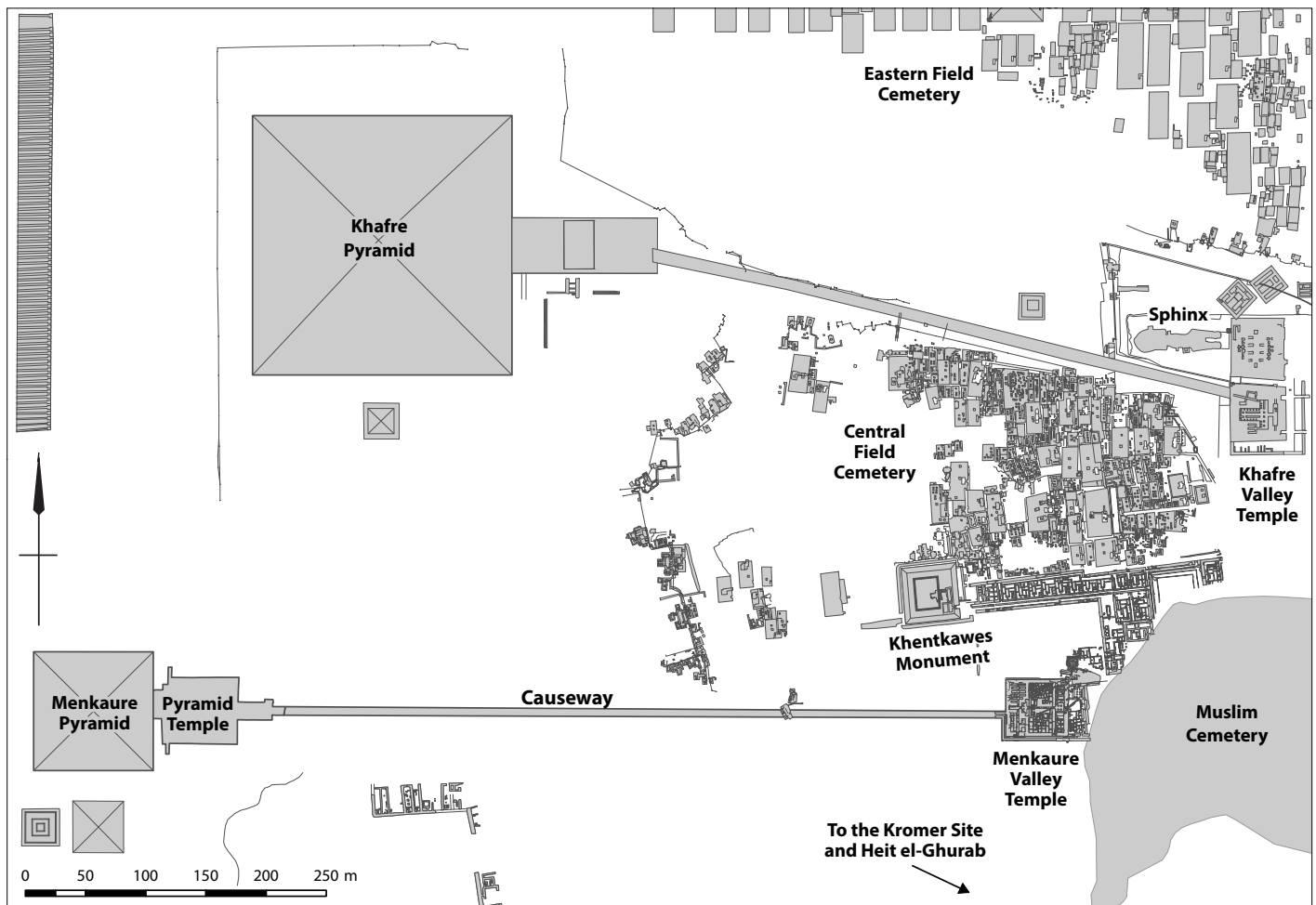
# Menkaure Valley Temple Season 2021 *by Dan Jones*

In September 2021, we undertook our sixth season of excavation at the Menkaure Valley Temple (MVT). During a six-week season, we continued our focus on the back portion of the temple where we documented new discoveries in 2019 and 2020.<sup>1</sup> Our goal was to learn as much as possible about the temple foundations and its subsequent building and occupation history. To do this, we needed to remove vast deposits that George Reisner originally excavated from the Central Court and then dumped as backfill, covering the western third of the MVT. Here, Dan Jones, AERA Senior Archaeologist and Area Supervisor for MVT, discusses highlights of the work from 2021, when the team uncovered parts of the temple untouched by Reisner and gained new insight into the foundation of the building.

AERA's 2019 and 2020 work in the Menkaure Valley Temple (MVT) opened new windows onto its complex history. Our most recent 2021 season continued the trend. This season's highlights included uncovering two large holes dug by George Reisner, original excavator of the MVT, which he had not documented in the northwest part of the temple.<sup>2</sup> These holes offered insights into the foundation of the MVT—a part of the temple's history that has eluded us thus far. We also excavated deposits untouched by Reisner inside and outside of the temple that gave us new information on the building phases of the temple and a flash flooding event that Reisner proposed destroyed much of the temple.

## History and Archaeological Recap

The MVT—a temple intended to serve as Menkaure's memorial after his death—was begun in stone by Menkaure, but finished quickly in mudbrick by his successor, Shepseskaf, after Menkaure's death in the closing years of the 4th Dynasty. This version of the building was called the "First Temple" by Reisner (its plan shown in green in map on right). It saw occupation during the 5th Dynasty but was eventually abandoned, likely following a major flash flood event that tore through the back wall and sanctuary of the temple. Later, the temple was renovated and reoccupied, likely in the mid- to late 6th Dynasty, during the long reign of Pepi II—Reisner's "Second



Map of the location of the Menkaure mortuary complex, including his pyramid, pyramid temple, causeway, and valley temple. Rebekah Miracle, AERA GIS.

Temple.” Although we have very few concrete dates and events around which to build our chronology of the temple, a series of royal decrees that Reisner found both in the MVT and the Menkaure Pyramid Temple (the MPT, the upper temple next to the pyramid itself, see map, facing page), and more recently, new clay sealings evidence, all speak to a repeating cycle of royal attention to Menkaure’s funerary cult over 200+ years of the Old Kingdom.

The main part of the MVT was first excavated by Reisner from 1908–1910. In 1932 Selim Hassan excavated the eastern Ante-town along the front. AERA worked in the MVT in 2008, 2011, and 2012. After a hiatus, we have completed three seasons since 2019. We have worked our way westward, beginning first with clearing and remapping the front part of the temple and the Ante-town in those earlier seasons,<sup>2</sup> then jumping over the court with its complicated settlement structures, and starting in the western third of the temple in 2019. Each season, we revisit Reisner and Hassan’s work with more thorough and modern excavation, recording, and collection techniques.

The MVT is perhaps most famous for Reisner’s discovery of a magnificent group of four greywacke triad statues<sup>3</sup> featuring Menkaure, Hathor, and different nome personifications; and

a dyad statue of Menkaure and a queen, possibly his mother. Reisner found the triads stashed in a back corridor. He found the dyad buried in a deep hole he believed was dug by later treasure hunters, which he called “Thieves’ Hole.” Our reexamination of Thieves’ Hole made it clear that the dyad was actually found in a deeper, older pit to the east (see map below for location of both holes)—what we call the “Dyad Hole.” Both holes provide us with windows onto the foundations of the MVT.

Returning to the Dyad Hole in search of the lowest foundation blocks and any additional statuary fragments was one of several goals of our 2021 season. We also focused on uncovering and documenting the back western wall and its foundation, and on the Northern Magazines. Lastly, we hoped to dig deeper in a 2020 sondage on the temple exterior, examining the spot where the flood broke through the First Temple back wall.

### Temple Back Wall Elevation

By the end of the 2020 season we had exposed the internal elevation of the temple’s back wall from the causeway corridor in the south up to and including the offering hall in the north. After our 2021 season, we could complete the profile of the back wall of the entire 52-meter-width of the temple. This profile is



Map of the Menkaure Valley Temple showing the First and Second Temple walls, Thieves’ Hole, Dyad Hole, and the AERA’s 2021 excavation areas. The thick red line indicates the location of the elevation (cross-section) shown on the next page. Map prepared by Rebekah Miracle, AERA GIS.

in an excellent state of preservation thanks to Reisner's backfilling of the temple. It stands nearly 7 meters high (from the base of Thieves' Hole), and shows the three broad phases of the temple: 1) the earliest and lowest being the large limestone core blocks laid down by Menkaure's workers, overlaid by 2) Shepseskaf's mudbrick completion, which in turn is overlaid by 3) the second build of the temple in the 6th Dynasty. Preserved in the elevation at the back of the Offering Hall, we could also see traces of rebuilds and modifications that were undertaken during the life of the First Temple and, most spectacularly, the flood debris described by Reisner that broke through the wall at this point.<sup>4</sup>

To capture this uniquely preserved elevation for further study and posterity we decided in 2020 to make a detailed record of the elevation that could be incorporated into our Geographical Information System (GIS), along with our accumulated data on the temple. With the exposure of the whole back wall of the temple in the 2021 season, we were able to record the entire elevation. I recorded it photographically, which required taking 3,500 digital photos. I uploaded these photos to Agisoft Metashape, a program that performs photogrammetric processing (or stitching) of the images to generate a 3D spatial view. So that the stitched profile image could be integrated into our GIS, we attached targets to the elevation before I took the photos. We located the position of these targets by using the Total Station and entered their coordinates into our GIS. By integrating the final profile image into the GIS (see below) we were able to produce a detailed drawing of the elevation to scale.

### Northern Magazines Uncovered

In order to uncover the elevation, we removed the clean sand

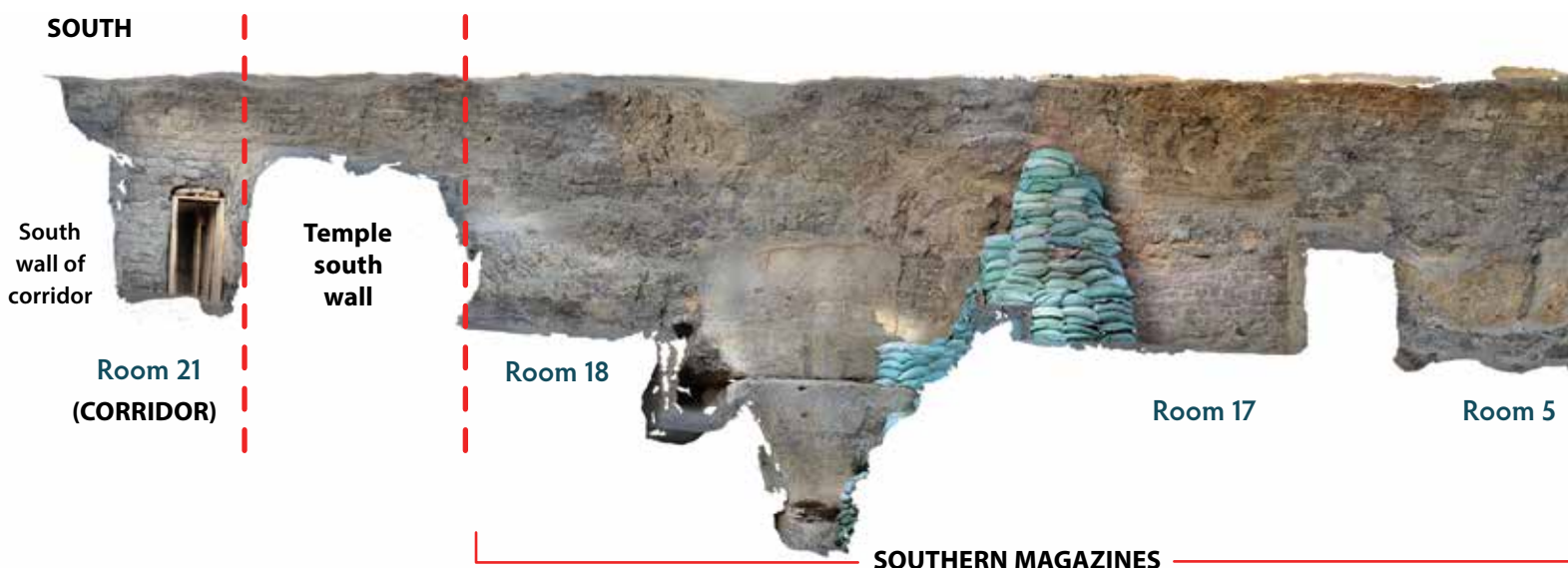
backfill we had placed against the west wall in 2020 and excavated Reisner's backfill from the rooms north of the Offering Hall, which Reisner named the Northern Magazines. He numbered them Rooms 6–11. Reisner's backfill was up to 7 meters deep from the surface. Rooms 6–11 were in excellent condition. The walls survive to a height of 3 meters. The rooms average 1.70 meters wide and show traces of a yellow marl clay plaster. A coating of red paint survives on the bottom half of the walls.

As Reisner excavated eastwards towards the front of the temple he deposited his spoil behind him into the western (back part) of the temple in reverse order from how they had accumulated and how Reisner excavated them. His workers first dug through surface sand in order to reach the temple remains. So this was the first deposit they dumped into the Northern Magazines, and therefore, the lowest deposit we encountered. By using Reisner's publication, diary, and photographs,<sup>5</sup> we have been able to ascertain that the backfilling of the Northern Magazines began on February 11, 1910. At this time, Reisner was excavating the southern side of the temple's court and it is highly likely that the backfill we removed from the Northern Magazines in 2021 was the spoil from this part of the temple. Although this spoil was not in its original context, we still put it through our rigorous sieving and sorting. We found it rich in material culture, such as animal bone, flint tools, and botanical remains. (See the following article by Ali Witsell for an analysis of clay sealing material removed from these deposits.)

#### Room 70: Part of a Late Phase Network

We found in a good state of preservation one of the last apartments in which people probably slept and ate in the temple.

Below: East-facing elevation of the back western wall of the Menkaure Valley Temple. See map on page 21 for the location of this profile. Using photogrammetry, Dan Jones produced this elevation profile from over 3,500 individual photos. From left: When the MVT was originally built, the corridor (Room 21) was open, running along the length of the temple. It was blocked in a later addition. The "doorway" shored up with lumber in Room 21 was cut through this block by Reisner, in order to examine a threshold between the western and southern corridors. The blue pile of sandbags are to support this part of the wall from collapsing.



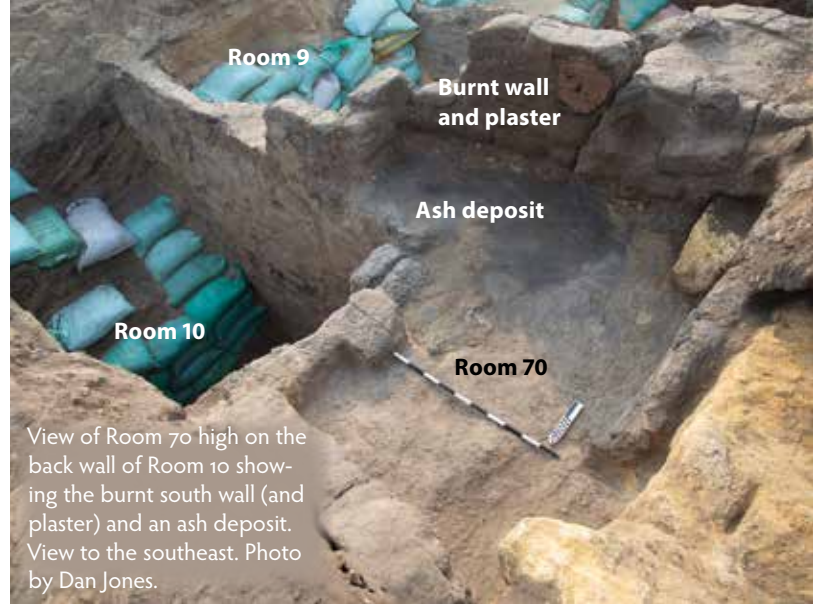
This is Reisner's Room 70, perched high up on the back wall of Room 10 of the Northern Magazines (see map page 21; photo at right). Room 70 belonged to a network of rooms that people built over the ruined walls of the First Temple, particularly over the northeast part of the Northern Magazines and in the southwest corner of the temple. Reisner thought that people built these rooms after the Second Temple was built, which places them very late in the history of the temple, at the end of the 6th Dynasty, assuming the Second Temple was built during the reign of Pepi II.

During our 2019 and 2020 seasons we encountered the ruined walls of some of these rooms built over the southern wall of the temple and southern causeway corridor. Reisner had fully excavated these rooms and removed parts of the walls as he excavated farther down. Since that left us scant remains of this late phase in the temple's history in the southern part of the temple, we did not expect to find better-preserved examples to test Reisner's theory that people occupied the temple so late in its history. Room 70 proved us wrong. Once again, it is due to Reisner's backfilling that we have this well-preserved window onto the late occupation of the temple.

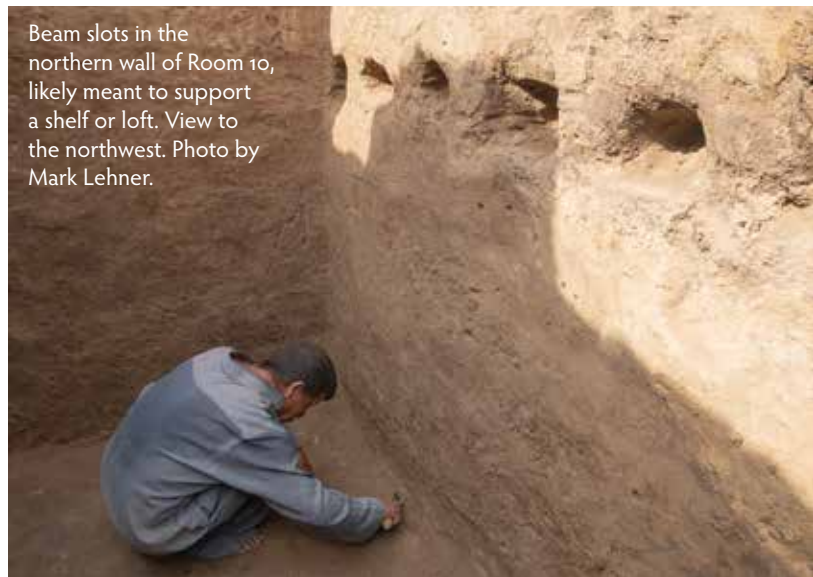
The south wall and plaster of Room 70 were heavily burnt. We found a deposit of concentrated ash and charcoal in its original place at the base of the wall. We took a sample for further analysis that we hope will yield information on what people were doing in Room 70 and when. Next season we will further probe the walls and floors of Room 70 to ascertain how they relate to the First and Second Temples.

#### Beam Slots: Lofts or Shelving?

Our excavation of Reisner's spoil from the Northern Magazines also revealed beam slots (photo, above right) in the northern and southern walls of Room 10. Reisner indicates these slots on his colored phase map of the temple with dashed lines across the room. He draws the same dashed lines across Northern Magazine Rooms 13 and 14, across the corridor from Room 10.

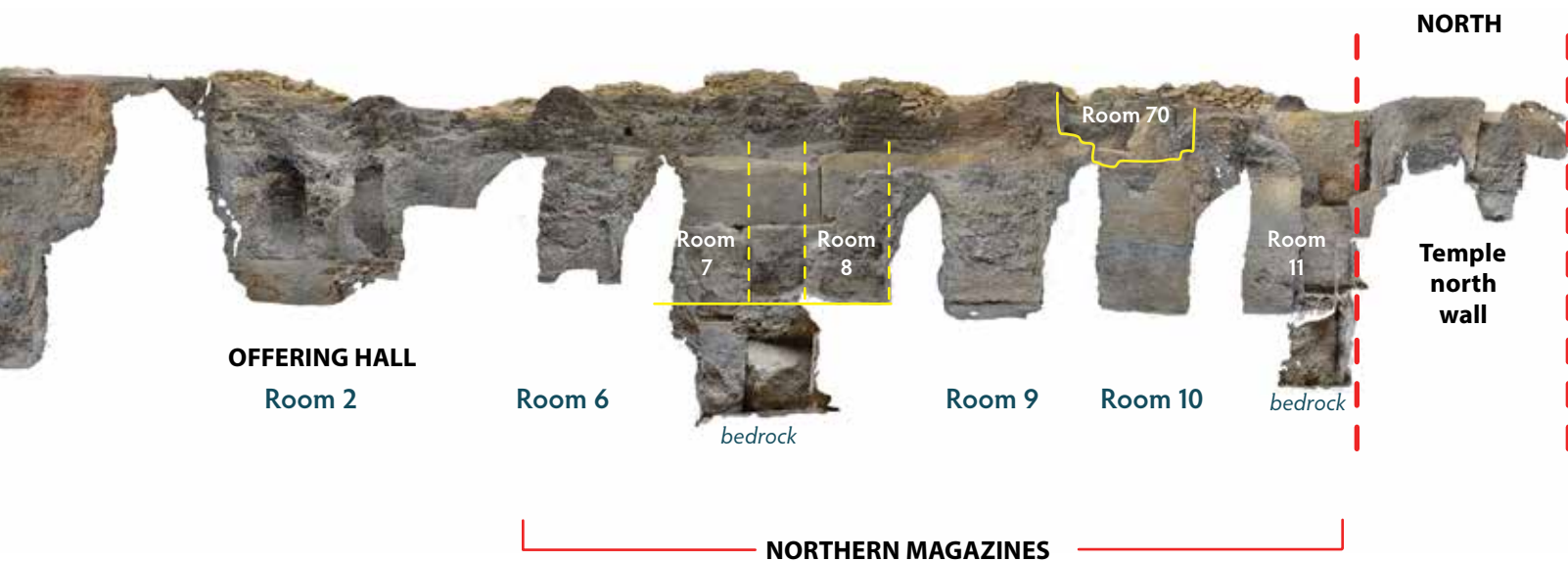


View of Room 70 high on the back wall of Room 10 showing the burnt south wall (and plaster) and an ash deposit. View to the southeast. Photo by Dan Jones.



Beam slots in the northern wall of Room 10, likely meant to support a shelf or loft. View to the northwest. Photo by Mark Lehner.

The holes for the beams also appear in the south wall of Rooms 10 and 13 in his east-west section drawing of the north side of the temple.<sup>6</sup> According to Reisner, these slots were evidence that the rooms contained a wooden loft (or mezzanine) for storage like the magazines of the MPT.<sup>7</sup>



Alternatively, we thought the slots may have supported wooden shelving on either side of the room. However, we found no evidence in the form of impressions or sockets in the floor that would have supported upright beams. The beam slots on the north side of Room 10 were partially excavated by Reisner, whereas the ones on the south side still contained the debris that filled the room. The slots vary in size (photo, page 23), which we believe is most likely due to how the wooden beams were removed in antiquity—being pushed up and down, and side-to-side, before being wrenched out. With the fill being partially removed from the north set of slots, we could average that the slots measured 0.18 meters in height by 0.24 meters in length, and both rows of slots are around 1.16 meters up from the floor surface of the room. However, the two rows of slots do not line up exactly with each other, so if beams did extend across the room they would have been on a slight northwest-southeast alignment. With the height of the room being nearly 3 meters, we believe that a mezzanine level that allowed for split-level storage would have been an efficient use of the space.

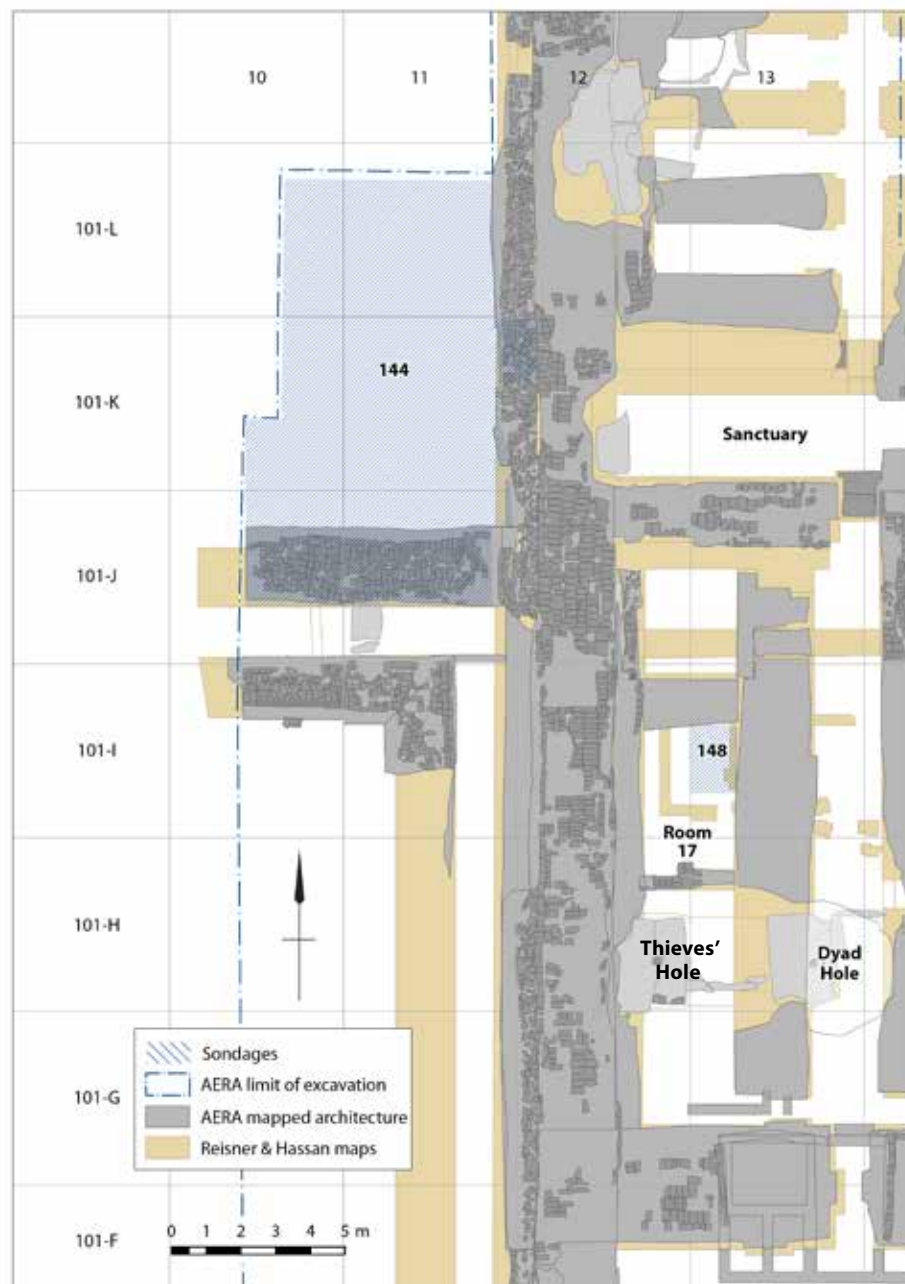
In Room 11, we also found a row of beam slots in the southern wall of the room. This was unexpected, as Reisner does not show dashed lines across this room on any of his maps, even though they were highly visible, but there was no evidence of slots on the north wall. This suggests the slots here could have supported beams for shelving rather than a mezzanine. The surface of this room was more degraded, and any evidence of upright supports was not present.

#### Reisner's Exploratory Holes

In Rooms 7 and 11 of the Northern Magazines we were surprised to uncover exploratory holes that Reisner's workers dug down to the limestone bedrock foundation of the temple. The bedrock foundation had eluded us for two seasons. This was the first time we have been able to get to the bottom of the stone temple to study how it was founded. Like Thieves' Hole to the south, these two newly uncovered holes revealed that by the time of Menkaure's death, his builders had managed to set in place three courses of large limestone "core blocks" at the back side of the temple.

We also found two shallow semicircular holes cut into the bedrock, most likely by Menkaure's builders to help lever the enormous blocks into place. The bedrock under the first foundation course slopes down gradually from north to south. Only 25 meters to the south, in Thieves' Hole and the Dyad Hole, our attempts to locate the bedrock have been thwarted by ground water. However, in both holes we were able to reach a point 2 meters lower than the bedrock in

Reisner's two exploratory holes. The bedrock must slope or step down to the south. This is illustrated as well by the differing elevations of the three courses of blocks showing the levels of the internal floor of the temple. In the two Reisner holes to the north, the top of the first (lowest) course of blocks was the level of the internal floor, with the upper two courses forming the back wall of the temple. But in Thieves' Hole to the south, for the point of the floor to be at the same level with that on the north, the floor had to be situated at the top of the second course of blocks. To account for the lower level of the bedrock, Menkaure's builders had to lay an additional foundation course of blocks, indicating to us that his builders based the temple on the steps, terraces, or the slope of a quarry.



Plan showing the location of Sondages 144 and 148, Rebekah Miracle, AERA GIS.

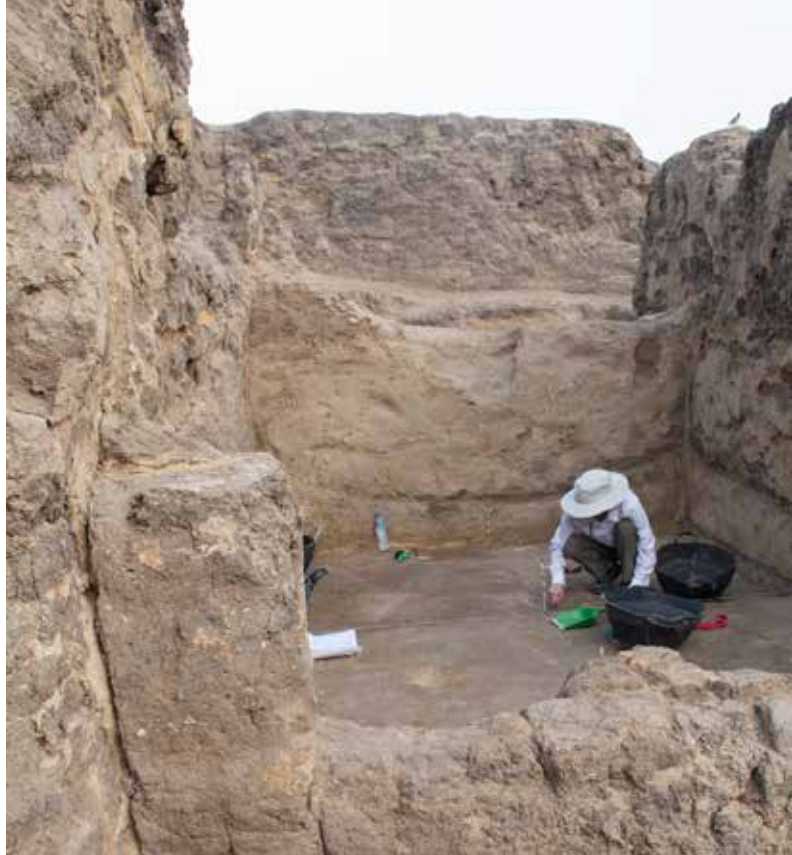


## Going Where Reisner Had Not Been: Sondages 148 and 144

As part of the exposure of the back wall we also cleared Reisner's spoil from Room 17, the southwest magazine immediately north of Thieves' Hole, which he thought was created during the occupation of the First Temple. To our surprise, we found that Reisner had not tunneled through the floor surfaces around the perimeter of this room—a method he regularly used to investigate wall foundations and understand the temple's building sequence. Reisner removed a small room<sup>8</sup> built over Room 17, presumably during the occupation of the Second Temple in the later part of the 6th Dynasty, along with the debris that the small room had been built upon and that filled Room 17. He also removed the formal yellowish-clay floor that had been laid after the room had been created. (Alternatively, the floor may have eroded away due to exposure during Reisner's time.) We could see traces of the floor at the edges of the room where it lapped up on to the plaster on the walls.

Since Reisner did not touch the floor foundation layer and what lay beneath, this room presented us with a unique opportunity to excavate ancient deposits in their original context. We therefore decided to open a small exploratory sondage (Sondage 148, see map, page 24) in the northeast corner of the room to investigate the structural sequence of the architecture, in hopes that any resulting material culture could help us establish relative dating for the sequence. Kathy DeRue excavated this sondage (see photo at right) and uncovered a floor surface that extended below the north wall of the room, indicating that not only was Room 17 a later modification (from the time of the First Temple), but the room's creation subdivided one long, earlier room that may have extended from the south wall of the temple to the Offering Hall in the north. In the uppermost floor layer (laid down after Room 17 was created), we retrieved a small, round, burnt ivory stamp seal with a cross or quartered-circle design (see image on page 33)—a type used in Egypt from the Old Kingdom (beginning in the 4th Dynasty) through the Middle Kingdom.<sup>10</sup> Further analysis of the items recovered from this sondage is ongoing.

Outside the temple we continued our excavation in Sondage 144 (see map, page 24), which we started in 2020 in the corner where the north wall of the causeway meets the back west wall of the temple. Although Reisner showed the northern causeway wall in his MVT maps, he only exposed its inner face. We excavated Sondage 144 to investigate the external environs of the temple and an infamous flooding event that Reisner believed destroyed the First Temple. We wanted to uncover and assess the survival of the west wall of the temple wall and the northern causeway wall, work out their structural components, and see what the breach through the first temple looked like from outside the temple itself.



Above: Kathy DeRue excavating Sondage 148 in Room 17. Photo by Dan Jones.  
Below: The causeway corridor of the Menkaure Valley Temple cleared where it meets the back of the western wall of the temple. Outside of the northern causeway wall, team members stand in Sondage 144 after this trench was excavated during Season 2021. View to the northwest.





Ben Bazely explains the deep probe in the corner of Sondage 144 where the northern causeway wall meets the back of the MVT western wall. Sondage 144 cut through many layers of gravelly debris left from desert flooding, culminating in the heavy gravel of the flash flood that breached the west wall of the First Temple. When people rebuilt the temple, they removed mudbrick debris that had washed into the temple from the flood and dumped it out behind the temple. Then they rebuilt the western wall of the Second Temple right above the western wall of the First Temple. View to the southeast. Photo by Mark Lehner.

We moved our excavation south of where we started Sondage 144 in 2020, into the corner between the causeway and temple. For the first time, we exposed the top face of the northern causeway wall, as well as its exterior face. Ben Bazely supervised excavation through the entire sequence, from the mounded mudbrick that collapsed from the western wall of the Second Temple down to the foundations of the causeway wall and First Temple western wall. At some point, builders dumped quarry debris to raise the level of the causeway floor 1.1 meters. At this level, they prepared a new paved surface. Above this surface we found very little cultural material to indicate human activity, but we tracked a series of gravelly deposits culminating in a layer of much larger limestone pieces laid down by the flash flood that broke through the western temple wall, as seen by Reisner from the inside the temple, principally in the Offering Hall. When people rebuilt the temple (Reisner’s “Second Temple”), they cleaned out the water-

borne deposits from inside the temple and dumped the material outside, against the west temple wall. Then they rebuilt the western wall. Later builders added a glacis-like, rubble “water-wall” of broken stones and clay as a skirt to guard against desert flash floods.

### Return to the Dyad Hole

In the hole where Reisner found the famous dyad statue of Menkaure, we pumped out ground water to try and reach the bottom (and the bedrock) and ascertain whether there were any remaining statue fragments. Reisner built walls of broken stone and mud around the Dyad Hole to retain the sand and debris from his own backfilling as he excavated the MVT to the east, believing that more statue fragments were to be found below the level at which he found the dyad in January 1910, standing upright against a large core block. But he concluded his excavations in April that year and never returned to the hole. This season we returned to try again to excavate deeper than the level Reisner reached. In 2020, we excavated to a level of 14.76 meters above sea level (asl) before we had to stop because of the water. During our work in September–November 2021, the water stood at 15.18 meters asl.

A small team of workers began excavating the bottom of the Dyad Hole on October 16. From October 17–23, we employed first one pump, then two, to reduce the ground water and make it safe to work (photo, facing page, upper right). Two pumps in operation were more effective in reducing the water level, but the farther we excavated, the greater the flow and pressure of water from the sides of the hole. Where we stopped, the level on the deposit at the bottom of the hole stood at 13.97 meters asl, 0.79 meters lower than where we stopped in 2020. On November 17 a small team of workers attempted once again to excavate, but stopped because the water was too deep. The bottom of the hole was now 13.71 meters asl, 3.71 meters down from the top of the core block on the west side of the hole. (Reisner found the dyad, 1.4 meters tall, standing against this core block, with the head of the king and queen slightly lower than the top of the block). After the sediment settled, the water in the hole was clear enough (photo, facing page, lower right) to see large limestone fragments; one in the center of the hole and others in the east and south section.

From slurry under water at the bottom of the hole, workers pulled up small fragments of greywacke, red granite, travertine (Egyptian alabaster), and larger fragments of limestone, as well as pottery fragments, most of which were Old Kingdom in date. A couple of large pottery sherds with ribbing are possibly Late Roman, which was a surprise.

### The Temple's Southwest Corner

During the 2021 season we also continued clearing Reisner’s backfill from the west causeway corridor south towards the



Above: Petrol generator being used to pump the water from the Dyad Hole. View to the east. Photo by Mark Lehner.

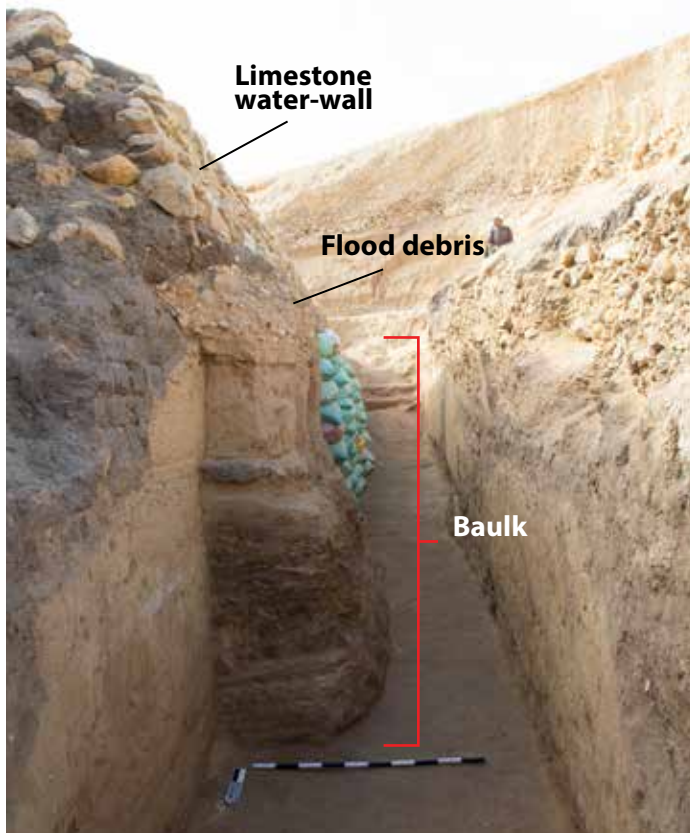
Below: Ground water filling the Dyad Hole, showing large limestone fragments visible underwater below. Photo by Mark Lehner.

southwest corner of the temple. In the corridor, we found a baulk, a column of original stratified deposits that Reisner left below the limestone water-wall that runs down the back side of the temple (photos, page 28). We presume Reisner left this section to stop the water-wall from collapsing into the causeway corridor. We are again grateful for his actions because this baulk now provides a cross-section of the material that filled the corridor in antiquity. It is composed of water-laid sand and gravel layers that built up over time on the corridor floor, overlaid by thicker windblown sand and silt layers, as well as fragmented mudbrick. All of this material accumulated prior to the flooding event that destroyed the First Temple.

At the southwest corner of the temple, against the external wall of the southern causeway corridor, we uncovered a small exploratory sondage that Reisner dug to investigate the foundation of the wall (photo, page 28). The sondage section shows the construction cut for the First Temple south wall of the southern causeway corridor. Just to the west of the sondage we also uncovered another column of ancient deposits left by Reisner that showed the construction cut for the Second Temple south wall. Combined, the section of the sondage and the baulk provide the construction sequence for this side of the temple.

When we return to the MVT in a future season, we hope to continue removing Reisner's spoil and clearing the Northern Magazines (Rooms 12–16) and the portico. We also hope to

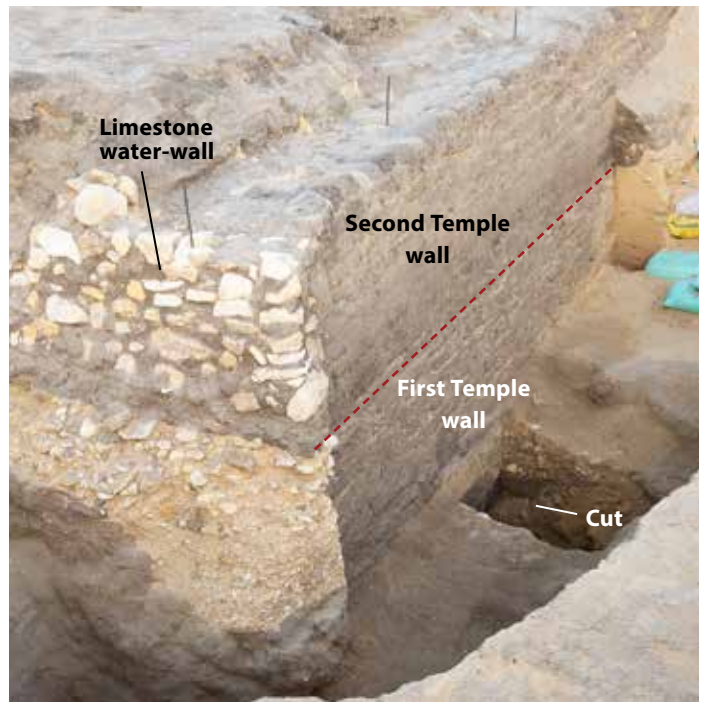




View to the south, west causeway corridor showing the baulk left by Reisner to support the limestone water-wall. Photo by Dan Jones. Reisner photographed this baulk and the photos (numbers C2012 and B463) can be viewed online through the Digital Giza website by Harvard University; <http://giza.fas.harvard.edu>.

extend an exposure from the portico into the western apartment of the central court to begin investigating the complex phasing of this area. And lastly, we would like to move immediately north of the MVT, where we believe there may be a broad ramp sloping up from the east to the west, toward the Khentkawes Monument and beyond.

1. "Return to the Menkaure Temple," *AERAGRAM* 20-1, pp. 1-8, 2019. "Menkaure Valley Temple Season 2020," *AERAGRAM* 21-1 & 2, 2020. *AERAGRAMs* are available for free download at our website: [aeraweb.org](http://aeraweb.org). Lehner, Mark. "Giza Plateau Mapping Project," *Oriental Institute Annual Report 2018-2019*, pp. 59-75, 2019; 2019-2020, pp. 63-82, 2020. *Oriental Institute Annual Reports* are available for free download at the Oriental Institute's website: [oi.uchicago.edu](http://oi.uchicago.edu).



View of the southwest corner of the MVT showing the construction cuts for the First and Second Temple south wall of the temple. View to the northeast. Photo by Dan Jones.

2. Lehner, Mark, 2012. "The Giza Plateau Mapping Project," in *Oriental Institute 2011-2012 Annual Report*, edited by G. J. Stein, Chicago: The Oriental Institute, The University of Chicago, pp. 63-64.
3. Friedman, Florence D., 2019. "Broken, Buried—And (Often) Bewildering," *AERAGRAM* 20-1, pp. 10-15.
4. George Reisner excavated the MVT over two seasons between 1908 and 1910. Reisner, G. A., 1931. *Mycerinus, The Temples of the Third Pyramid at Giza*. Cambridge, MA: Harvard University.
5. For our interpretation of the changes the Offering Hall went through see *AERAGRAM* 21-1 & 2, pp. 5-9, 2020.
6. Nearly 2,000 photographs along with many of Reisner's diary pages of his excavation at the MVT are available online through the Digital Giza website by Harvard University; <http://giza.fas.harvard.edu/search-results/?q=Reisner>.
7. Reisner's color-coded phase map of the MVT is pl. VIII in his 1931 publication and the section drawing that shows the beam slots in Rooms 10 and 13 is his Section GH in pl. X of the publication.
8. Reisner 1931, p. 42.
9. This small room was numbered 3 by Reisner and forms part of his sequence of rooms that he believed were built as part of the occupation of the Second Temple. The thin walls of this room are shown on the map with diagonal lines.
10. The foundation layer was numbered [35,992] and the seal was given the unique identifier Sealing Number (SN) 6282.



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# Lost but Found Again: On Old Kingdom Stamp Seals and the Sealings from AERA's 2019–2021 Menkaure Valley Temple Excavations by Ali Witsell

*Through many field seasons, Ali Witsell has been studying sealings (pieces of clay impressed by a seal) recovered from AERA excavations. In the field lab she identifies, analyzes, and documents the sealings, the majority of which were impressed with a cylinder seal. Her work has enhanced our understanding of AERA excavation sites and added to the corpus of Egyptian cylinder seals. The material from the 2019–2021 Menkaure Valley Temple excavations opened a new chapter in Ali's sealings work. For the first time in AERA's 30+ years at Giza, the sealings were mainly impressed by stamp seals, a type that is rare at our flagship site, the Heit el-Ghurab settlement (see back cover). Here Ali discusses how the MVT material helps resolve questions about how people used stamp seals and their dating, both somewhat muddled issues in Egyptology. Her discoveries raise questions about some of the findings of George Reisner, who excavated the MVT in 1908 and 1910. In his publication, Reisner wrote nothing about stamp sealings coming out of his MVT excavations, although he must have found many of them. Ali tries to find an explanation for why these sealings were missed. Stamp sealings are important settlement material in themselves, but stamp seals (the objects that made the impressions) are most well-known in Egyptian archaeology from burial contexts.*

Seals were important administrative objects used in civilizations across the ancient world for millennia. Small bits of clay were impressed by a seal used as a marker of responsibility—be it representative of a king, an institution, or an individual—for an item, a room or area of a building, or for a transaction. Seals largely came in two forms: as cylinders meant to be rolled across the clay or as stamps for punching into it. These bits of clay, called sealings, and their outer surfaces (the fronts, or obverses) bear impressions of the seal, while their backs (or reverses) bear traces of the items they sealed, such as jars, bags, papyrus documents, or even door closures. When an item or room was opened, the clay was broken and discarded. By piecing together these ancient impressions like puzzles, we can reconstruct the composition of whole seals, even when we do not have the original seal (we call these “theoretical” seals, see drawing, top page 30). AERA's excavations at Heit el-Ghurab (HeG), the 4th Dynasty city of Khafre and Menkaure, have produced a wealth of cylinder seal impressions, but very few stamp impressions. The Menkaure Valley Temple (MVT) flips that script on its head.

## Revising Reisner

When George Reisner worked in the MVT, he left its middle, the central court, for last (map, page 21; discussion of MVT's occupation and archaeological history starts on page 20). As his men dug the court, they hauled the excavated material (or spoils) to the back of the temple and dumped directly on top of the western magazines, portico, and sanctuary/Offering Hall, which they had previously cleared. During our 2019, 2020, and 2021 field seasons, when we re-excavated the western end of the temple, we removed parts of Reisner's backfilled deposits.<sup>1</sup>

By following Reisner's diaries and photographs, and recreating the timeline of when and where in the temple his team excavated, we determined that the spoils we removed likely came from his excavations on the southern side of the central court.<sup>2</sup> This area was crowded with rectilinear chambers and apartments, used by people who occupied the MVT in the 5th and 6th Dynasties. The earlier, 5th Dynasty occupation was fairly orthogonal, consisting of five apartments in the southern court. Chambers built during the later occupation, probably 6th

The Menkaure Valley Temple during 2021 excavations, with the Menkaure pyramid in background. View to the west. Photo by Sayed Salah.



## AN OLD KINGDOM SEAL CONTINUUM

At AERA, we see all Old Kingdom seals as occupying spots on a loose continuum of artistic “grammar,” bookended by “formal” and “informal.” Despite the clarity of these ends, there is much gray in between. The gradual definition of these uncertain areas and the potential assignment of labels to the actors behind these seals—royal vs. non-royal, canon vs. free, rich vs. poor, urban vs. rural, group vs. individual, professional vs. crude—is part of the ongoing work of Old Kingdom glyptic (seal) studies.

We owe much to the landmark work of Peter Kaplony, whose 1977–1981 *Die Rollsiegel des Alten Reichs*<sup>4</sup> gathered together many Old Kingdom seals and attempted to scaffold an organizational framework and common terminology around the amorphous corpus of that time. Among the seals he collected were many “official” seals (*Amtssiegel*, by his terminology), representing the king, high officials, and their administrative activities. Official seals of this period tend to follow a very specific (and formal) canon of layout by which the cylinder surface was divided for carving. This is often based on a repeating pattern of *serekh* (a symbolic palace facade containing the pharaoh’s Horus name, surmounted by a falcon) and job titles or epithets for the seal-holder and the king (see Wa’ab 7 at upper right).

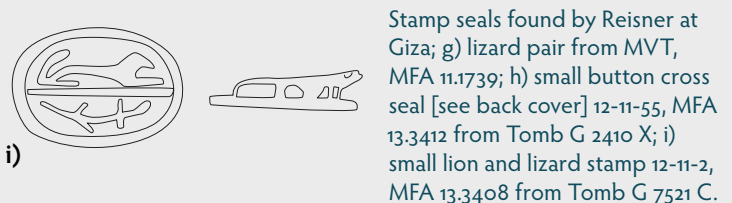
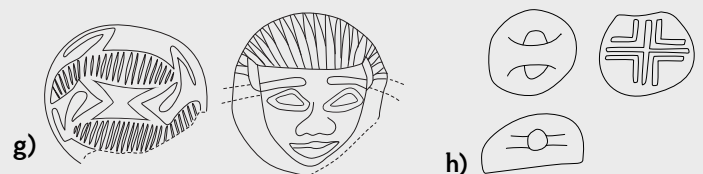
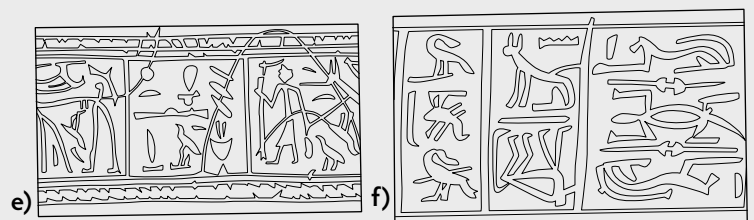
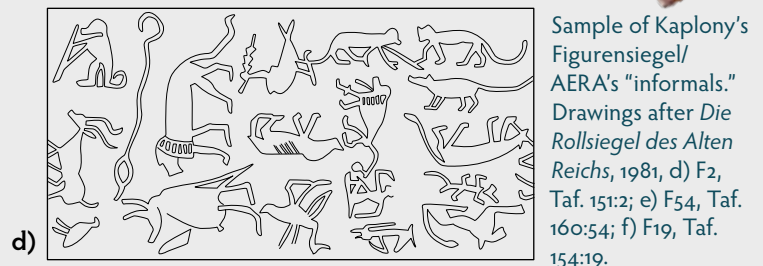
At the other end of Kaplony’s framework are what he called *Figuresiegel*—a type he thought was for use by the individual in domestic or household settings—which often bore informal, wild, and chaotic animal scenes or geometric motifs, sometimes quite crudely done, and sometimes occurring with hieroglyphs that seem to have been used more decoratively than grammatically. *Figuresiegel* were generally carved on a larger scale than *Amtssiegel*, with larger individual glyphs and motifs, and a looser organization to their design, sometimes paneled.

Official/Formal seals can function as a sort of snapshot of an official’s career. By identifying these officials, reconstructing their seals, and paying careful attention to the findspots of their sealings across a site, we gain information about the responsibilities their jobs entailed. Another benefit of official seals is that they bear the Horus name of the pharaoh in whose reign they were carved—a name thought to have only been used by the reigning king—meaning these seals (and their sealings) can often be carefully used as chronological markers to date not only the seals and their sealings, but also material culture found in association. This is frequently not the case with informal seals.

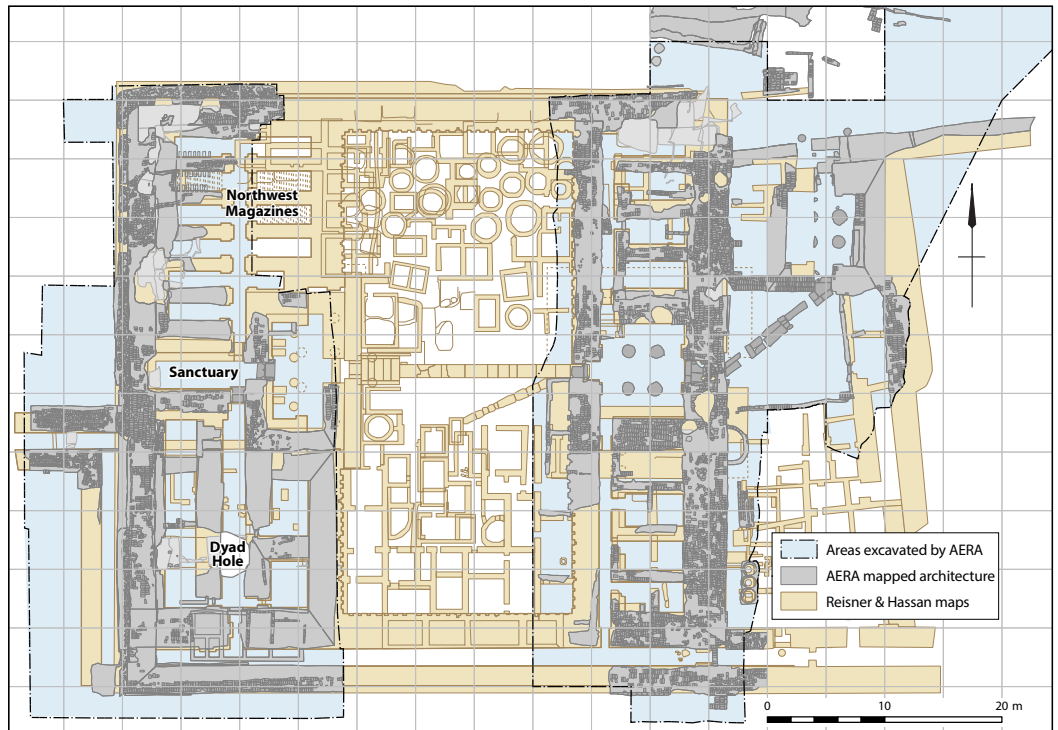
But formal seals are far from the only type that was in use during the Old Kingdom or at Giza, one of the most clearly royal sites of the period. Other classes of more informal seals have long been known, but their administrative function, and the individuals or institutions they represent, remains more uncertain—the stamp seals (samples at right) discussed here are among these groups.



Theoretical reconstruction of “Wa’ab 7,” a “formal” official seal active at the HeG site and dating to the reign of Menkaure. It belonged to an “inspector of the assistant(s) of the royal workshop” (reading and modified drawing based on original by Foy Scaff). Wa’ab 7 is currently constructed from duplicates (sealings that bear impressions from the same seal) of approximately 40 sealings. The image above shows the areas present on three examples (below) from amongst those 40 sealings, separated by color; a) SN 4262 is shown in orange (two impressions), b) SN 4320 in purple, and c) SN 4420 in blue (drawing not to scale, sealings 1:1). Overlapping or repeating sections allow us to piece together the whole (or “theoretical”) seal like a puzzle.



Map showing the history of excavation in MVT. Blue/gray indicates areas cleared and mapped by our team, against the tan of Reisner and Hassan's plans. AERA began in the east, then moved to the west, reserving (as Reisner did) the court (center, tan) with its complicated stratigraphy for later. Map by Rebekah Miracle, AERA GIS.



Workers clear sand backfill atop Reisner's spoil heaps prior to their excavation. View of these undulating amorphous deposits of silt-rich occupational debris interspersed with pockets of clean sand, as shown in the elevation behind the worker on the left. Photo by Sayed Salah.



Dynasty, were also rectilinear, but less substantial. It was in the northern end of the court that people built a series of bins and silos over time, resulting in much more complicated structures. The whole, according to Reisner,<sup>3</sup> had the “general appearance” of a “poor modern village.” Reisner’s extensive spoil deposits consisted of either absolutely clean sand, or dark, dense settlement debris and waste. They spanned almost the full width of the MVT building and were up to 3.5 meters deep in places. We dry-sieved 100% of what we removed, and recovered a wealth of material culture: pottery, ash, charcoal, worked stone, pigment, wood, metal, and most abundantly, animal bone and flint tools. We were shocked to also find dozens and dozens of sealing fragments, overwhelmingly stamp-impressed.

Although the spoil deposits are jumbled—material from all periods mixed—these stamp sealings, along with the back impressions of the items they sealed, give us a window onto the lives of the people who occupied the central court, as well as information on the history of the seals and how people used them. While they were “trash” to Reisner, they are “treasures” to us.

### Stamp Seals in Egypt: Value Misunderstood?

Egyptologists used to think that stamp seals first appeared in the late Old Kingdom, 6th Dynasty, although more recently the 5th Dynasty has been accepted as the starting point. They continued in use through the First Intermediate Period, eventually subsumed into the ubiquitous scarab stamp seal of later periods.

In the early history of discovery of stamp seals, scholars misunderstood their function, and value. Egyptian stamp seals have diverse motifs and shapes that evolved over time. But a large, early group share a common pool of motifs and themes that are easily recognizable, once they become familiar to the eye. Their shape—flat on the sealing surface, with a rounded back and small hole for suspension—led to their designation as “button” seals (see sample at left). Unlike the “official seals” so familiar from HeG (see sidebar at left), which bore royal names that can be used to date their context, stamp seals are problematic for dating. The earliest ones rarely bore royal names, rather they were dated based on the material culture with which they were found.

In the 1920s–30s, Guy Brunton<sup>5</sup> discovered a large group of stamp seals in cemeteries dating from the 4th to the 11th Dynasties, largely in the graves of poor women and children, usually with one seal placed at the neck or wrist as part of a necklace or bracelet. Because of these burial contexts, and a lack of excavated stamp-impressed sealings from settlement sites, Egyptologists did not recognize stamp seals as administrative tools. They lumped them with women’s jewelry as “seal amulets.” Brunton identified them as “clearly intended for amulets,” stating they were “impossible to use” as seals.

Further, Sir Flinders Petrie took this burial *sui generis* group and combined it with other known examples from the time (including many he bought from the antiquities market, thus devoid of any datable findspot) to form his 1925 *Buttons and Design Scarabs*,<sup>6</sup> where he suggested that button seals were foreign-made—saying “they have an un-Egyptian feeling” and were “homeless strangers in Egypt.” He assigned them to the 6th Dynasty, “brought in by the intruders from Asia.” In a 1927 publication he claimed they were “never used for sealing.”

In 1932, our very same George Reisner published results from his 1901–1905 excavations in Old Kingdom tombs at Naga ed-Deir, including what he called a “very full and characteristic” collection of stamp seals he dated from the 5th Dynasty through the beginning of the Middle Kingdom.<sup>7</sup> He breaks with Petrie and states that the stamps must have had a native development based on their wide distribution, large numbers, and because their designs fit in with the preceding cylinder seals and later scarabs. However, he makes no mention of finding any sealings himself or of his examples being used to produce *actual* stamp-impressed sealings. This is puzzling, because we now know that at least a few stamp-impressed sealings were found in nearby Naga ed-Deir tombs that Reisner himself excavated but seemingly failed to mention.<sup>7</sup>

Because there were no stamp-impressed sealings to contradict it, this idea that stamp seals were women’s jewelry and therefore not used as seals seems to have reinforced itself for decades. But at long last, stamp-impressed sealings began to turn up in the 1970s in two sites in the Dakhla Oasis, at Balat in the 6th Dynasty Governor’s Palace of Pepi II and at Ayn Asil in 6th–First Intermediate Period contexts, proving that button stamps were, in fact, used for sealing. Other securely dated stamp seals and sealings have been found at Elephantine, in Aswan, dating from the late 5th–12th Dynasties, and recently in a 5th Dynasty context at Abusir. A stamp impression<sup>8</sup> dating to Khufu found at Al Sheikh Sa’id, a mining site near Mallawi, as well as stamp sealings from AERA’s work at the Heit el-Ghurab site (see back cover), now firmly push the timing of stamp seal usage in administrative contexts back into the 4th Dynasty. These and many other examples have produced a corpus that we can compare with our new MVT examples.

## Mystery of the MVT 1910 Sealings Finds

In *Mycerinus*, Reisner’s publication of his excavations at the Menkaure mortuary complex, he mentioned finding only a single stamp seal (see drawing, page 30). He devoted only one short paragraph<sup>9</sup> to stamp seals, indicating that they are “very rare” in the Old Kingdom. He is somewhat dismissive of his one example, which he dated “not much later than Dynasty VI.” Reisner presented cylinder seals<sup>10</sup> he recovered from the MVT, and both cylinder-impressed sealings and later stamp seals from the nearby Menkaure Pyramid Temple (MPT). Yet he does not mention stamp sealings from his work in MVT. This is completely baffling considering AERA’s recent work. At last count—and we are far from the finish line of the MVT analysis—we’ve registered over 200 sealings, seals, and sealing-related objects (pieces that are not sealings but are related to the sealing process in some way), with the majority being stamp sealings. So Reisner must have been excavating sealings hand over fist—both cylinder and stamp-impressed. Why did he not mention them?

The only plausible explanations are that he missed them, likely due to fast and blunt excavation techniques, or simply found them unworthy of mention. But the latter would be puzzling too, because their appearance in these MVT layers is crucial evidence for one of the very topics he discussed in his brief paragraph on button seals: the timing of stamp seal usage in Egypt! One can’t help but think of the examples he seemingly missed at Naga ed-Deir as well, and how differently the story of Old Kingdom stamp seals may have unfolded had they been recognized and discussed sooner.

## MVT Stamp Sealings from AERA Excavations

Thus far in MVT we have found many types that are well known from Old Kingdom seals (see page at right for a sample of the sealings). André Wiese’s 1996 definitive study<sup>11</sup> of stamp seals dating from the 6th Dynasty–First Intermediate Period provides an invaluable source where scholars can find common terminology and comparisons for their pieces. It remains the most thorough study since Petrie’s analysis, but because his study was based heavily on Brunton/Petrie’s early work, unfortunately only a small percentage of these (253 of 1,426 total) come from sound archaeological contexts. We have many of the same types: simple geometrics, cross seals with angled ends and simple fishnet cross-hatched pieces; more complicated geometrics, including his shamrocks/clovers; insects and animals, including a phase of his “antelopes in degenerated fashion”; tête-bêche compositions of animals, often recumbent lions, or lions and lizards; seals showing *ankh* signs and *wah* scepters; and human figures with staff, and the so-called “Bes-shaped dwarves,” twins or “demons,” and jumping/dancing gods with a lion. Providing so many of these types on sealings with a related administrative context, even a jumbled one, is one of the most significant contributions of this new corpus of material.



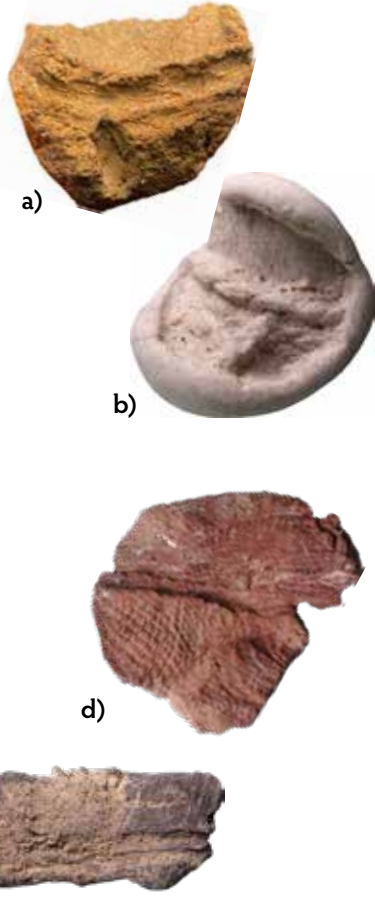
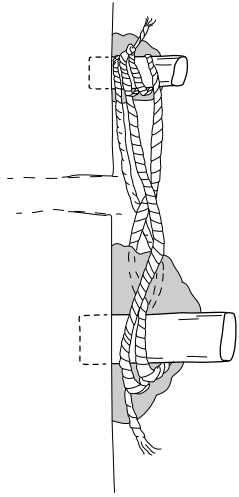
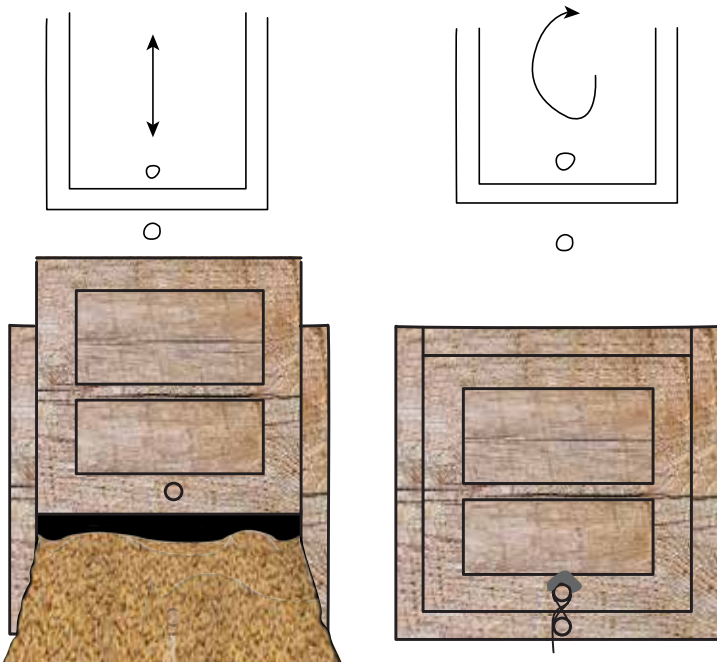


Two stamp seals and a sample of stamp sealings found in the Menkaure Valley Temple between 2019–2021. Types are based on André Wiese's 1996 *Die Anfänge der ägyptischen Stempelsiegel-Amulette*; see endnote 11 for reference.

a) Sealing Number (SN) 5953; standing figure with staff, perhaps with twin figure in tête-bêche arrangement, variant on Type A.6.b; b) SN 5954; figure with arms raised and knees akimbo, Type A.2; c) SN 5961; "jumping" figure holding lion, Type A.10, variant on a "master of animals" motif; d) SN 5963; *ankh* flanked by two *wah* scepters, variant on Type B.8.g; e) SN 5965; fishnet/cross-hatch motif, Type F.10; f) SN 5966; Kreuz or quartered circle, Type F.5; g) SN 5981; a variant on Wiese's "degenerated antelope" or Type D.8.d; h) SN 6033; an insect

or scorpion, Type D.26; i) SN 6043; insect with additional partial motif, variant insect Type D.26; j) SN 6053; variant on lotus rosette, Type E.3; k) SN 6058; facing horus falcons with *ankh* between, Type B.1; l) SN 6306; Wiese's "shamrock" or "cross clover" Type F.1; m) SN 6290; jumping "Bes-shaped" demon god or twin, variant Type A.2; n) SN 6323; geometric, variant Type F.3; o) SN 6314; rosette, Type E.4 variant; p) SN 6189, tête-bêche lion and lizard, Type D.2; q) SN 6191; tête-bêche recumbent lions, Type D.1; r) Object 5020/SN 6283; stone frog stamp seal; s) Object 4953/SN 6282; ivory Kreuz stamp seal. All objects shown 1:1; photos by David Jerabek and Ali Witsell, seal drawings by Darcy Hackley, sealing drawings by Ali Witsell.

Many of these are similar to, if not direct examples of, well-known types dating to the late Old Kingdom and early First Intermediate Period, and have many comparables to well-dated contexts at Balat, Elephantine, Abusir, Ayn Asil, Qau, Badari, and other sites. It is exciting to have so many types in administrative context within one building at Giza. A fuller treatment with catalog and comparables is forthcoming.



Top and center left: Reconstruction of how a bin in the central court may have functioned. Two pegs secured by twine, sealed by clay. Above: MVT back impressions: a) SN 5952, its reverse or back impression shows a wooden peg with string closure, b) a Sculpey mold of this same piece, preserving the peg and string as it would have looked; c) SN 6306, a flat wood impression, perhaps a wooden door frame; d) SN 6289 shows an impression of fine textile, perhaps a bag, based on the thinness of the clay; e) SN 5955, showing the impression of a folded papyrus document, wrapped and bound with three passes of fiber strapping. Sealings not to scale. Photos by Ali Witsell and David Jerabek.

We also discovered two new seals, unfortunately both broken. One is a stone seal with a motif very similar to known designs of beetles, turtles, spiders; the detail on this one suggests a frog. The other seal, made of ivory, is a quartered-circle, also called a *Kreuz/cross* (photos, page 33). It is gratifying that we have also found several sealings impressed by this very type in the new MVT material. It was a popular type throughout the late Old Kingdom and First Intermediate Period, so this is not surprising. Reisner himself found another example near mastaba tomb G 2410 in the Western Cemetery (see h on page 30).<sup>12</sup> Impressions of this type are common at other sites, including Balat and Elephantine, and it is also the main stamp present in the HeG 4th Dynasty material (see back cover).

### How Were the Stamps Used?

We must be mindful that these sealings, while made by the same sorts of stamps published by Petrie and Brunton, come from very different archaeological contexts than those of the MVT—those burials vs. MVT’s settlement, those representing the dead (or the hopes of the dead) rather than the MVT’s living and their responsibilities. As mentioned, the physical impressions preserved on the reverses of sealings are hints as to how the sealing functioned, or what type of item it sealed. These can include—among others—doors, bags, jars, and basketry. Thus far, the majority of the MVT sealings are what we call peg-and-string sealings (see drawings at left), meaning their reverses show impressions of twine (or string) and a wooden peg. Outside of that, we have significant numbers of textile impressions, indicating active use of bags or indirect jar sealings (jars with a scrap of textile stretched over the mouth prior to sealing). We also have one document sealing. All of this suggests that a mix of sealing activity took place in the MVT.

### Dating: Which Pharaoh?

The dating of these new MVT sealings is a work in progress. Many of the stamp-impressed sealings would be happy in the 5th–6th Dynasty, with motifs that carry on into the First Intermediate Period. We also found a small number of official seals (see sidebar, page 30), albeit just a few, but the royal names they carry attest to the complicated and extended history of patronage and interaction with this temple. Among them we have Horus names of Pharaohs Menkaure, Niuserre, and Unas, and cartouches of Menkaure, Khafre, and one belonging to a Pepi (whether II, who rebuilt the MVT, or Pepi I, is yet inconclusive).

The analysis of the materials found in association with these sealings may help to date these deposits, most especially that of the pottery. Mahmoud el-Shafey, ceramicist on the MVT material, reported that his initial impression is that the pottery is generally 4th–6th Dynasty in date, with the majority being from the latter part of that range, and a very small percentage

that could be as late as Middle Kingdom—this is roughly in line with the sealing evidence.

### Families, Women, and Children?

As alluded to previously, we must work toward understanding whom these seals represented—a topic of ongoing interest in Old Kingdom seal study. Considering that stamps were first found in burials overwhelmingly associated with women and children, what does the presence of stamp seal-impressed sealings in the central court of the MVT tell us about its inhabitants? How do we square this seemingly administrative function here in MVT and a recent idea<sup>13</sup> that the grave button seals served as magical amulets during a woman's life, perhaps for aid in conception and protection during childbirth? What should we make, if anything, of the presence of personal deities like Bes, Bat, and Tawaret—popular household deities all affiliated with women, children, and childbirth—on other known Old Kingdom stamp seals? Their symbols speak to a focus on the household cult in stamps that is absent in the official seals.

Who lived in the MVT court and used these seals? Reisner found fragments of several stone decrees in the MVT and MPT: one dating to the time of Shepseskaf that instituted the mortuary cult and set up *pekher* offerings for the *w'b* (purification) priests living there and tending to Menkaure's memorial; portions of two decrees dating to the 6th Dynasty reign of Merenre, renewing the cult some 200+ years later; and one dating to the 6th Dynasty reign of Pepi II—more evidence attesting to a complicated cycle of royal attention, occupation, and abandonment from the 4th–6th Dynasties.<sup>3</sup>

Based on comparisons between MVT and the pyramid towns of the 5th Dynasty pharaoh Raneferef at Abusir and the 6th Dynasty Queen Wedjebten at Saqqara, Mark Lehner has suggested that the MVT court buildings may represent apartments of dependents of “high ranking people, and their estates,” marking their claims to a share of the temple offerings of the “royal memorial foundation” based in the MVT.<sup>14</sup> Might they—or their family members and representatives—have been opening, closing, and sealing packages, bins, and documents? Evidence from the pyramid town of Wedjebten suggests that this patronage could last through multiple generations of scribal families. Might these stamps be some sort of family seal passed down as heirlooms, thus eventually being used as grave goods for women and children?

Another related line of evidence lies in the clear parallels between the 5th and 6th Dynasty stamp seals of MVT and the 4th Dynasty informal (see sidebar, page 30) cylinder seals from HeG and the nearby Kromer dump site. There is extensive evidence to show a tandem development of stamps and informal cylinders beginning in the 4th Dynasty.

Much work remains. We hope someday to tackle the complicated stratigraphy of what is left in the MVT court and find portions intact and untouched by Reisner, with these stamp sealings in original contexts. We also look forward to what other potential household evidence might be uncovered by AERA specialists in the lab as they analyze other material culture from the Reisner spoil heaps. We have only scratched the surface of this truly fascinating material, seemingly cast aside and left behind by MVT's earliest excavator.

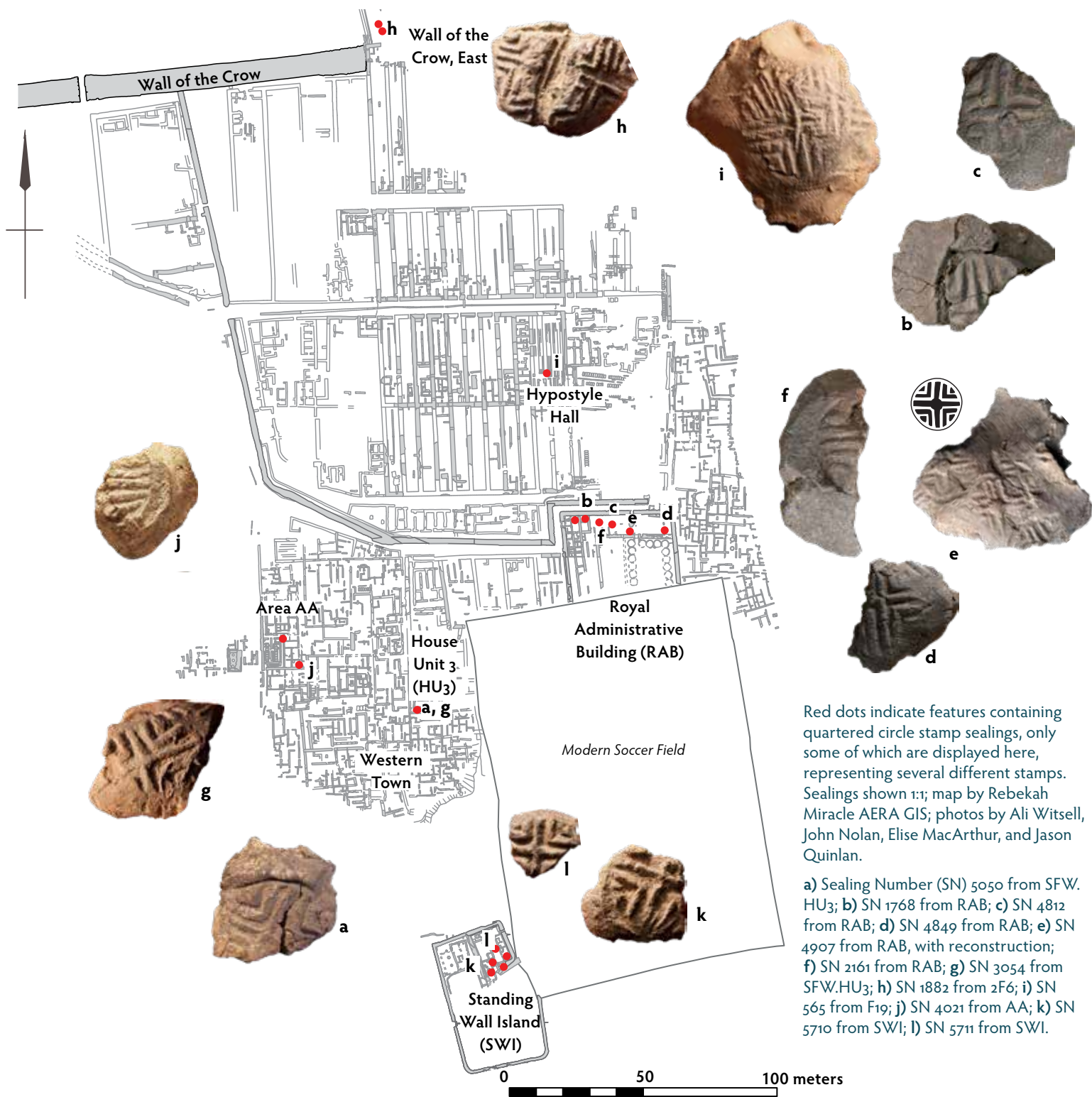
1. For further reading, see endnote 1 in the previous article by Dan Jones. Photos of Reisner's excavation, including the “village” in the Central Court, can be seen at <http://giza.fas.harvard.edu/sites/2035/full/>.
2. Jones, Dan, et al. 2019. “Menkaure Valley Temple-West (MVT-W) Data Structure Report, April 2019,” on file, AERA Archive.
3. Reisner, George A., 1931. *Mycerinus, The Temples of the Third Pyramid at Giza*, Cambridge, MA: Harvard University. See p. 49.
4. Kaplony, Peter, 1977, 1981. *Die Rollsiegel des Alten Reichs, Allgemeiner Teil mit Studien zum Königtum des Alten Reichs*, Monumenta Aegyptiaca 2, 3a, 3b, Brussels: Fondation Égyptologique Reine Élisabeth.
5. Brunton, Guy, 1927. *Qau and Badari I*. London: British School of Archaeology in Egypt. See pp. 55–59, pls. xxxii–xxxiv. Brunton, Guy, 1937. *Mostagedda and the Tasian Culture*, London: British Museum Expedition to Middle Egypt. See pp. 107–8, pl. LX. Brunton, Guy, 1948. *Matmar*, London: British Museum Expedition to Middle Egypt 1929–1931. See p. 49, pl. XXXIII.
6. Petrie, W. M. Flinders, 1925. *Buttons and Design Scarabs*, London: British School of Archaeology in Egypt. See specifically pp. 1 and 8 for quotes. Petrie, 1927, “Notes on Dating,” *Qau and Badari I*, London: British School of Archaeology in Egypt, pp. 78–80. See p. 79 for quote.
7. Reisner, George, 1932. *A Provincial Cemetery of the Pyramid Age, Naga-ed-Deir III*, Oxford: University Press. See pp. 109–120, fig. 47. See the new publication by Vanessa Davies on Cemeteries N 500 and N2500 at Naga ed-Deir (*The Phoebe A. Hearst Expedition to Naga ed-Deir, Cemeteries N 2000 and N 2500*, London: Brill, 2021), showing a small group of sealing impressions excavated by Reisner before he started at the MVT, which are clearly impressed by button seals. My thanks to Vanessa for directing me to high-quality photographs of these sealings available online at the Phoebe A. Hearst Museum of Anthropology at Berkeley. Although Reisner would excavate here a few years before turning his attention to Giza, his publication of this 5th-Dynasty stamp group would come out in 1932, one year after the *Mycerinus* volume.
8. Willems, Harco, 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. Willems et al., 2009. “An Industrial Site at Al-Shaykh Sa'id/Wādī Zabaydā.” *Egypt and the Levant* 19: 293–331.
9. Reisner 1931, p. 236.
10. Reisner 1931, 234, pl. 64j–l; Menkaure Pyramid Temple, p. 19, pls. 17a–b, 23g.
11. Wiese, André, 1996. *Die Anfänge der ägyptischen Stempelsiegel-Amulette: Eine typologische und religionsgeschichtliche Untersuchung zu den "Knopfsiegeln" und verwandten Objekten der 6. bis frühen 12. Dynastie*, Freiburg, Switzerland/Göttingen, Germany: Universitätsverlag/Vandenhoeck Ruprecht.
12. See HUMFA\_12-11-55, Digital Giza, The Giza Project at Harvard University. <http://giza.fas.harvard.edu/objects/15833/full/>.
13. Dubiel, Ulrike, 2008. *Amulette, Siegel und Perlen: Studien zur Typologie und Tragesitte im Alten und Mittleren Reich*. Fribourg/Göttingen: Academic/Vandenhoeck Ruprecht.
14. Lehner, Mark, 2015. “Shareholders: The Menkaure Valley Temple Occupation in Context.” In *Towards a New History for the Egyptian Old Kingdom, Perspectives on the Pyramid Age*, edited by Peter Der Manuelian and Thomas Schneider, pp. 227–314. Leiden: Brill. See pp. 247–49, 306 for quotes.

# Stamp Seals from the Heit el-Ghurab in the Time of Khafre and Menkaure

Clay sealings impressed by stamps have been rare in AERA's excavations on the Giza Plateau. As mentioned in the article on page 29, prior to the 2019 MVT-W (Menkaure Valley Temple-West) excavations, and from a pool of thousands of pieces, only 40 or so were conclusively made by stamps. However, among those, the most common is a type known as a "Kreuz" stamp after André Wiese's "Kreuz mit Winkelfüllung" (Type F.5, "cross with angled filling")—a quartered circular stamp (or a "nwt" or city stamp, due to its similarity to the hieroglyph for "city"). It is among the most commonly found stamp seal types in later Old

Kingdom 5th/6th Dynasty contexts, continuing into the 7th/8th Dynasties—the later First Intermediate Period and beyond. But at HeG, we have found it in meaningful groupings and contexts solidly dating to the reigns of Khafre and Menkaure. It is exciting to find it in settlement contexts that securely push its usage in everyday settings back into the 4th Dynasty (a sample of these sealings excavated from the Heit el-Ghurab site is shown below), making these among the earliest, if not the earliest, currently known examples of this stamp type. For a comparable, see MVT-W Sealing 5966 and seal Object 4953 on page 33.

-Ali Witsell



Red dots indicate features containing quartered circle stamp sealings, only some of which are displayed here, representing several different stamps. Sealings shown 1:1; map by Rebekah Miracle AERA GIS; photos by Ali Witsell, John Nolan, Elise MacArthur, and Jason Quinlan.

- a) Sealing Number (SN) 5050 from SFW. HU3; b) SN 1768 from RAB; c) SN 4812 from RAB; d) SN 4849 from RAB; e) SN 4907 from RAB, with reconstruction; f) SN 2161 from RAB; g) SN 3054 from SFW.HU3; h) SN 1882 from 2F6; i) SN 565 from F19; j) SN 4021 from AA; k) SN 5710 from SWI; l) SN 5711 from SWI.



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