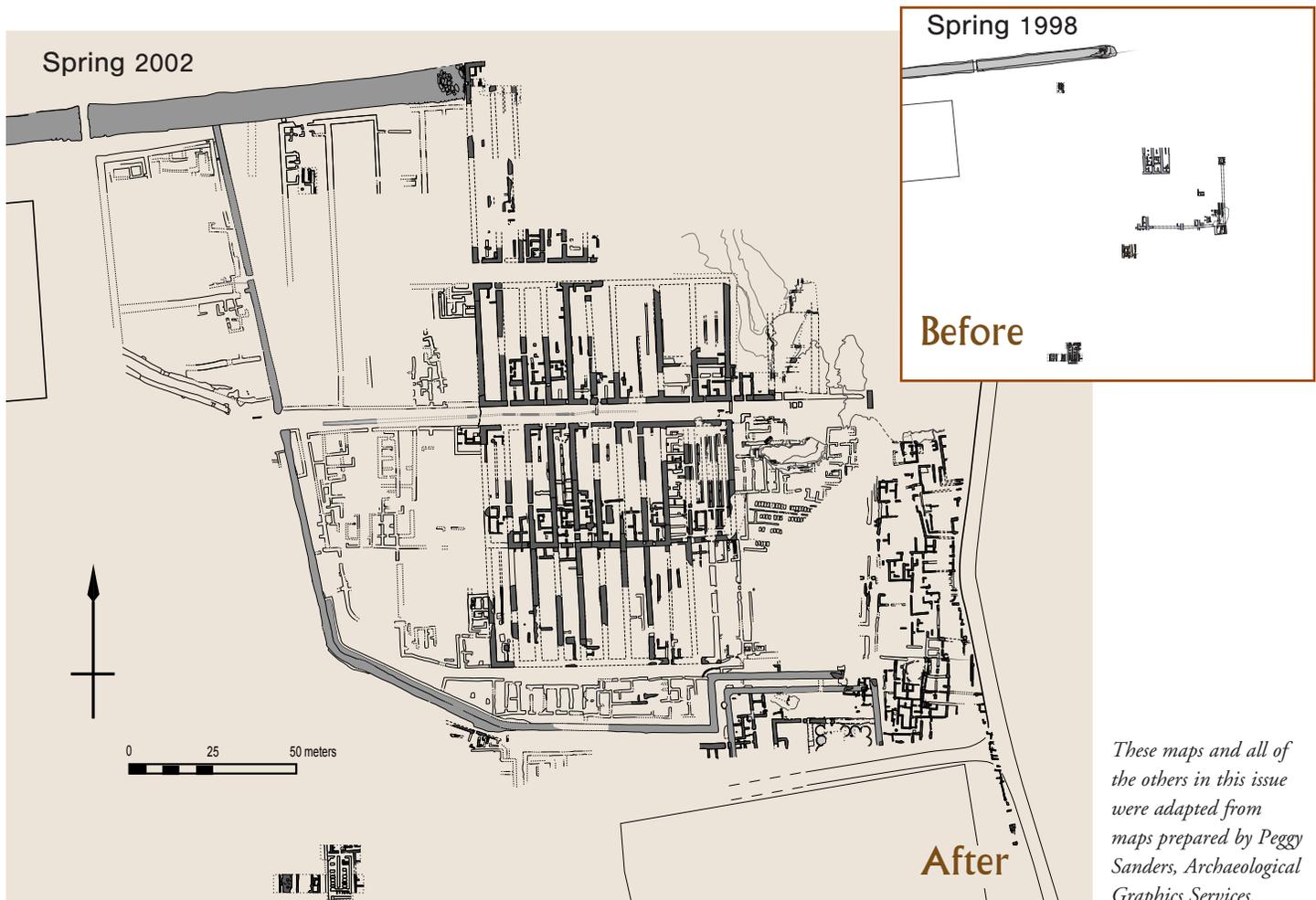


AERAGRAM



Newsletter of the Ancient Egypt Research Associates + Volume 6 Number 1 + Fall 2002

The Gift that Worked: The Millennium Project



These maps and all of the others in this issue were adapted from maps prepared by Peggy Sanders, Archaeological Graphics Services.

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The massive 4th Dynasty royal complex at Giza shown in the map above was nearly unknown three years ago. The small inset map shows what we had mapped and excavated as of spring 1998. With a generous gift from the Lurie Family Foundation and matching money from David Koch, Peter Norton, and our other supporters, the Giza Plateau Mapping Project was able to “capture” the footprint of this vast urban center, which we call

the Lost City of the Pyramids. Working intensively for three years, between October 1999 and June 2002, we uncovered a city that supported the pyramid builders. It is a major archaeological site of great importance to Egyptology and other disciplines.

Our archaeological marathon, the Millennium Project, was a massive effort involving 21 months of field work aimed

(Continued on page 2)

The Millennium Project by the Numbers



Faunal analyst Richard Redding brushes off a bone as he excavates it. This is one of the more than 150,000 fragments of animal bone that he analyzed.

Number of days in the field	630
Square meters of settlement cleared & mapped	53,750
Cubic meters of overburden moved	ca 119,000
Grid squares (5 x 5 meters) surveyed	1,320
Square meters excavated intensively	5,485
Bags of artifacts collected	22,582

Pottery pieces processed	500,000
Diagnostic pottery pieces processed	150,000
Clay sealings registered	1,724
Chipped stone pieces registered	26,689
Bags of animal bone examined	2,928
Fragments of animal bone analyzed	151,083
Liters of soil floated for plant remains	40,000
Number of samples for flotation	2,950
Number of samples analyzed for plant remains	1,515
Ancient plant parts identified	75,000
Charcoal fragments analyzed	27,160
Human burials excavated	237
Number of field photos taken	>17,000
Number of field drawings prepared at 1:50	>700

The Gift That Worked *(Continued from page 1)*

at salvaging the plan of an ancient settlement buried under the sand and threatened by forces of modern development.

The scale of the project was enormous by the standards of modern, intensive excavations, dwarfing our previous work. (See "By the numbers" above.) We mapped about 5 hectares (50,000 square meters) of this ancient city and excavated about 10%, or 5,000 square meters. Our collections of material culture are among the largest ever scientifically excavated in Egypt.

The findings of our Millennium Project are of great importance in understanding monument building and its role in the development of Old Kingdom Egypt. With the data from our final Millennium Project field season, winter-spring 2002, we can now begin to answer questions about where the massive work force was housed, where the central administration was located and how it fed the laborers.

While this site is of primary interest to Egyptology, its importance extends to anthropology and history of architecture, cities, and technology. It includes Egypt's:

- * Oldest workers' city
- * Oldest paved street, Main Street
- * Oldest bakeries
- * Oldest hypostyle hall
- * Oldest copper working facility
- * Oldest faience working facility.

In this issue of AERAGRAM we report on some of the findings from our last Millennium Project season, January to June 2002, a season that brought disparate components of the site together. With the discovery of final puzzle pieces we were able to answer lingering questions.

We finally found the connection and chronological relationship between the Gallery Complex and the gigantic Wall of the Crow (story on page 11). To gain insight into the enigmatic galleries comprising much of this great complex we completely excavated one gallery and found that it may have been a barracks, possibly for rotating workers (story on page 4).

During this last season we also had major new discoveries. The prize is the large Royal Administrative Building, the heretofore-called Buttress Building, for storage and administration (story on page 6). On the eastern edge of the site we discovered a new neighborhood, the Eastern Town, radically different from the rigid layout of the rest of the complex (story on page 10). Both the town and the administrative center continue south beyond our excavations, so much work lies ahead to save this lost city. Our immediate goal is to publish the vast volume of data we have collected during the Millennium Project in order that information about life in the Lost City is not lost. 

AERAGRAM

Volume 6 Number 1, Fall 2002

Editor

Wilma Wetterstrom
Harvard University

AERAGRAM is published by AERA, Ancient Egypt Research Associates. It reports on ongoing research and other developments on the Giza Plateau for friends and supporters of AERA and others interested in ancient Egypt.

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A Tribute to Ann Lurie

Words cannot do justice to what Ann Lurie made possible through her challenge grant. With Ann's encouragement and funding from the Ann and Robert H. Lurie Foundation we launched our Millennium Project, an archaeological marathon, in the fall of 1999. Through four subsequent field seasons Ann provided ongoing funding with the condition that we raise support from our other donors.

If Ann had not challenged us to determine the overall plan of the site and provided major support for our 21 months of field work, the map of the Lost City would still be little more than the small inset map on the first page. Moreover, it would not have been possible to study this major archaeological site much longer because many forces threatened to destroy it. The

architecture of everyday life at the pyramids would have been lost to backhoes, loaders, garbage dumping, sand digging for riding stables, expansion of the Abu Howl soccer field, roads on the east and southeast, and the inexorable growth of the modern cemeteries on the northwest. With the "flag" of archaeology that we have planted across the site, we have arrested these forces.

To Ann we say: Thank you for the opportunity you have presented. While our Millennium Project has been difficult at times, it has also been an archaeological dream come true. We would never have taken on this massive project without your challenge and encouragement. Science and scholarship are indebted to you for the opportunity to uncover, salvage, and map this newly discovered City of the Pyramids



Ann Lurie with Mark Lehner during a visit to Giza in the spring of 2000.

and to retrieve the information embedded in its ruins.

To honor your commitment and support of our work we are now making a major push at publishing our discoveries during our winter 2003 field season. These publications will consolidate our achievement and honor your gift for posterity.

— *Mark Lehner*

Thanks to All who Made it Possible

Our Generous Donors

Ann Lurie's extraordinary grant on behalf of the **Ann and Robert H. Lurie Foundation** was accompanied by the challenge that we sustain and increase other support. **David H. Koch** has made our work possible since our first season in 1988-'89, and his major contribution allowed us to go forward with Ann's initiative. **Peter Norton** and **Jon Jerde** provided additional major support for our Millennium Project. National Geographic Society and National Geographic Television provided additional major support for the 2002 field season.

Our accomplishments would not have been possible without the loyal support of **Robert Lowdermilk**, **Glen Dash**, **Matthew McCauley**, **Bruce Ludwig**, **Ann Thompson**, **Fred and Suzanne Rheinstein**, **Sandford and Betty Sigoloff**, **Victor and Nancy Moss**, **David Goodman**, **Marjorie Fisher**, **Alice Hyman**, **Don Kunz**, **Richard Redding**, **Lora Lehner**, **Bonnie Sampsell**, **Art and Bonnie McClure**, and **Charles Rigano**.

Our Egyptian and American Colleagues

We could not have carried out this project without the help of our Egyptian friends and colleagues. We are grateful to **Dr. Zahi Hawass**, Undersecretary of State and Secretary General of the Supreme Council of Antiquities, and **Dr. G. A. Gaballa**, former Secretary General of the Supreme Council of Antiquities.

We thank **Mr. Adel Hussein**, Director of Giza and Saqqara, and **Mr. Ahmed al-Hagar**, former Director of Giza, for their kind assistance. For their help, we are grateful to **Mr. Mansour Bureik**, Chief Inspector of Giza, and to **Mr. Mahmoud al-Afifi**, former Chief Inspector for Giza. We thank **Mr. Mohammed Sheeha**, and **Mr. Ashraf Abd al-Aziz** who represented the Supreme Council of Antiquities at the excavation site. We would like to thank **Ms. Nagway Abd al-Zaher**, assistant Inspector on the site, and **Mr. Ahmed Eiz** who served as our inspector in the storeroom. We are especially grateful to **Eng. Abd al-Hamid Kotb** for assistance with mechanized equipment for clearing modern overburden from our site so that we could carry out the archaeology. Once again this season, **Mohammed Musilhi** executed this task with skill and determination. Without this help we could not have carried out our work. **Reis Shehat Abd al-Basat** did a remarkable job supervising the workmen who cleared the last, or lowest, layers of the modern overburden over broad areas of the site to expose the ancient surfaces and architecture so that we could map and excavate.

I am grateful to **Larry Stager**, Director of the Harvard Semitic Museum and **Gil Stein**, Director of the Oriental Institute, University of Chicago, for the support of their institutions. Thanks to **Joe Greene** and **James Armstrong** for their help. I am grateful to **Peggy Sanders** of Archaeological Graphic Services for the computer graphics that resulted in our overall site map. 

A Gallery Unveiled

The long, narrow galleries may have been barracks for the men who built the pyramids.

In 1999 when we first discovered the narrow galleries, nearly 35 meters long, duplicated over and over across much of our site, we were puzzled. What were these bowling alley-like structures? We knew of nothing comparable in any other ancient Egyptian site. The scattered 5-meter squares that we had dug throughout the complex offered contradictory clues. The only way to get a handle on what was going on here was to clear the entire length of a gallery. Ashraf Abd al-Aziz took on the challenge and intensively excavated Gallery III-4 (the fourth gallery from the west end in Gallery Set III). The map on pages 8-9 shows its location within the gallery complex.

What he discovered appears to be workers' housing, probably used by rotating crews of laborers. About three-quarters of the gallery's length is an open area where workers may have slept, while the south end of the gallery is a series of small interconnected rooms, possibly quarters for a foreman who oversaw these workers.



Above: Excavations in progress at Gallery III-4. Looking northwest with the "house" portion of the gallery in the foreground.

A Barracks

The barracks portion, 21.5 meters long, opened unto Main Street through an entrance with a door that pivoted on a stone socket in the floor. It was probably covered with a canopy supported by columns that stood on a low wall or bench (stylobate) running down the length of the open area. (See map on facing page.)

Workmen and crew demonstrate how the gallery might have accommodated "sleepers," while Ashraf Abd al-Aziz tallies their numbers.



Aside from the stylobate, the floor was featureless except for five curious mud ramps. Four of them slope down to the floor from a curb about 9 centimeters high that runs along the base of the gallery walls. Another platform is tucked into the front corner of the gallery next to a little foyer separated from it by a partition. A sixth platform is located in the house, on the south end of the gallery (photo on page 16). The ramps might have been sleeping platforms for older or higher status workers while the rest of the crew slept on the floor, as demonstrated in the photo on the left below. Here our workmen and crew lay on the dirt floor side by side to determine the gallery's capacity. Ashraf, seated in the photo, counted 40 people, but estimated that 50 could have been accommodated.

The House

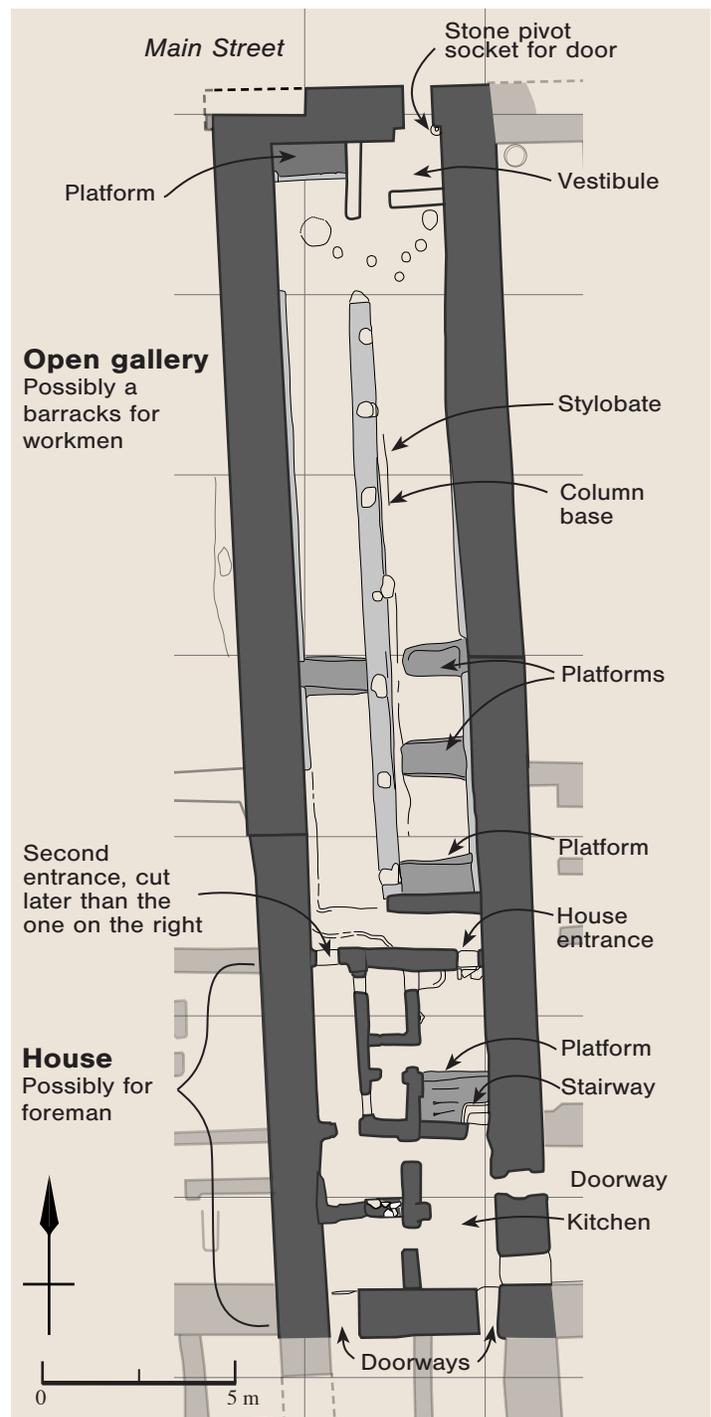
The house at the back of the gallery was a complex of ten small rooms with an entrance at the east end of a hallway behind a partition wall. At some point this entrance was blocked and another door was cut through the west end of the front wall of the house. In the front room on the east side of the house there was a sloped mud platform similar to the other "sleeping ramps" but with an irregular mud staircase at the low end leading up to the higher floor level of the next room. The back rooms were probably used for cooking; their walls were reddened by fire. The two small rooms in the center of the house also showed much evidence of burning. The house backed unto Gallery Set IV and would not have had direct access to the street, but entrances had been cut into the adjoining galleries on the south and east.

Up on the Roof

The walls of the gallery are more than 1.5 meters thick, suggesting that they supported a significant weight. It is possible that the roof was an integral part of the structure, serving as a work and sleeping area, just as house roofs do today in villages throughout the Middle East. During hot weather villagers often sleep on their roofs where it is cooler. In cold weather they stay inside at night on the ground floor, but may work on the rooftop during the day. The Giza workmen may also have rotated with the weather between the ground floor and the roof. On the other hand, the slender columns of the front colonnade may suggest a lighter roof, perhaps covering just half of the gallery width. The thick walls may have been more for insulation than structural support.

The Gallery Complex: A Massive Barracks?

Were all the other galleries barracks too? We are not in a position to answer definitively since we have only intensively excavated portions of other galleries. In addition, the northeast corner of the complex was destroyed sometime in the past, probably by wadi and Nile floods. Still, we can say that most of the galleries had a similar but not identical configuration: the north end was a large, open area while the south end looks like an ancient Egyptian house. We suggest that the gallery complex was largely housing for the labor force. If so, it could have housed between 1,600 to 2,000 workers.



Map of Gallery III-4 showing the barracks area and a foreman's house.

The galleries may have also been work areas. Some of the houses which we excavated in past seasons yielded evidence of small scale craft work, such as copper working and pigment preparation.

In addition, there seems to have been a headquarters within the gallery complex. At its east end we identified a large house that we dubbed the "Manor." The largest residential structure we have found thus far, it may have housed an overseer for the whole complex. The Egyptian language offers a clue. The house's relationship to the larger gallery enclosure is similar to that of the small square (thought to be a house or manor by Helen Jacquet) inside the larger rectangle in the hieroglyph for "estate" (*hwt*), .

Pharaoh's Storeroom & Counting House

Protected behind stout walls, workers poured grain into huge silos, and stocked, tabulated, and issued supplies.

The Gallery Complex may have been administered from a royal building (in addition to the Manor) that we began to uncover during our 2001 field season, and had mistakenly dubbed the “Buttress Building.”

Located in the southeast corner of the site, it measures 48 meters east-west. A double fieldstone wall enclosed the building on the north and south. It was clearly an integral part of the complex since its thick outer wall is a continuation of the Enclosure Wall which wraps around the western and southern sides of the galleries.

Since most the building lies under the Abu Hol Sports Club we were able to excavate only 25 meters of its north end. But the 1,125 square meters we cleared revealed a very different sort of structure than we had seen anywhere else.

On the eastern side of the building we uncovered what we believe was the central grain store, which helps resolve a lingering mystery. Across the site we have found



Above: Paul Sharman sets scale rods for photography in the large silos of the Royal Administrative Building. **Below:** View of the northwest corner of the Royal Administrative Building, looking north. The building's outer double wall can be seen on the left.

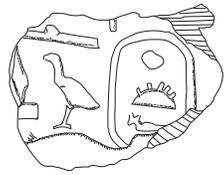
scores of bakeries and baking areas where the inhabitants made the large conical loaves of bread, but up until this discovery we had no idea how they were supplied with flour.

The granary is a sunken courtyard 19 meters across, lined with large round silos built of mud brick about 5 Egyptian royal

cubits across (2.6 to 2.7 meters). The thick wall that surrounds the courtyard may have supported a raised walkway used to fill the silos from above. The grain was probably removed through doors at the bottom of the silos in the courtyard. We excavated seven silos but there are probably more buried under the soccer field for future work.



People most likely ground the grain into flour somewhere nearby. In a cairn that was built in later times atop the ruins of



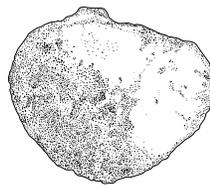
Cartouche of Khafre on a mud sealing.

the administrative building we found eight pieces of grinding stones. We also found grinding stones nearby in the Eastern Town (discussed on

page 10) and in the deposits in the building (shown on the map on pages 8-9.) Up to this point we had found almost none elsewhere on the site.

The northwest corner of the building was probably abuzz with clerical work and craft activities. Here we found a series of little mud tokens that the 4th Dynasty Egyptians might have used as counters, similar to the counting beads in an abacus. Some are round or oval, possibly standing

for a kind of bread similar to pita called *pesen* in ancient Egyptian. Others appear to be quarter-*pesen* loaves. One small mud token looks like a haunch of beef.



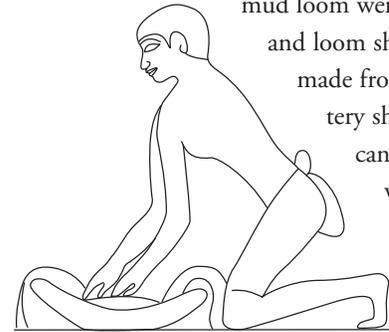
A mud token that may have represented pesen, a pita-like bread.

We also uncovered nearly 200 mud sealing fragments, some of which carried the names of Khafre and Menkaure. Used to seal bags, boxes, doors, and ceramic pots, the fragments indicate that large quantities of stored

goods passed through here after being opened. Goods were also apparently sealed up for storage here as well, no doubt in the silo court. We found little balls of clay which might be remnants of the very fine clay that was used for sealing. Finger tracks

converging on little peaks suggest that pieces had been pinched off.

We found traces of copper and alabaster working, as well as weaving. There were



mud loom weights and loom shuttles made from pottery sherds. We can imagine workers carry-

A woman milling cereal grains (probably emmer wheat) into flour using grinding stones. After a relief in the 5th Dynasty tomb of Ty at Saqqara.

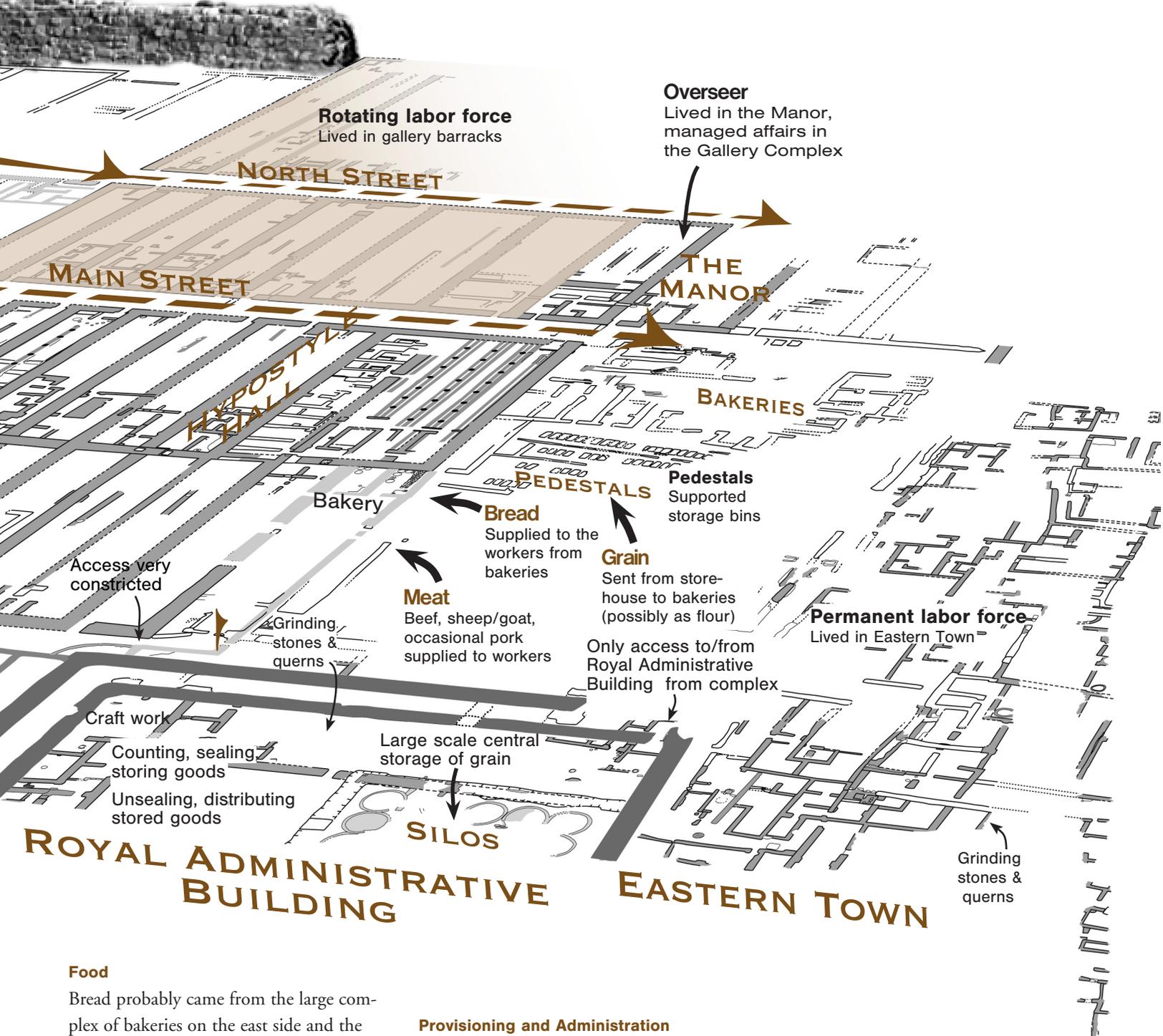
ing food and supplies in and out; clerks counting out materials, sealing up stocks, and cracking mud seals as they open others; craftsmen at their forges and looms in the workrooms and courtyards. 

Looking northwest across the Royal Administrative Building and its sunken court of storage silos. The wall around the silo court was removed in antiquity when the building was decommissioned and demolished.



Although much work lies ahead before we understand this city, we now have some hypotheses about how it functioned. Here we offer our preliminary (and as yet unproven) ideas.

LAYOUT OF THE CROW



Food

Bread probably came from the large complex of bakeries on the east side and the south and from bakeries scattered throughout the Gallery Complex. Meat—beef, sheep/goat, and occasional pork—were supplied by a central authority which must have received most of the meat as livestock on the hoof.

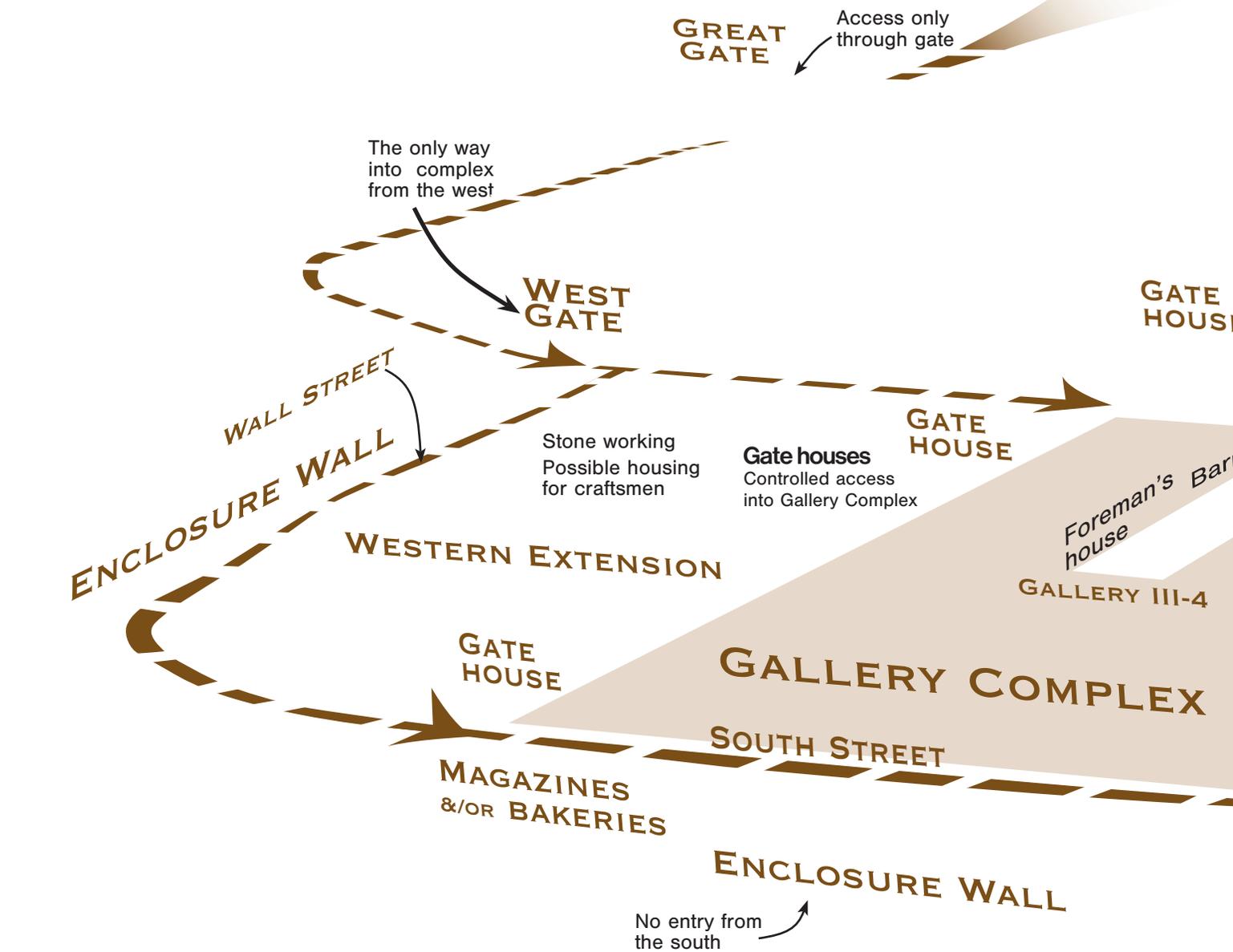
Provisioning and Administration

Goods came into the Royal Administrative Building and were stored and counted out before being dispersed. Grains were kept in the silos, possibly milled here, and sent to the bakeries. Some goods were also manufactured here.

Administration

A central authority worked from the Royal Administrative Building, possibly a palace as yet unexcavated. An overseer living in the Manor maintained control over the Gallery Complex.

The Workings of a Great Pyramid



Control and Access

The structure of this complex suggests highly controlled movement of workers. From the north, entrance was through the Great Gate in the Wall of the Crow. (We don't know if there was an opening through the north wall of the Gallery Complex.) West Gate in the Enclosure Wall was the only way into the complex from the west. Once inside, Main Street lay straight ahead, running east, while Wall Street led southeast. The Western Extension was accessible from both streets.

The Gallery Complex could be reached going either way, but access was more tightly controlled with a gate house at the Main and South Street entrances, as well as at North Street. The only way to move through the Gallery Complex was along these three streets. But at the end of South Street the way narrowed drastically. The only access into the Royal Administrative Building, which was protected behind a double wall, was a narrow opening in the northeast corner.

Housing

Much of what we have uncovered thus far was housing. We think that the long galleries of the Gallery Complex might have been barracks for the rotating labor force that came from the countryside. (See page 4.) The village-like Eastern Town housed permanent workers, possibly craftsmen and their families. (See page 10.) The Western Extension also may have housed craftsmen. The pattern vaguely resembles a modern military base with barracks for recruits and family housing for officers.

The Eastern Town

An “organic” village, unlike the rest of the site, may have housed permanent workers and their families.

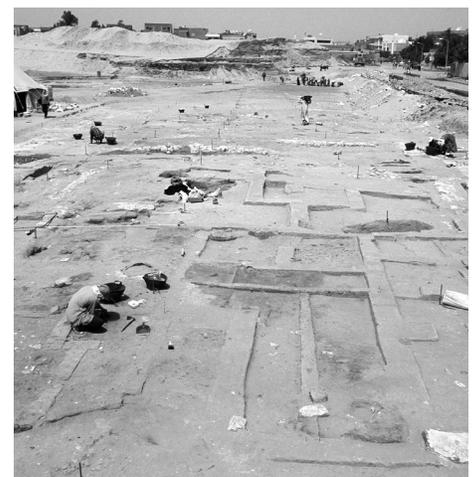
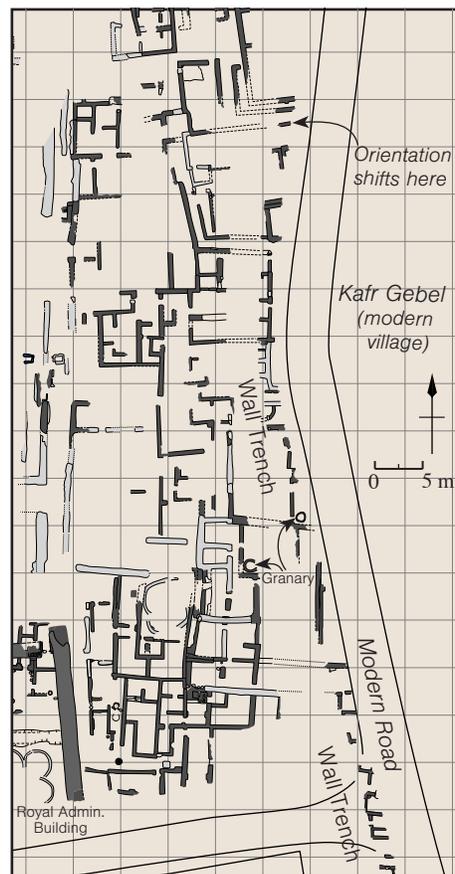
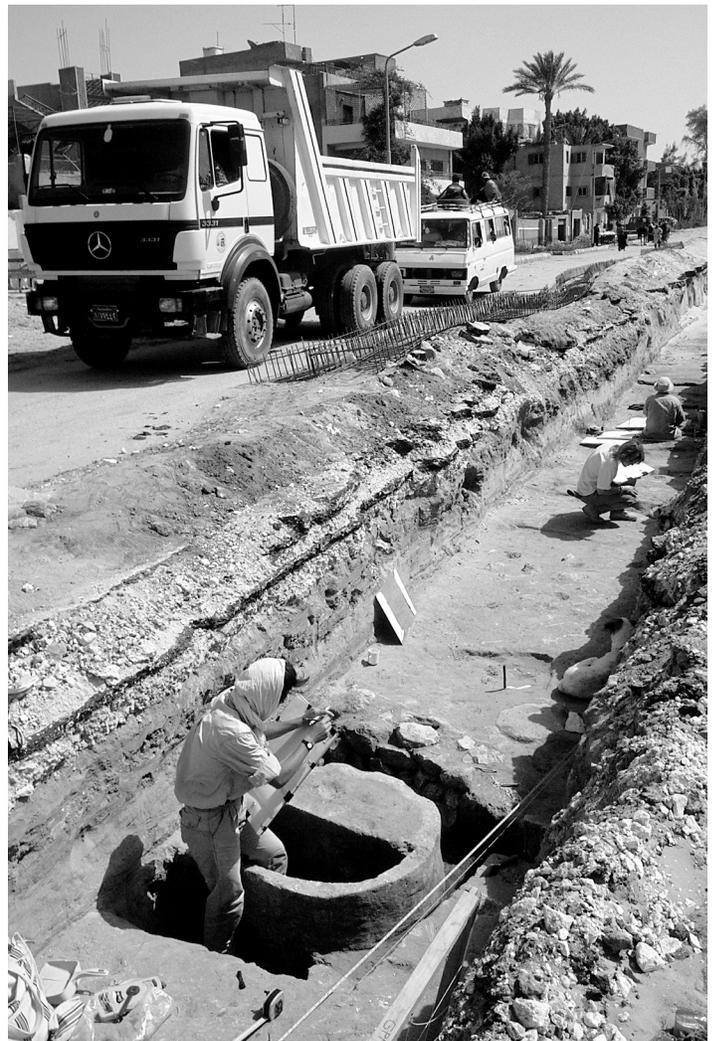
On the eastern edge of the site we discovered a whole new district, a town very different from the gallery complex. Early in the season we began clearing overburden east of the Royal Administrative Building (previously called the “Buttress Building”) in anticipation of a new high security wall that was to be built for the Giza Plateau between our site and the modern road along the town of Kafr Gebel. As excavations for the wall’s foundation trench approached our site from the south, we moved our clearing as far east as we could to see what the ancient layers held near the path of the wall.

Here we found a very different kind of settlement from the formal, large-scale architecture of the gallery system and the administrative building. (See map below.) This was a warren of small rooms, thin mud brick walls, and a more “natural” organization than the massive, rigid, pre-planned orthogonal architecture of the gallery complex. The layout is regular and approximate to the cardinal directions. In contrast to the gallery system and the Wall of the Crow, which are oriented slightly north of east (or west of north), the orientation of the southern part trends slightly south of east (or east of north) except in what is now the town’s north end where the orientation abruptly shifts to the west of north.

The settlement includes mud-lined bins, courtyards, and corridors. We also found two circular granaries, with interior diameters of 1.01 to 1.03 meters (probably an intended 2 cubits) and several grinding stones, suggesting that these may have been self-sufficient households or that the inhabitants ground grain to flour for the bakeries inside the Gallery Complex.

At this point we do not know the Eastern Town’s full extent. It continues under the modern road and Kafr Gebel on the east. On the north side we were able to trace the village until its walls dove under the Nile flood layers which washed over the northeastern corner of the site in later antiquity. On the west we found that the northeast corner of the Royal Administrative Building was superimposed on the town walls, indicating that the royal building was built later.

The contractors building the new security wall, in the end, did not cut the 2-meter wide foundation trench through our concession, but made their cut about 5



Top: Ana Tavares maps a granary in the wall trench. Fiona Baker and Dave Swan work in the background. **Above:** The Eastern Town looking north. **Left:** Map of the Eastern Town.

meters farther east through the asphalt sidewalk along the west side of the street. This gave us another window onto the ancient town and for several days we worked down in the trench recording the walls and other remains along a 100-meter stretch. 



Kevin Kaiser photographs the Wall of the Crow butting up against the west wall of Gallery Set I. The cut in the wall is marked on the map below.

with the galleries, its end designed to butt up against the western mud brick wall of all the galleries. But a Late Period cemetery, dating 2,000 years after the Pyramid Age, with a high density of burials near the end of the massive stone wall, hampered our excavations. This past season our Swedish

Critical Junctionure

We finally excavated the squares where the Wall of the Crow meets Gallery Set I and discovered the massive stone wall was built onto the gallery complex while it was in use.

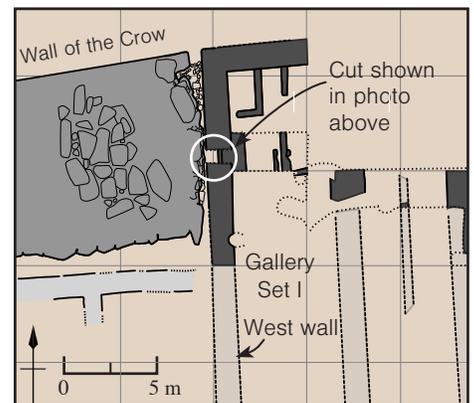
The gigantic stone Wall of the Crow, 10 meters high, 200 meters long, and more than 10 meters wide, has held our attention through the Millennium Project. We have cleared its large gate, dug down to its foundations, and excavated its eastern end. We have puzzled over why the 4th Dynasty Egyptians expended so much effort and so many resources to build this behemoth. Surely it played a major role in our royal production facility. We proposed that it may have helped to deflect flash floods running off the desert down a wadi just north of the site. It also was a massive barrier controlling the movement of goods and people into and out of the complex. It may have played a symbolic role as well, separating the very active community of the living from the sacred precinct of the dead.

All of these theories were contingent upon how the wall and gallery complex were related in time. Thus much of our work during our last two seasons focused on the wall's east end where we hoped to learn how it was related stratigraphically to the gallery complex. During our 2001 season we became convinced that it was built as a set piece with the gallery system. The wall's end was flat, unfinished, and lined up with the west wall of the entire gallery system. (See map on pages 8-9.) All of this suggested to us that it was built

osteo-archaeological team, lead by Jessica Kaiser, systematically removed the burials (discussed on the next page), clearing the way for Lauren Bruning to excavate the 4th Dynasty ruins.

When Lauren cleared a thick layer of granite dust, the gallery walls emerged and resolved the stratigraphic relationship. We found that the east end of the Wall of the Crow presses hard against the plastered western wall of Gallery Set I. The plaster surface indicates that the mud brick wall of the gallery was here first and that the Wall of the Crow

was built up to it. It is hard to conceive that the occupants butted such a massive, weighty stone wall up to the much more fragile one of mud brick. Still, it seems quite clear that they constructed the behemoth up against the northwest corner of Gallery Set I. The north side of the Wall of the Crow is on a line with the outer corner of the gallery and its north wall. The Wall of the Crow was apparently built to satisfy some need(s) while the gallery complex was in operation, perhaps those we have suggested. ▲▲▲



The Wall of the Crow meets the west wall of Gallery Set I. The circle marks our cut in the wall where we were able to examine the juncture.

Graves upon Graves

Some 2,000 years after our site was abandoned by the pyramid builders, people of modest means buried their dead in the thick layers of sand hiding the great complex below. Now 2,400 years later, Swedish osteo-archaeologist Jessica Kaiser is excavating the graves in their vast cemetery.

When I first came to work at Giza in October of 2000, my main objective was to clear Square 4.Z.6 of burials. Interred sometime during the Late Period between dynasties 26 through 30 (664-343 B.C.), they stood in the way of excavating the Old Kingdom layers below.

This was my first dig in Egypt, so I started out slowly. I was not used to the soil types and the relentless sun that did unspeakable things to the bones. We don't have that many skeletal finds in Sweden and spend weeks on each grave. The sun alone makes this impossible in Egypt, where you can see the bones literally deteriorate in front of your eyes as you excavate.

Learning to Dig At Giza

It was also the first time I had to work with B 72 (paraloid, a glue used to consolidate fragile bones), something that had not been necessary at the sites where I worked before. Consolidant is something you really don't want to apply in the field. It is basically diluted glue, and it will consolidate not only the bones, but also dirt and sand adhering to them. However, at Giza it is a must. The skeletons are in such poor condition that it is impossible to handle them at all without consolidant. This is probably due to the fact that the site has been flooded several times in antiquity.

The first burials I dug had me almost in



Lauren Bruning inspects a thick layer of granite debris after the osteo-archaeologists extracted the human skeletons from many graves that punctuated the layer. Large stones which had slipped off the east end of the Wall of the Crow lie in the background.

tears; I couldn't figure out how to lift them without inflicting damage. After consulting with Mark Lehner and John Nolan, I realized that the only thing I could do was document them very thoroughly and get all the information I possibly could before lifting them. This means that I have to take most measurements before the skeleton comes out. The bones will crumble to such an extent that you cannot measure them after being lifted. This is not ideal—normally I

would want to just excavate in the field and do the analysis in the lab, taking all measurements with an osteometric board—but it is the only way to do it here.

When drawing the burials, I make very exact 1:5 plans, something that is very time consuming, and I ended up digging only ten burials the first season. With so many graves waiting to be cleared, I had to speed up. So I computerized the mapping process. At the end of the 2000 season I

brought to Sweden one of the project Thinkpad computers, generously donated by Glen Dash, and installed two cartography programs, Idrisi and Mapinfo, to allow me to map the burials digitally. This would not have been possible without the help and support of Professors Göran Burenhult and Gustav Svedjemo at University College Gotland, Sweden, and I am very grateful to them.

As a result, I was able to work faster during the Fall 2001 season. I dug nine more burials in 4.Z.6 and then 31 in Operation Wall of the Crow East (WCE). This was a high priority area because of the goal to find the stratigraphic relationship between the galleries and the gigantic wall. (See article on page 11.)

Although the cartography programs saved me a great deal of time in the field, I could not have excavated so many burials without the help of my workmen, Elsoughir, Sayed Salah, and Bagdaddi Abdullah. They even learned all the Latin names of the different bones, so that they could label the bone bags and help me lift and pack the burials.

Slow Digging

As it turned out, there were so many burials in the WCE that even with the help of three workmen and the time-saving cartography programs I would not have been able to properly excavate all them before the end of the Millennium Project. Excavating a burial scientifically is a very slow process that involves more than digging out the bones.

First, I take many measurements, such as elevation of the burial at various points and, if there is a coffin, its dimensions. I take soil samples and collect and bag material associated with the grave—pottery, charcoal, animal bone, and burial items. All of this is recorded on a form along with additional data. When there is a coffin, it has to be sampled and then dug away. (See page 14 for a discussion of the graves.) The coffins, which are made of mud, are in such poor condition that it is impossible to preserve them, but if the mask is in good shape I carefully remove it.

On a skeleton recording form I note which bones are present and their state of preservation. I take measurements of individual bones—as many as possible in order to determine, for example,

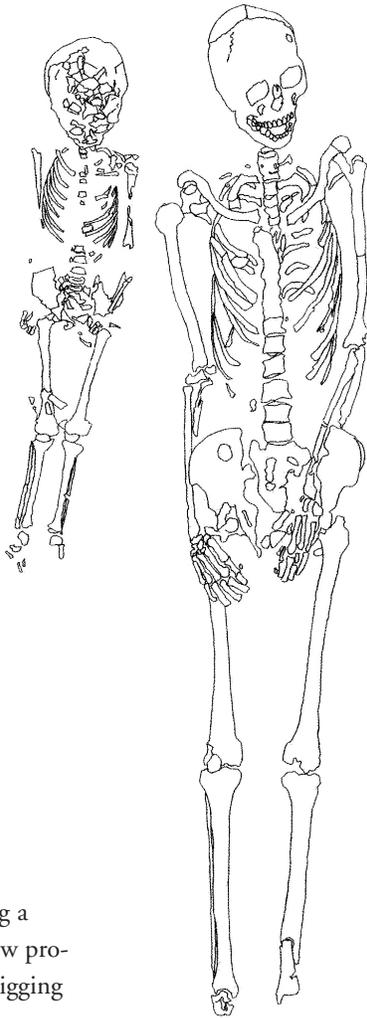
stature and sex. For a child, I do a field analysis of the teeth using eruption patterns to get an idea of age. After all the data is collected, I apply B 72. Once it is dry, I lift the bones, labelling them with bone type and side as I go along, so that analysis in the storeroom later will be easier. Finally I pack the bones for storage.

There is no way to significantly hasten this process and do a good job. The only way we could remove burials at a faster pace was with more excavators. So I convinced six osteologists from Sweden (listed on page 16) to join me, and together we dug another 187 burials during the last season.

This brings the total to 237 graves, plus another ten excavated before I joined the project. These may be only the tip of the iceberg. Judging from what has been dug so far, there could be at least a thousand burials. During future seasons I hope to do an extensive survey of the site to get a clearer picture of the number of graves.

Valuable Data

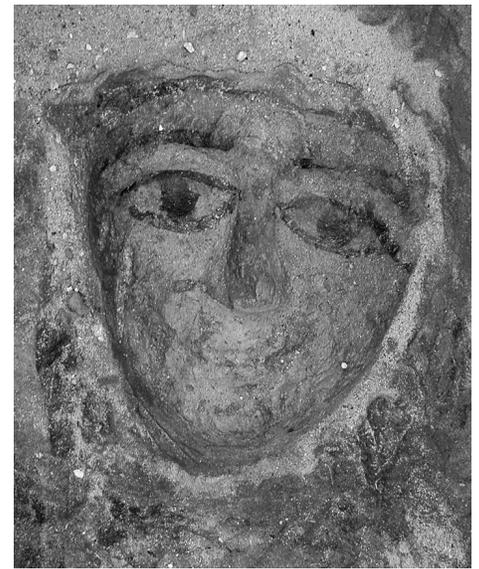
The burials we have excavated are far from the Millennium Project's 4th Dynasty focus, but they are important to Egyptology and anthropology. As the largest collection of scientifically dug low-status burials from the Late Period, they are nearly unique. The publication I am now preparing on the Giza burials will be, as far as I know, *only* the second extensive report on a modern excavation of a Late Period cemetery. Although my publication will not help us understand the Lost City, it will be invaluable for scholars studying health, demography, and burial practices of Late Period common people. — Jessica Kaiser



Left: These skeletons were mapped using Mapinfo, a cartography program that makes it possible to trace digital photos of a burial and place it on a digital site map. The burials were in the critical location where the Wall of the Crow and Gallery Set I meet, discussed on page 11.

Below: Jessica Kaiser prepares a top-plan of a burial. (Photo by Kevin Kaiser.)





Above: A mask painted on one of the mud coffins. (Photo by Kevin Kaiser.)

Left: Workmen clean around a mud coffin.

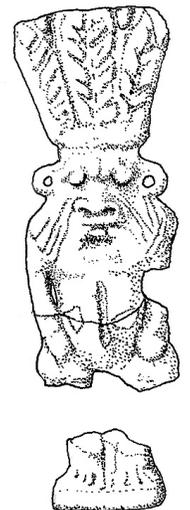
The majority of the dead were positioned on an east-west axis, with the crown of the skull pointing west. Most were laid out on their backs in an extended position, with their hands on the pelvis or femurs (as in the burials on page 13). Many of the children were also set on their backs, but some were placed on their sides in a slightly flexed position.

Adults went to the Afterlife empty-handed with no goods, although they might have been buried with perishables, such as textiles or food. Over one third of all children,

on the other hand, were laid to rest with amulets and/or jewelry—earrings and bracelets made of metal, cowrie-shells, and beads. The *wedjat*, the falcon sky god Horus' eye, was a common amulet motif. The gods Bes (shown on the right) and Hathor, both of whom protected pregnant women and children, also appeared as amulets.

The very youngest children's burials received the most lavish attention. Over 50% of them had grave goods. One child in his or her second year of life was buried with two bracelets, ankle chains, and two *wedjat*-amulets, one of carnelian and the other of faience, as well as a sow-amulet.

The amulets and jewelry were all low quality, possibly mass-produced. They can be dated no more precisely than the 26th Dynasty onwards. — Jessica Kaiser



Bes amulet from a child's burial. Scale: 1.5:1. (Drawing by Johnny Karlsson.)

Honoring the Dead

The Late Period graves are a far cry from the magnificent tombs of the royals and nobles a stone's throw away. They are crowded into the northwestern end of the gallery complex, especially at the east end of the Wall of the Crow, with graves dug into graves, most unmarked. They were so dense that as many as five burials per square meter were found in some areas!

About half the individuals were interred directly in the ground, perhaps wrapped in a shroud that has long since disintegrated. The rest (61% of the adults and 50% of the children) were buried in mud coffins, an inexpensive version of a painted coffin. These were probably made with a wooden frame which decomposed long ago. What remains is a thin layer of sand, where the wood probably stood, sandwiched between two coats of fine mud. Remnants of paint appear on both the top and bottom of some of the coffins, so we know that they were not manufactured on site. From impressions in the mud, we concluded the paint was applied to a cloth which also disintegrated. (See photo of coffin above.)

School of Hard Knocks

With most of her time devoted to removing burials, Jessica Kaiser has had little opportunity to study the skeletons in depth. Here she offers some initial observations on health problems and possible causes of death.

Thus far the burials are about equally distributed between adults and children. Many individuals probably died of simple afflictions, such as pneumonia and diarrhea (in children), that would not prove lethal today and that would not leave any traces on the bone. But we do see evidence of injuries and disease that offer clues to life during this period.

Aching Backs, Knees, and Teeth

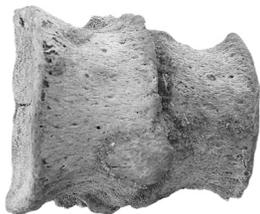
Hard work took its toll on the body. Back problems, some of the most common afflictions seen in Egyptian cemeteries, plagued our Giza population. Many of the vertebrae that were preserved suffered from herniated discs (Schmorl's nodes), lipping (see photo below) and osteophytic growths (bone spurs, or non-inflammatory osteo-arthritis).

The knees also took a beating. A number of femurs showed eburnation of the joints. This abnormal hardening of the bone underlying the cartilage occurs after the latter is destroyed, as happens with osteo-arthritis. Once the cushion of cartilage is gone, bone rubs on bone. The joints of the hand and feet also showed many cases of eburnation.

The people of this period also suffered occasionally from abscesses and cavities (cavities).

Overall, though, their teeth were in good shape, except for tremendous wear.

This was probably because of sand and grit in the food. Sand blowing off the desert is pervasive here. (When we have a second "breakfast" in the field we often have to brush sand off of our falafel sandwiches.) Ancient



Vertebra with lipping, indicating an osteo-arthritic condition. (Photo by Kevin Kaiser).

Egyptian bread was probably gritty too because the flour was stone-ground.

The wear on the teeth is so extensive in many of the burials that when I age an individual's teeth using a standard dental wear chart he or she ends up with an age of 50+. But the bones indicate that the individual was under 25 at the time of death!

Early Death

Life was perilous for the children living without the benefit of modern medicine, such as antibiotics. Their mortality rate was very high at 49%.

Many of them probably died from infectious diseases that we cannot detect, but several pathologies were fairly common: cribra orbitalia (porosity of the orbital roof, the eye socket) and porotic hyperostosis (porosity of the skull bone). Both indicate iron deficiency. Another common condition, primarily

among children, was enamel hypoplasia, lines on the tooth-enamel that suggest malnutrition or serious illness.

Violent Death

One of the adult males may have died a violent death. He had two oval fractures on the left side of the face, one on the parietal bone and one on the mandible, lesions which are consistent with blows to the head. One could imagine a confrontation

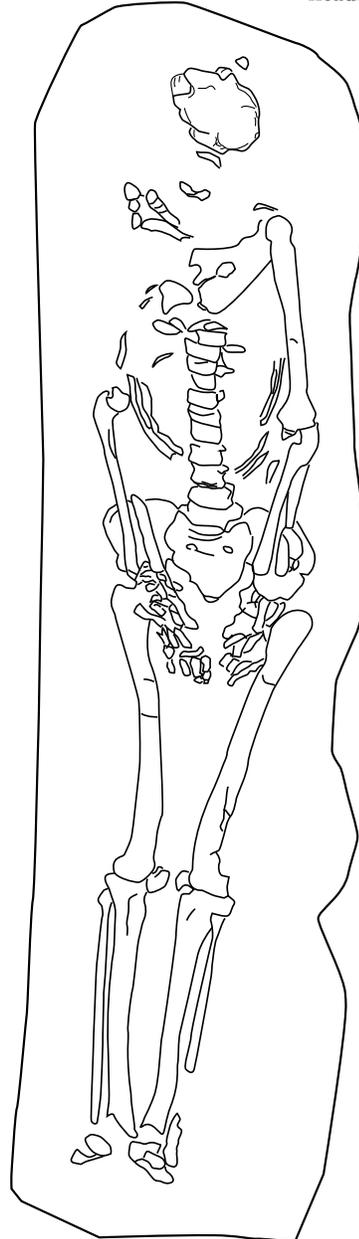
in which the victim was attacked by a right-handed assailant. However the man ended up with the fractures, he survived for at least a few weeks. His injuries show signs of healing.

Signs of Compassion?

Some of the burials are interesting because of what they might tell us about compassion and caring during the Late Period.

One small child around two to three years of age had a terrible congenital disorder. His or her cranium was extremely small and had almost no parietal bones (the paired bones that make up the cranial vault), nor zygomaticums (cheek-bones). The child may have suffered from pencephaly, a condition in which parts of the brain are missing. Despite this dreadful affliction, the child was interred with care; he was placed in a simple, unpainted mud coffin and adorned with faience beads.

An adult male had a substantial deformity of his femurs (thigh bones), shown in the drawing on the left, that must have immobilized him significantly, if not fully. His legs were twisted inwards at a 90° angle and the femoral heads were extremely small with osteophytic growths, or excessive bone formation. Nevertheless he reached adulthood, suggesting someone cared for him. 



A male with legs that twisted inward at 90° which probably immobilized him. Compare his knees with those of the adult burial on page 13.



2002 Crew

Director: **Dr. Mark Lehner**, *Harvard Semitic Museum & the University of Chicago*.

Assistant Director & Epigrapher: **John Nolan**, *University of Chicago*. Assistant

Director & Archaeobotanist: **Dr. Mary Anne Murray**, *Institute of Archaeology, University College, London*. Geomorphologist: **Dr.**

Karl Butzer, *University of Texas, Austin*.

Osteo-Archaeologists: **Jessica Kaiser**, **Gabriella Venturi**, **Tom Westin**, **Emma Durehed**, **Petter Nyberg**, **Tove Bjork**

and **Johnny Karlsson**. Faunal analyst:

Dr. Richard Redding, *Michigan Museum of Natural History*. Lithics analyst & storeroom manager: **Cordula Werschkun**,

University of Tübingen. Charcoal analyst: **Rainer Gerisch**, *Freie Universität, Berlin*.

Ceramicist: **Anna Wodzinska**, *University of Warsaw*. Photographer and archaeologist: **Kevin Kaiser**, *University of California, Berkeley*. Artist: **Caroline Hebron**,

University College, London. Registrars:

Holly Parton, *Firat Archaeological Services*; **Tanya Ashkar**, *Beirut University*.

Archaeologists: **Fiona Baker**, **Paul**

Sharman, **Dr. Catriona Gibson**, **Susan Bain**, **Bob Will**, **Dr. David Swan**, and

Stephanie Durning, *Firat Archaeological Services*; **Ana Tavares**, *Centre de Recherches Archéologiques, Valbonne*;

Tobias Tonner, *University of Tübingen*;

Mohsen Kamal, *University of California, Los Angeles*; **Lauren Bruning**; **Ashraf Abd**

al-Aziz, *Supreme Council of Antiquities*;

Serena Love, *University College, London*.

Giza Plateau Season 2003

Probing Plateau and Site: Remote Sensing Survey

Remote sensing is a great boon to archaeologists. While scientific excavation is a very slow and destructive process, remote sensing gives us a “glimpse” underground without having to excavate or tear up overlying ancient structures. In July we began to plan for remote sensing on our site to be carried out by the California firm of Tremaine Associates and AERA board member and part-time geophysicist Glen Dash. We hope to find the rest of the Royal Administrative Building, the portions lying under the Abu Hol sports club. We also plan to look for the walls of the older phase of the Lost City, lying under the architecture that we have mapped.

Comprehensive Giza Survey

During this past year Dr. Zahi Hawass and the National Geographic Society began to plan a broader remote sensing survey of the entire Giza Plateau, including the interiors of the three main pyramids. Their explorations in the shaft in the Queen’s Chamber of the Great Pyramid was seen

last September in a National Geographic Channel/Fox Network TV special. That program also highlighted our discovery of the Lost City of the Pyramids.

The National Geographic Society is keen to continue scientific collaboration with us and would like to combine our remote sensing survey with the larger program. Archaeological evidence of the ancient cities of both the living and the dead—the pyramids and the surrounding Giza Necropolis—would be combined.

Giza Data Base and GIS

As part of the Comprehensive Giza Survey, plans are underway for a central data base. We envision a GIS (geographic information system), with layers for the geology, topography, soil cover, ancient and modern architecture and settlements, wind and particulate flow, tourist flow, and traffic flow. This is a tool very much needed for managing and conserving Giza as a world heritage site for future generations.

Publish or Perish

Although we have “captured” the footprint of this massive 4th Dynasty royal complex and saved it from forces threatening to destroy it, the site is still not out of danger. It will be lost if we do not analyze and publish all of our masses of maps, drawings, field notes, photos, and artifact data

so painstakingly excavated and recorded. Future Egyptologists would have to, in effect, re-excavate the Lost City of the Pyramids from our old dig records if we do not publish the material. Thus much of our work in the 2003 season will be devoted to analysis, writing, and graphics.

Above: *Archaeobotanist Mary Anne Murray up to her elbows in the “flotation tank” recovering plant remains. Charred seeds and wood float out on the water and are caught in the sieve on the right.*

Below: *A workman demonstrates how a ramp in the house portion of Gallery III-4 might have been used for sleeping. A stairway leading to the back rooms can be seen behind his legs. See story, page 4.*

