



## DISCOVERY! EXCAVATING THE ANCIENT WORLD

What questions do we ask in exploring the human past and its contemporary significance? And how do we gather and understand various kinds of information to answer these questions? In this exhibition, we invite you to peek into the nuts and bolts of the many disciplinary approaches and methodological paths we take in studying and interpreting the ancient world. For instance, have you ever thought about how to photograph the kilometer-long expanse of an excavated town site or asked why it's important to be able to see the site in this broad way? Have you wondered how the physical characteristics of ancient texts as well as their contents can help us to figure out their original context? What do we do if important artifacts are in a poor state of preservation? Or have you considered exactly how we determine what people ate more than 4,000 years ago and where that information fits into discussions of society, economy, and ethnicity?

Not all of the work leading to answers for these questions is done in the field or with a trowel. The 17 Kelsey Museum-affiliated research projects highlighted in this gallery richly illustrate that the term *excavation* should be defined in the broadest sense possible: fieldwork we undertake in archives, in museums, in libraries, and at archaeological sites worldwide. And the innovative questions guiding these investigations draw their shape from the wide range of disciplinary perspectives represented here: anthropology, art history, zoology, information science, conservation, history, papyrology, cuneiform studies, fine arts, classical studies, biology, and sensory archaeology.

Join us in the process and pleasure of discovery.

This exhibition is dedicated to the memory of  
Edwin H. and Mary E. Mander and their own voyages of discovery.



# DISCOVERY! EXCAVATING THE ANCIENT WORLD

# DISCOVERY!

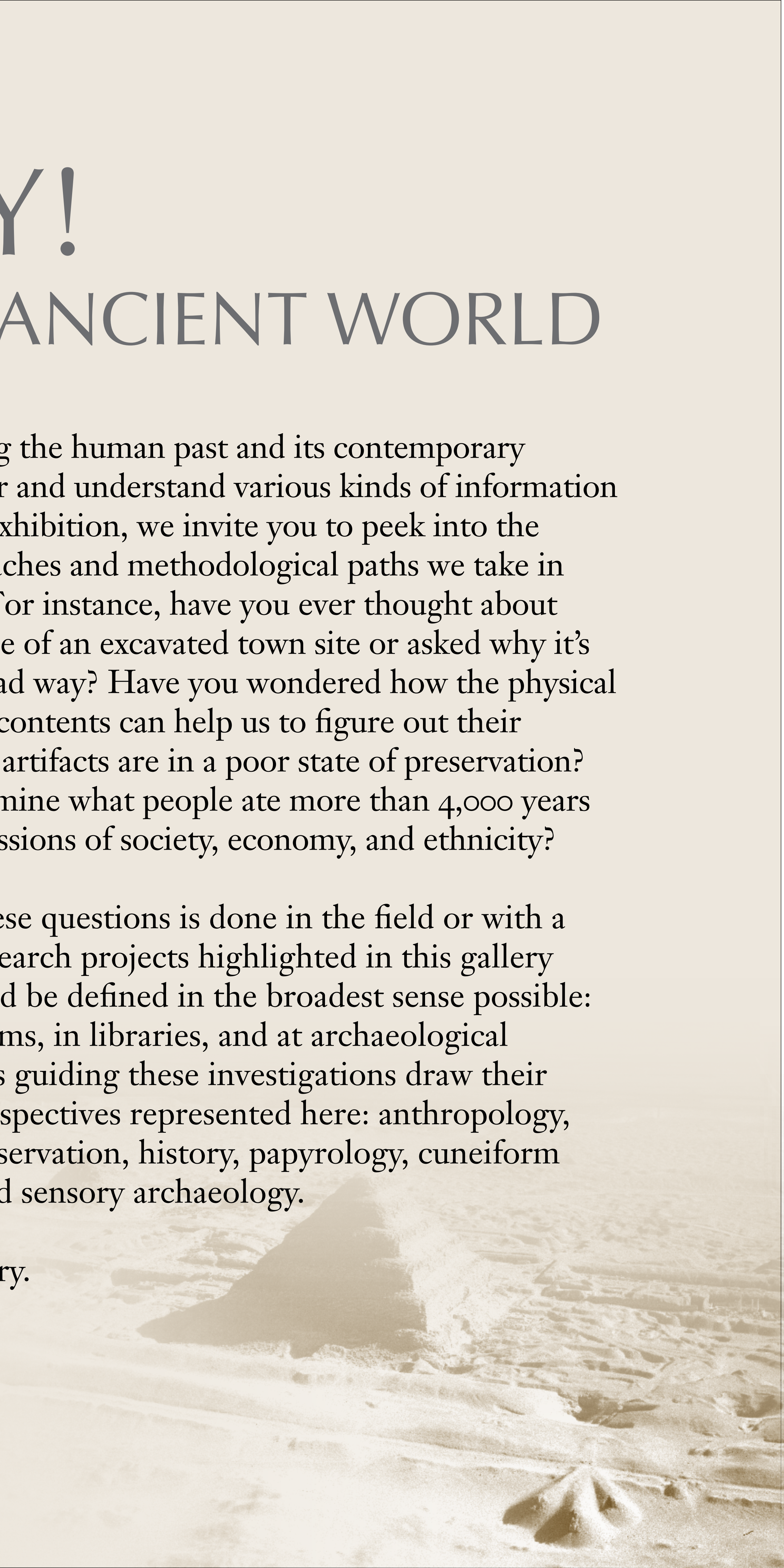
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## TOOLS OF THE TRADE

Archaeologists in the field use tools ranging from old fashioned pencils and notebooks to digging tools like trowels. Measurements of ancient sites, architecture, or objects can be taken by rulers, plumb bobs, and tape measures, and also increasingly using GPS-enabled devices like this field computer. We also need protection from the elements, including wind and dust, sun, and sharp rocks.

# M A P P I N G

Where did people live, and how do we reconstruct the landscapes they inhabited? Archaeological sites amount to more than a simple, one-to-one reflection of the activities that produced them. Most often, researchers confront only fragments of the entire picture of a house, or town, or region. Some settlements are buried below meters of sediment, others are still visible above the surface and often dominate even modern landscapes; some are tightly clustered, others widely dispersed; some preserve abundant elements of material culture, while others preserve only very ephemeral traces, often invisible to the naked eye. Scholars must therefore devise different strategies to address research questions on the basis of different types of data.

Art historians and archaeologists affiliated with the Kelsey Museum deal with settlement remains ranging from villages of small huts to opulent villas, urban neighborhoods, and entire royal cities. The study of these contexts requires sophisticated mapping techniques, whether of standing remains or of distinctive magnetic or chemical patterns created by subsurface features. The projects featured in this section of the exhibit demonstrate a number of ways the resulting data from mapping projects can be used: to guide further research (including excavation), to reconstruct the spatial, material, and experiential patterns of habitation, and to relate these patterns to specific social and cultural behaviors.

# VILLA LIFE ON THE BAY OF NAPLES



The north garden façade of “Villa A” at Oplontis near Pompeii (photo Elaine Gazda).



Student interns from the University of Texas, Austin, sort through hundreds of fragments of wall plaster in an excavation storage room in “Villa A” (photo Elaine Gazda).

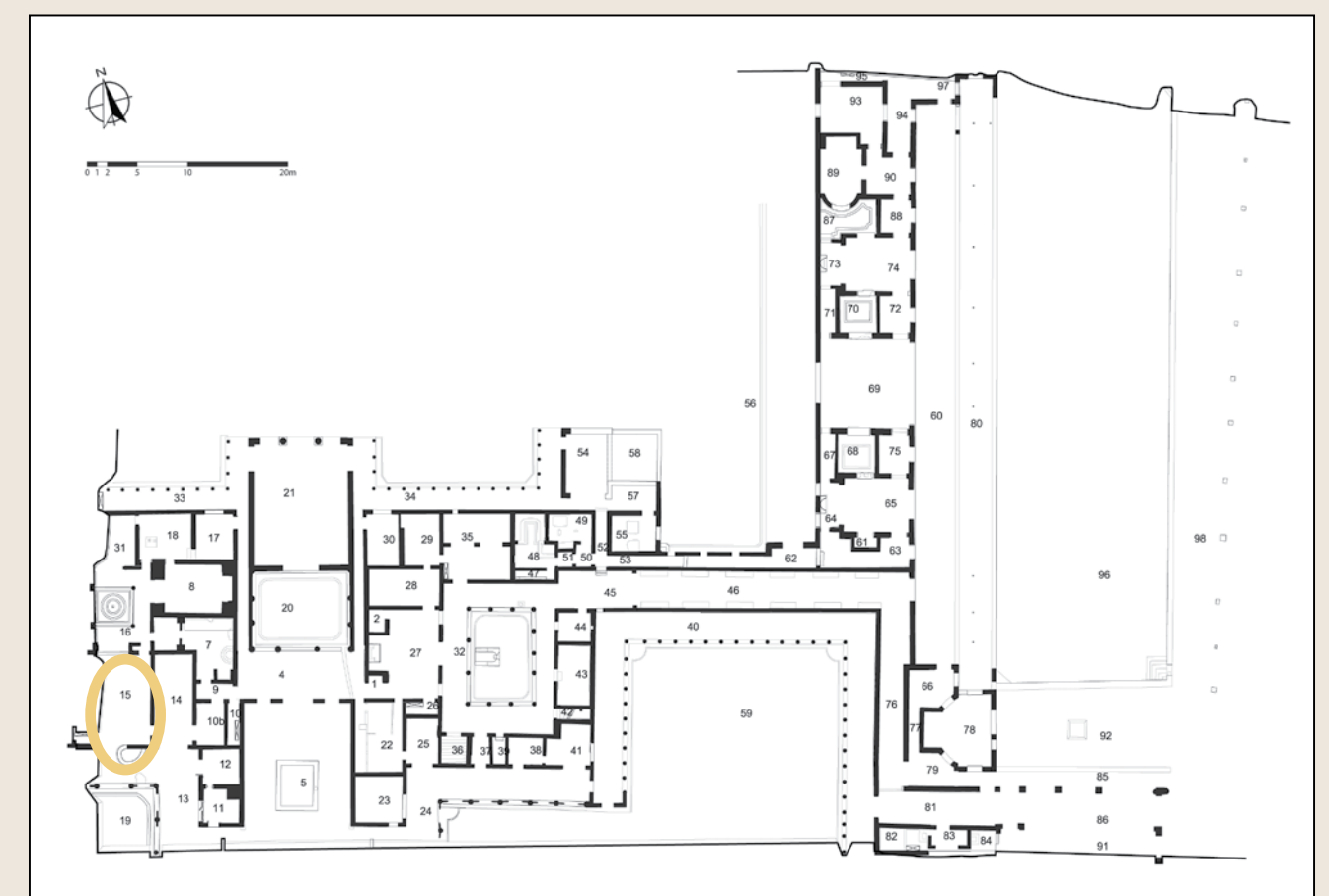
During the last centuries of the Roman Republic, country villas often served as quiet retreats where senatorial elite left behind the pressures of city life to pursue leisure activities and work the land. With Rome’s expansion, military victories yielded enormous wealth and power. Many elite villas became luxurious stages for social and political competition. From the mid-1st century BC to Vesuvius’s eruption in AD 79, large reception halls with impressive wall paintings and colonnaded walkways framing gardens ornamented with sculptures in marble and bronze became the norm along the Bay of Naples. Yet the ideal of country life remained symbolically important to aristocratic Romans, whose ancestral wealth lay in productive land. Even lavishly ornamented estates could have vineyards and olive groves that yielded a good income.

My research focuses on the role of artworks in such villas. Kelsey Museum visitors can see a large replica of the famous frescoes from the Villa of the Mysteries in Pompeii. “Villa A” at Oplontis near Pompeii likewise preserves important murals. Since 2012, I have worked at “Villa A” with a team from the University of Texas led by John R. Clarke. While doing research for a book and preparing an exhibition for the Kelsey, I am also helping to reconstruct wall paintings from Room 15, one of the villa’s most spectacular reception spaces. The owner would have entertained important guests in this room, among them perhaps the infamous emperor Nero, whose in-laws (the family of his second wife, Poppaea) have been tentatively associated with this villa.

*Elaine Gazda*



Ghost of reversed east wall of Room 15 with fragments of the west wall overlaid in a tentative arrangement (image Timothy Liddell; courtesy the Oplontis Project). Nature is here envisioned as an enclosed garden surrounded by massive double-storied colonnades similar to those found in sanctuaries. The shields on the upper left may have been dedications to a deity as well as symbols of the owner’s military valor.



Plan of the excavated parts of “Villa A” showing numbered rooms. Room 15 is circled (courtesy the Oplontis Project).



## 1. Fragment of a Border with Vegetal and Architectural Elements

White, red, and yellow pigments on a plaster and mortar ground

Puteoli (Pozzuoli), Italy. Giuseppe De Criscio collection 1923. KM 93586

Troy Samuels noted that the vegetal and architectural forms on this fragment resemble those on decorative borders found on a ceiling of one of Nero's palaces in Rome, the so-called Domus Transitoria. He suggested that the Kelsey fragment is from the upper zone of a wall, similar to the one shown in the illustration.

## 2. Fragment of a Decorative Border

Blue, red, and white pigment on plaster and mortar ground

Pompeii, Italy. F. W. Kelsey gift 1893. KM 309

For many years, Egyptian blue was considered a rare and expensive pigment, but recent research indicates that it was, instead, very common. Supporting this newer view, Gregory Tucker noticed that on this fragment blue was used as the background color, with the red and white pigments painted on top.



### 3. Fragment of a Decorative Border with Framed Rosettes

Red, green, gold, and white pigment on plaster and mortar ground

Probably from Pompeii, Italy. F. W. Kelsey gift 1924. KM 1988

Alison Rittershaus proposed that this fragment differs enough in the width of the bands and the execution of the floral motifs from two similar fragments in the Kelsey's collection to suggest that, while all three may have come from the same room or even the same wall, they would have been from different parts of the overall composition.

### 4. Fragment of Abstract Lotus and Geometric Border

Red pigment (probably cinnabar) with purple, green, gold, and white pigment on a plaster and mortar ground

Provenance unknown. Mrs. David Dennison gift 1977. KM 1977.3.11

Prized for its brilliant hue and rarity, cinnabar red was used for murals only in the most expensive villas or townhouses. Elements of the design on this fragment suggest that it belonged to a vertical border framing a large section of a wall that had a figural composition at its center, as Nicholas Streicher proposed in his reconstruction.



## Items from a Roman Villa in Boscoreale

Bronze, iron, wood and unidentified debris

Roman Period

Boscoreale near Pompeii, Italy. Michigan State Millers' Association gift 1923

All of the pieces shown here come from one of the villas at the site of Boscoreale near Pompeii. Some of them are easily recognizable. Others are not.

### **Can you identify the mystery pieces?**

Look for clues among exhibit cases in the other gallery spaces on this floor of the museum. Then write your answers on a card, and drop it in the ballot box on the table. Be sure to include the item number on your card.

Thank you for helping the Kelsey Museum discover more about its collection!

# RECONSTRUCTING ANCIENT TOWNS



*View of the Acropolis from Museum Hill* (photo William James Stillman, 1882). Koile area is visible in the foreground.



The Koile valley in 2011. The main road runs along the bedrock at the bottom of the valley (center) with a modern trail alongside to the right.

Much research has been devoted to the public buildings of Classical Athens—on the Akropolis and around the ancient market square, for example. But where did the people who built them live? And what can we learn about their lives by looking at the city’s residential quarters?

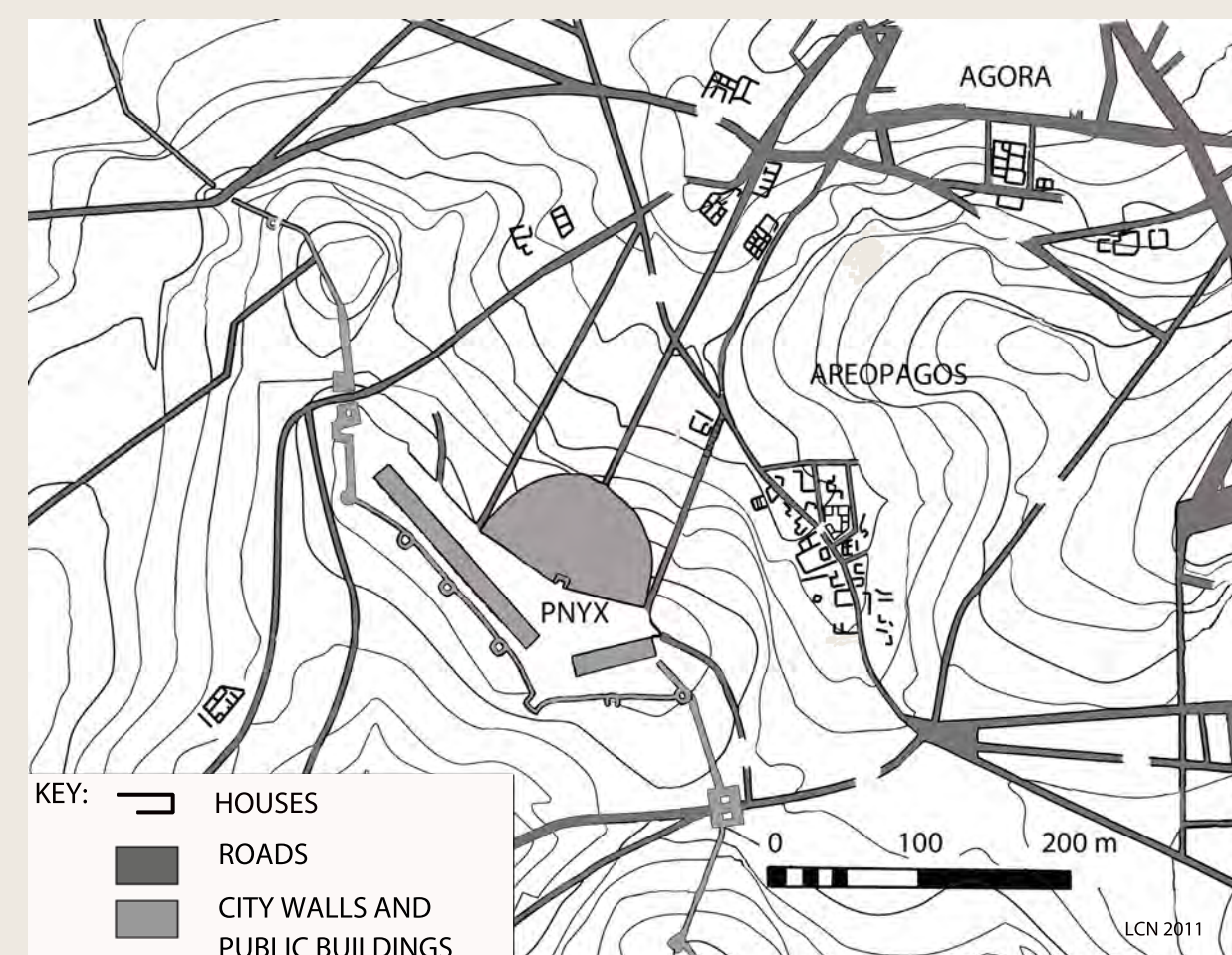
My project aims to address these questions by exploring an area southwest of the Akropolis that in Classical times was part of the residential districts of Koile and Melite. Extensive excavation during the mid-19th century by French archaeologist Émile Burnouf revealed at least 600 rooms of houses. His publications note that steep terrain forced the main streets for cart traffic to follow the valley bottoms or climb slowly up the hillsides. Drains running alongside carried away excess rainwater. Minor roads were little more than flights of steps giving access to houses carved into the slopes. In some neighborhoods houses were aligned in neat rows, while in others they seemed scattered on different orientations.

This ongoing project moves beyond such general impressions, looking at Burnouf’s unpublished notes, along with 19th-century maps of visible ancient remains by German scholars (Ernst Curtius, Johannes Kaupert, and Walter Judeich) and recent plans of the ancient streets. Together, these offer a more detailed picture that sheds light on the lives of the ordinary residents of these neighborhoods. The widest thoroughfares divided houses into separate clusters within which residents—especially women, whose social contact was restricted—could have gone about their daily business with little interruption from outsiders.

*Lisa Nevett*



Rock-cut foundations for houses at the base of the Pnyx, with a stepped street ascending behind (2011).



Reconstruction by Lisa Nevett of some of the streets and houses east of the Pnyx. Extract from the plan of Athens published by Walter Judeich showing the Koile and Melite areas.



### 1. Attic Red-figure Pyxis with Lid

Clay, paint

5th–4th century BC

Greece. Mrs. David Dennison gift 1977. KM 1977.3.2a,b

### 3. Journal Volume, *Revue générale de l'architecture et des travaux publics*

Published 1878

Property of University of Michigan Library

### 2. Attic Red-figure Lekythos

Clay

Ca. 430 BC

Greece. Marburg Collection 1923. KM 2603

This volume of the French journal *Revue générale de l'architecture et des travaux publics* (1878) contains Émile Burnouf's most detailed surviving account of his work in the Koile valley. The plan shows the contours of the landscape, peppered with rock-cut foundations from ancient houses. The Kelsey's two vases show the kinds of activities that might have been carried out in an ancient Athenian house.

The *lekythos* (oil bottle) shows a woman spinning. She stands by a *kalathos* (wool basket) holding a distaff in her left hand and a spindle in her right.

The *pyxis* (cosmetic container) shows a woman attended by a maid and (far right) a winged cupid, who bring caskets to her. The inclusion of the cupid is a reminder that these images are viewed through the eyes of the painter and should not be regarded as photographic records of Athenian households.

# THE LOST CITY OF KURRU

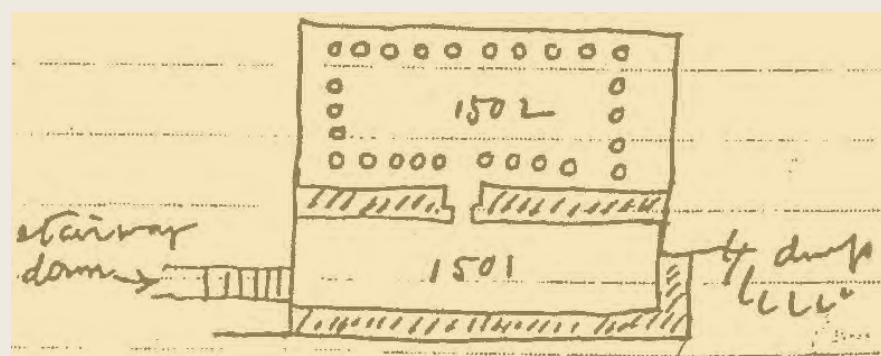


How do archaeologists find sites and decide which ones are worth excavating? Challenges in locating sites can vary, depending on the materials used to build houses and larger structures, and on local environmental conditions that affect how these remains are preserved, covered up, or destroyed.

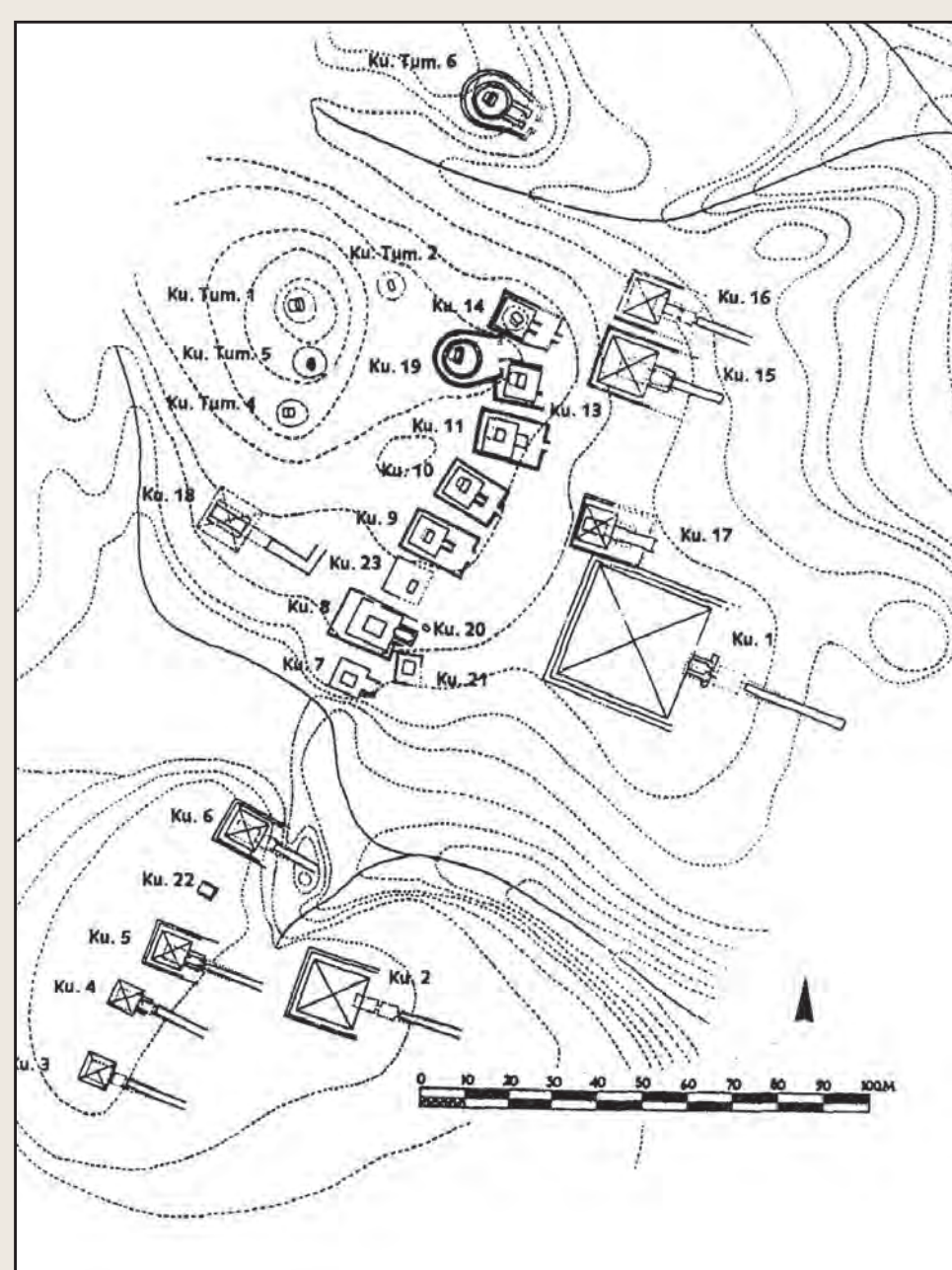
Nubia, located in the Nile Valley stretching from southern Egypt to northern Sudan, was home to cultures that interacted with both ancient Egypt and sub-Saharan Africa. In the past, archaeologists working on ancient Nubia tended to focus on burials and monumental stone-built temples, largely because these sites provided museum-quality objects. Settlement sites—the places people built their houses, ate their meals, and lived with their families—can be very difficult to find.

A new Kelsey Museum project aims to recover the settlement at El Kurru, a lost royal city of Nubia. El Kurru's cemetery, excavated by George Reisner in 1919, proved to contain pyramid burials of the Nubian dynasty that conquered Egypt in the years after 750 BC. Reisner noted extensive settlement remains in the area and sketched a few buildings in his notebook. These remains are completely invisible on the ground today, perhaps covered by silt deposits from high floods, obscured by sand, or concealed by modern construction. Locating the city could give new insight into the social, political, and economic underpinnings of the Nubian dynasty that conquered Egypt. Using tools such as infrared satellite and magnetometry, in 2013 our project set out to find the lost city of El Kurru.

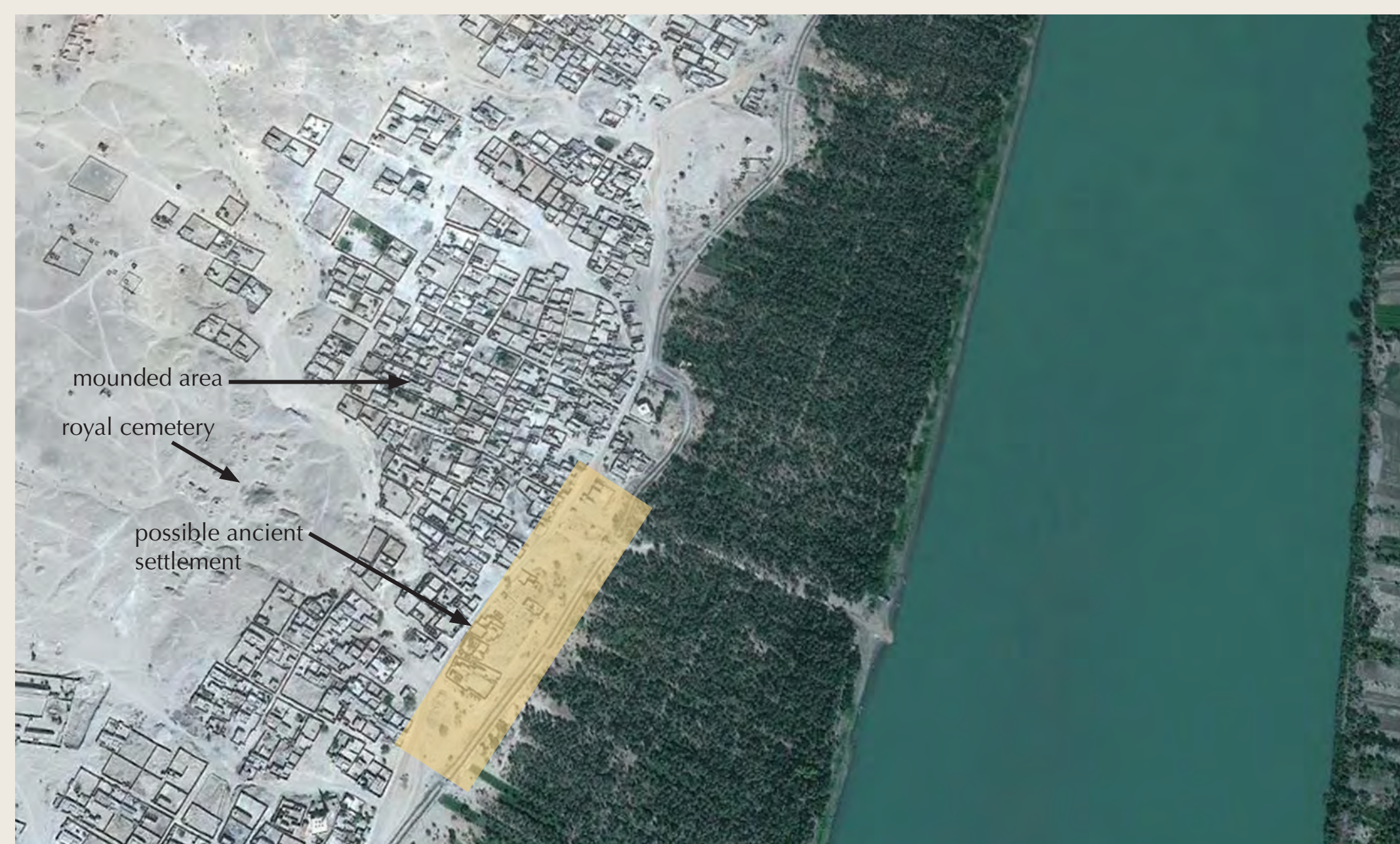
*Geoff Emberling*



Plan from Reisner's notebook showing a temple he located but did not excavate.



Plan of the royal cemetery at El Kurru as discovered by Reisner in 1919.

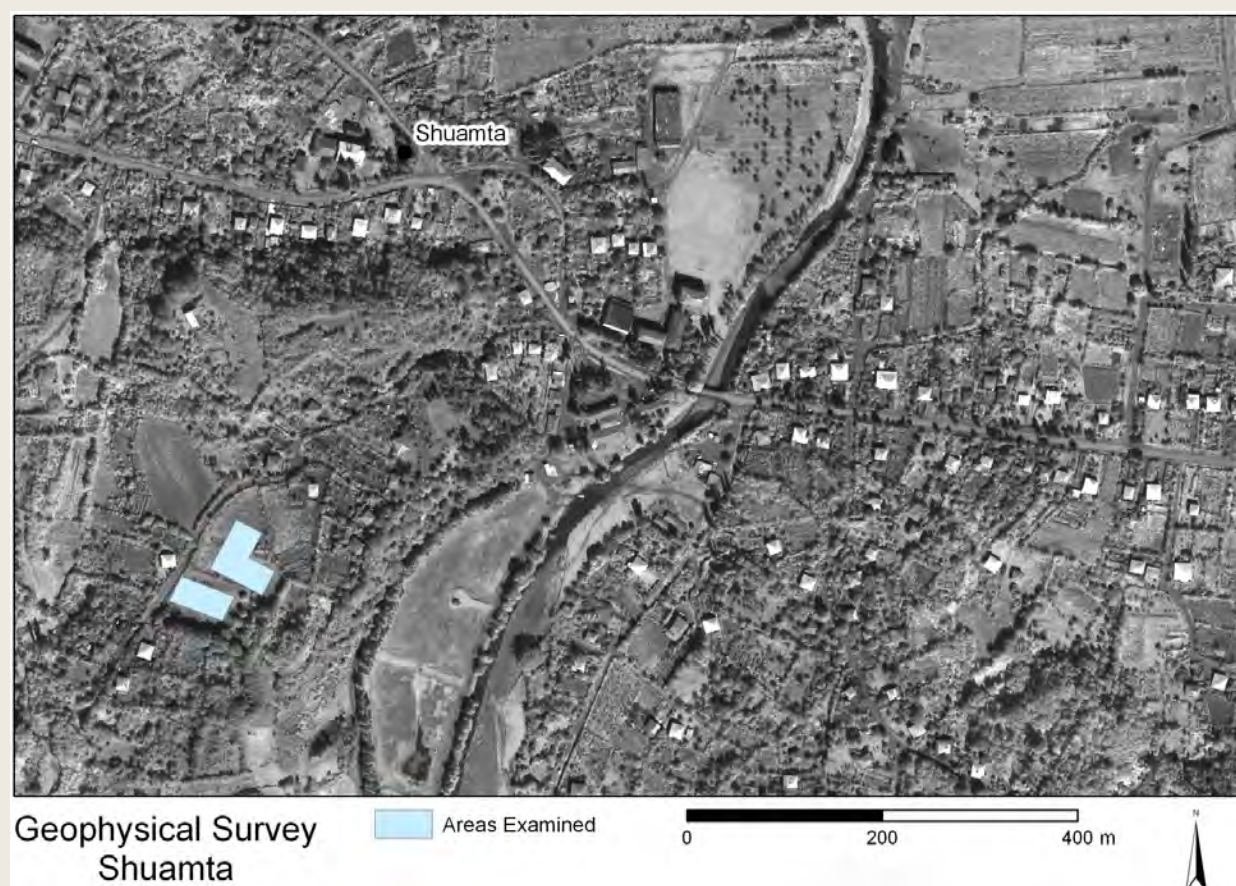


Satellite image of the ancient site and modern village of El Kurru.

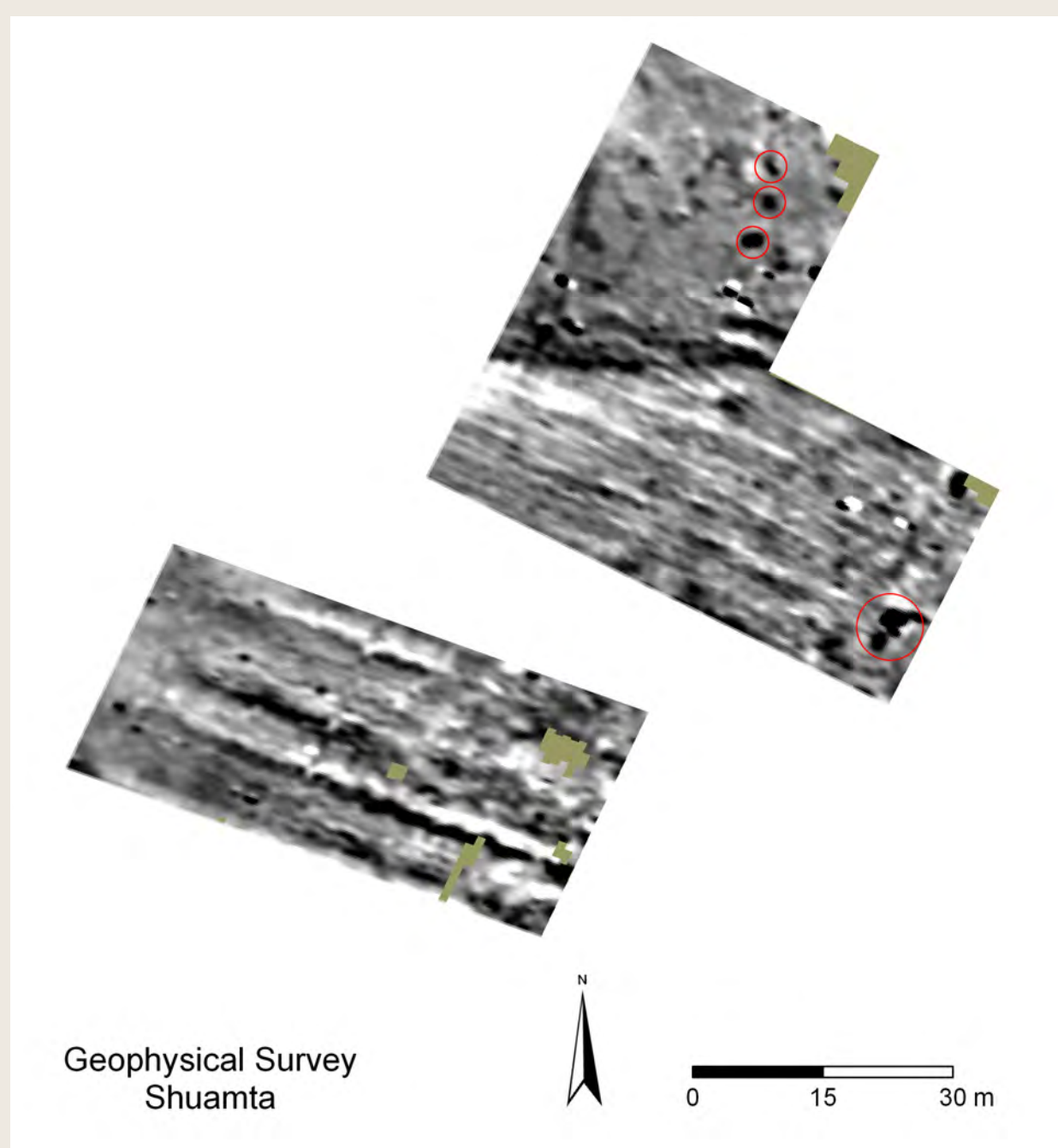
# ARCHAEOLOGY OF ANCIENT COLCHIS



General view of Phasis river valley, showing location of Shuamta.



Satellite image of Shuamta.



Colchis in modern Georgia was famously the “farthest shore” in Greek mythology, the land of the Golden Fleece and home of Medea. In 2009, a team of U-M archaeologists began a new field project in the region of Vani in Colchis, an archaeological site near the river Phasis (after which the pheasant is named).

Vani was the center of a local chieftdom, occupied throughout the 1st millennium BC. It encompassed an area of about 15 acres, surrounded by imposing stone fortifications. The goal of our project was to improve our understanding of Vani’s regional context by examining the surrounding territory. Were there other settlements nearby, and if so, what kinds of administrative, commercial, or religious connections did they have with Vani? In 2009–2010 we catalogued 95 archaeological points of interest, ranging from isolated graves to substantial villages.

One of the most interesting sites lies in the village of Shuamta, 5 km west of Vani, where villagers had reported finding pottery and other artifacts in their fields. After examining and mapping the site, we carried out geophysical surveys of select areas using a “flux gradiometer,” which measures disturbances in the earth’s magnetic field caused by buried archaeological features. We then followed up with a series of test trenches, which revealed pits dug to quarry earth for use in wattle and daub construction.

Continued research of this kind around Vani and throughout Georgia will shed new light on the past of this fascinating and beautiful frontier land.

*Christopher Ratté*



General view of excavations at Shuamta, with excavator Jana Mokrisova.

# T R A N S L A T I N G

What did people choose to write down? Those of us who study literate societies of the past benefit not only from material evidence but also from written records. These might be inscribed in temples and tombs, painted on walls, or literally set in stone. They could be letters, accounts, funerary books, labels, and legal, political, philosophical, biographical, fictional, or teaching texts, written on a variety of media. Ancient documents offer details we cannot necessarily deduce from material remains and sometimes give us a real sense of the personalities who created them.

Earlier researchers often focused exclusively on either textual or material evidence, writing historical narratives from texts and inferring lifeways and visual culture from archaeology. But this practice ignored the interdependence of text and context, which supply different data streams that can fill each other's silences. Many scholars today take a holistic approach to the full range of evidence available.

Textual evidence carries specific issues of preservation and bias. Not everyone could read or write in ancient societies; most texts reflect the viewpoint of more elite, literate individuals. Also, in some regions the business of life tended to be written on perishable materials such as papyrus, while elsewhere more durable media such as clay tablets were used. Finally, as early archaeologists discovered them, texts were often divorced from their contexts either because their beautiful, exotic scripts were thought worthy of museum display or because only their contents were considered important. The projects in this section show the rewards of translating context together with text.

# FROM ARCHAEOLOGY TO PAPYROLOGY



Partially preserved papyrus  
P.Mich.inv.5866b before  
restoration, 3rd century AD.

An object containing text passes through many hands, from its creator and reader in antiquity, to archaeologists, through conservation, to papyrology, and on to ancient history. The papyrus featured in the video here (video stand) shows one of the technical problems of reading texts—restoration often must occur before a text is legible. In this case the object was literally unraveled by a conservator before a papyrologist could unravel the meaning of the text.



Senior Papyrus Conservator Leyla Lau-Lamb  
working on a papyrus.

Once a text becomes readable, scholarly excitement about the translation and its possible contributions to ancient historical research can overshadow the archaeological information about the text's context and background. But many scholars today, especially at the University of Michigan, are approaching texts in a more holistic manner, recognizing them as part of the archaeological record, thereby allowing the object and the written word to create lines of evidence for analysis in tandem.

A case study of the text-as-object approach begins with the U-M excavations at Karanis, Egypt (1924–1935). At the time of excavation objects found together were divided for distribution, with papyri going to the University Library and artifacts going to the Kelsey Museum. Only recently have there been efforts to reconnect them in studies and reconstructions. The translation of papyrus P.Mich.inv.5866b reveals that the text is an account recording rather high numbers of drachmas. The archaeological documentation shows that the papyrus was found in granary C123, in room CA (the south entryway of the building). This room yielded a surprising variety of artifacts, including jewelry, beads, a string with amulets, and several domestic implements. Because this room was a highly trafficked entrance to the building, it is unlikely that all these objects, including the papyrus, were left there by the original occupants of the granary. Perhaps they were deposited after the building was abandoned.

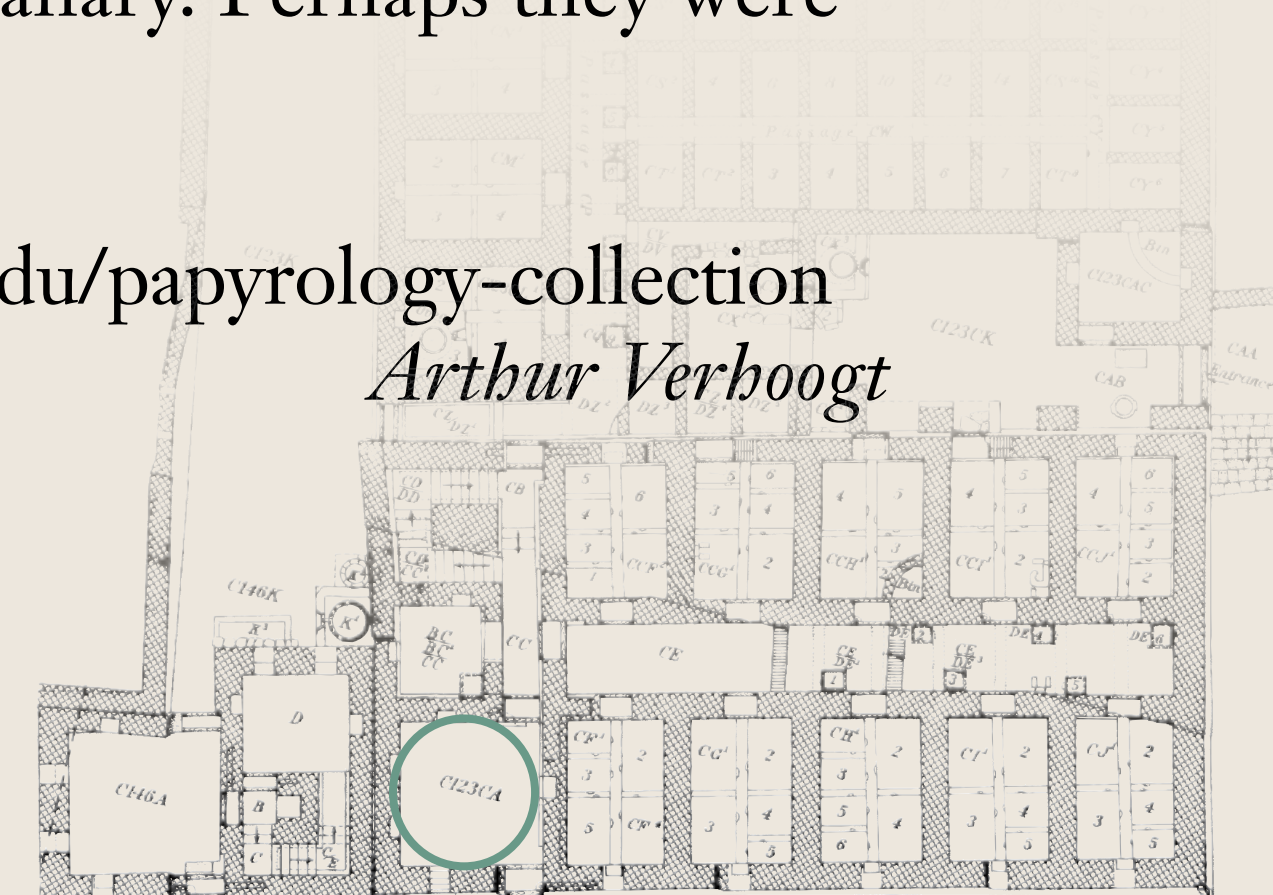


Restored papyrus P.Mich.inv.5866b,  
with translation of text showing large  
amounts of drachmas.

Visit the U-M Papyrology Collection at <http://www.lib.umich.edu/papyrology-collection>

*Arthur Verhoogt*

Fig. 4. Plan of granary C123, with findspot  
for papyrus P.Mich.inv.5866b circled  
(Kelsey Museum Archives M8.694).





## Fragment of Account

Papyrus, ink

Roman Period (3rd century AD)

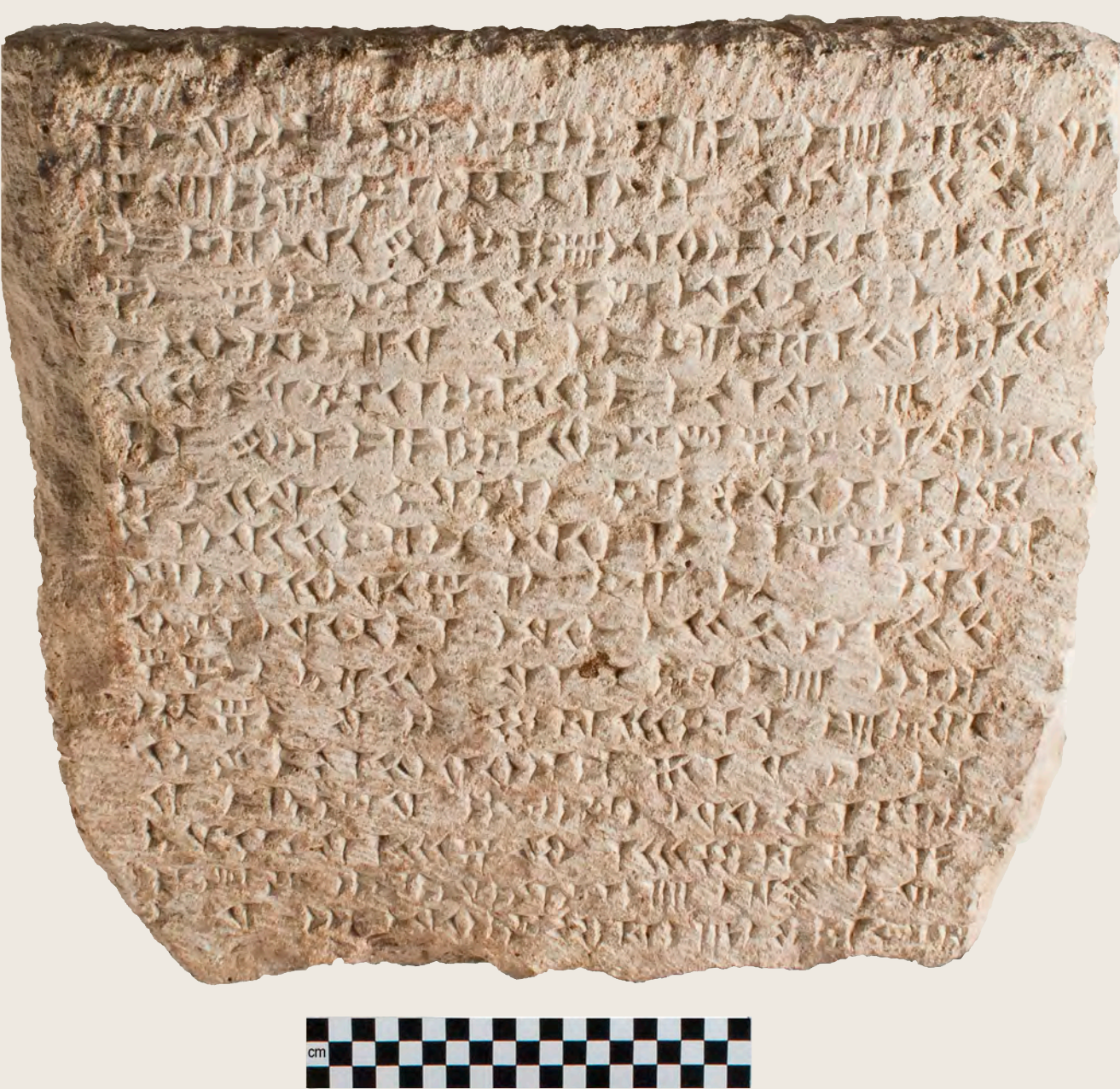
Room CA, Granary C123, Karanis, Egypt. University of Michigan excavations 1924–1935.

P.Mich inv. 5866b. Courtesy of the University of Michigan Library Papyrus Collection

# TEXT AND CONTEXT IN ANCIENT MESOPOTAMIA

“For Nabû, the exalted lord, who dwells in Ezida in Nineveh, his lord, Assurbanipal king of Assyria, the wish and desire of his great godhead, who at the conveying of his instruction and with the issuing of his venerable command, in the heat of the battle cut off the head of Teumman the king of Elam, and Ummanigas, Tammaritu, Pa’e and Ummanaldaš, who exercised kingship in Elam after Teumman. At his (Nabû’s) solemn word I personally captured them and harnessed them to my royal processional carriage, and in all of the lands I established the proper ways. At that time I enlarged the courtyard of the temple of Nabû, my lord, with massive limestone slabs. Thereupon, o Nabû, look at (it) joyfully; may it be acceptable to you! With your reliable writing may you decree a long life for me! May my feet walk in Ezida before your divinity for a long time!”

Tayfun Bilgin’s translation of the Kelsey’s Nineveh slab, following W. Hallo’s 1987 translation of an almost identical text on a slab in the Israel Museum.



Limestone paving slab from the Temple of Nabû at Nineveh (KM 89808).

Where does learning end and research begin? The Kelsey’s collection includes objects from Mesopotamia inscribed with texts in Sumerian, Babylonian, and Akkadian. These documents form a valuable resource for students learning to read these languages in the cuneiform script.

As they translate these three-dimensional texts, students can also explore the archaeological contexts in which ancient individuals originally deposited them. Through a process that began with translating a text as a training exercise, and then led to detective work inspired by its content, U-M graduate students discovered that a seemingly nondescript limestone slab in the Kelsey’s collection is actually a paving stone from the Temple of Nabû at the site of ancient Nineveh.

The Assyrian king Assurbanipal (668–627 BC) enlarged this temple during his reign, a pious act he reinforced by inscribing architectural materials used in the renovation. The original excavator of the site recovered 80 limestone slabs (ca. 60 × 60 cm each) from a large area of pavement on the southeast side of the temple but estimated they originally totaled 400. The inscribed surfaces of these slabs were set face down, indicating they were intended for the gods’ eyes only.

Several of these slabs are now in museums throughout the world. By comparing the Kelsey object to these other examples, Tayfun Bilgin and Gina Konstantopoulos were able to conclude that it is a material manifestation of an historical act: one of the “massive limestone slabs” from Assurbanipal’s extension of the Temple of Nabû, part of a pavement on which he intended to walk “for a long time.”

*Gary Beckman and Tayfun Bilgin*



Gary Beckman (right) and Tayfun Bilgin in Kelsey collections storage.



Proud of having “cut off the head of Teumman the King of Elam,” as described in the Nineveh inscription, Assurbanipal also recorded it elsewhere. Detail from a wall panel depicting the Battle of Til-Tuba, from the Southwest Palace at Nineveh (British Museum 124801).



### Tablet with Cuneiform Inscription\*

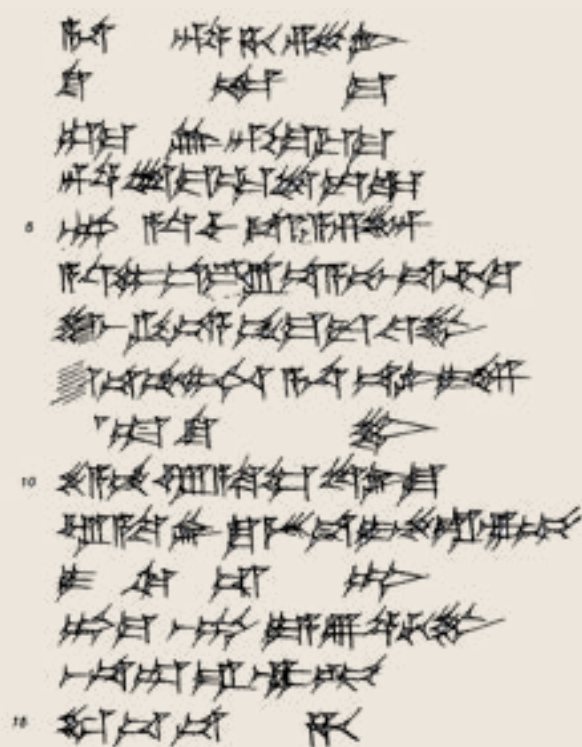
Clay

Ur III Period (2051 BC)

Drehem, Iraq (Nippur). Near Eastern Studies. KM 89203

A number of cuneiform documents in the Kelsey's collection are transaction records relating to the administrative and economic life of the Ur III state. The most frequently encountered name is that of the king Shulgi, the longest reigning and best-remembered ruler of the Ur III period. The tablet featured here, written in Sumerian, is from the tax collecting redistribution center of Puzrish-Dagan in central Babylonia and is dated to the 9th month of Shulgi's 43rd year. It records 508 sheep distributed for various purposes, including offerings made on behalf of the king, but also mentions six of his consorts. Near Eastern Studies professor Piotr Michalowski comments that Shulgi's two main queens, Shulgi-simti and Geme-Ninlila—both mentioned in this account—seem to have been buried together with Shulgi when all three died just over four years later, possibly during a coup.

Tablets such as this lengthy list of sheep donations not only provide the details of economic and ritual life; they also allow us to piece together the roles individuals played in the Ur state.



\*A list of offerings to the temple\*

"x sheep (for) the kitchen on the  
10th day

x+1 sheep on the 12th day

9 sheep on the 21st day

12 sheep on the 22nd day

62 sheep on the 23rd day

14 sheep on the 24th day

24 sheep on the 26th day

22 sheep on the 27th day

32 sheep on the 28th day

11 sheep on the 29th day

11 sheep on the 30th day  
(for) the kitchen.

30 sheep for the regular offering of  
(the goddess) Gula,

30 dead sheep (for?) the account of  
Illum-bani,

x+4 sheep on behalf of the king,

x sheep on behalf of Geme-Ninlila,

x sheep (for) Nin-kala,

x sheep, provisions (for) Simat-Ea,

7 sheep, provisions (for) Shulgi-  
simti,

7 sheep, provisions (for) Ea-nisha

14 sheep, provisions (for) Taddin-  
Eshtar,

20 sheep (for?) the account of  
Shelebum,

3 sheep (for?) the account of Lu-  
dingira,

166 sheep (for?) the various  
accounts of Bizeze.

Disbursal of Ur-kununa.

9th month.

The year: "The high priestess of (the  
moon god) Nanna was chosen by  
means of the omens' (43rd year of  
Shulgi).

508 sheep."

—Trans. Piotr Michalowski



## Tablets with Cuneiform Inscriptions

Clay

Old Babylonian Period, reign of Hammurapi (1792–1750 BC)

Iraq. Near Eastern Studies. KM 89469–KM 89476

These tablets come from the large administrative archive of Shamash-hazir, who was a high official in the southern city of Larsa after its conquest by Hammurapi in 1763 BC. After discovery, the group of tablets was divided; and now, piecing together the full story of the archive involves researchers and publications across many institutions. Written in Old Babylonian, the Kelsey tablets consist mainly of letters written to Shamash-hazir, and one letter from Hammurapi himself, on display in the Kelsey's permanent Near Eastern gallery downstairs.

The Kelsey letters to Shamash-hazir all discuss the assignment of fields. The land belonged to the state, and it was assigned to people for cultivation in exchange for rent or was given as a reward to high officials. Occasionally these exchanges were heated, as witnessed by the aggravated tone of the tablet whose translation is provided above.

### A Letter of Complaint

Trans. Tayfun Bilgin

KM 89476

“Speak to Shamash-hazir, thus says Lu-Ninurta: May Shamash keep you in good health! As for the field of Azi’el, it is a permanent field of his wife’s father. The king told me, ‘I(!) gave (the field to him). Why did you give (it) to another?’ Return the grain and the field to him, and give him the field of the fullers that he inspected for you. When I have written to you concerning my business, do not treat the matter lightly! Send me a reply to my letter.”

# I M A G I N G

Once an archaeological site has been excavated, its potential for informing future research is only as good as the records kept by its excavator. Producing careful drawings, detailed descriptions, and representative photographs, in addition to many other forms of documentation, may seem pedestrian. But documentation is a critical dimension of what we do, both of sites and artifacts and ecofacts (biological remains) as they emerge during survey and excavation, and of objects held in museum collections. Research on objects in museums can also be an “excavation,” as the details of the original context may not be preserved, may be inaccessible, or may never have existed given the dislocation caused by centuries of antiquarian collecting.

This section of the exhibition highlights the use of photography in research on the human past. Taking pictures of sites and objects is not as straightforward as it sounds: deciding what exactly needs to be photographed, and how, involves a complex process of choice and methodological strategy. What happens when an excavation area is too large to be photographed efficiently from the ground? Or when a feature is too detailed for a simple picture to do it justice? Or, finally, when the evidence is so fragmentary that patterns can only be reconstructed by attempting hundreds of combinations between individual pieces? As detailed here, faced with challenges like these, scholars deploy situation-specific methods such as using blimps, adding a third dimension to pictures, or constructing remarkably detailed composite images.

# DISCOVERING SOCIAL LIVES IN EMPIRE

Archaeology only begins in the field. In 1933–1934, University of Chicago investigations of Persepolis, the heartland capital of the vast Persian Empire, yielded an archive of over 20,000 clay tablets bearing cuneiform writing and the impressions of many seals.

Translations of 2,087 of these texts appeared in a landmark publication in 1969. The texts bear dates within the reign of King Darius the Great (522–486 BC) and record disbursements of food commodities to people ranging from royals to camel drivers.

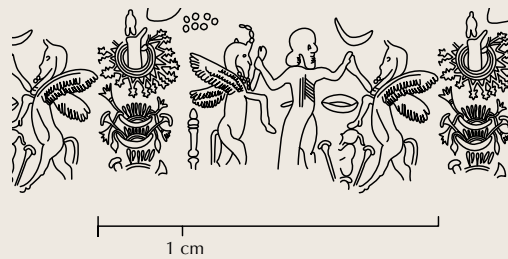
A Michigan project initiated in 1978 has now documented the 1,600 different seals ratifying those 2,087 texts. Most are cylinder seals, rolled out so their designs can vary greatly depending upon many factors. The reconstitution of all these seal images, coordinated with the tablet texts, gives us glimpses of social lives in empire.

Queen Irtashduna [ear-tash-DOOna] was a daughter of the founder of the empire, Cyrus the Great, and the favorite wife of Darius. She created a crazy-quilt of over 50 fragmentary, overlapping impressions of her large and sumptuously carved seal on only 11 tablets. Rich in imagery of fertility, it features the infant Horus perched in a papyrus thicket—referring to an Egyptian myth of dynastic succession. The Greek historian Herodotus suggested that a political marriage may have taken place between an Egyptian princess and Irtashduna’s father, Cyrus. Modern scholars have dismissed this tale. Does Irtashduna’s seal now give it some validation?

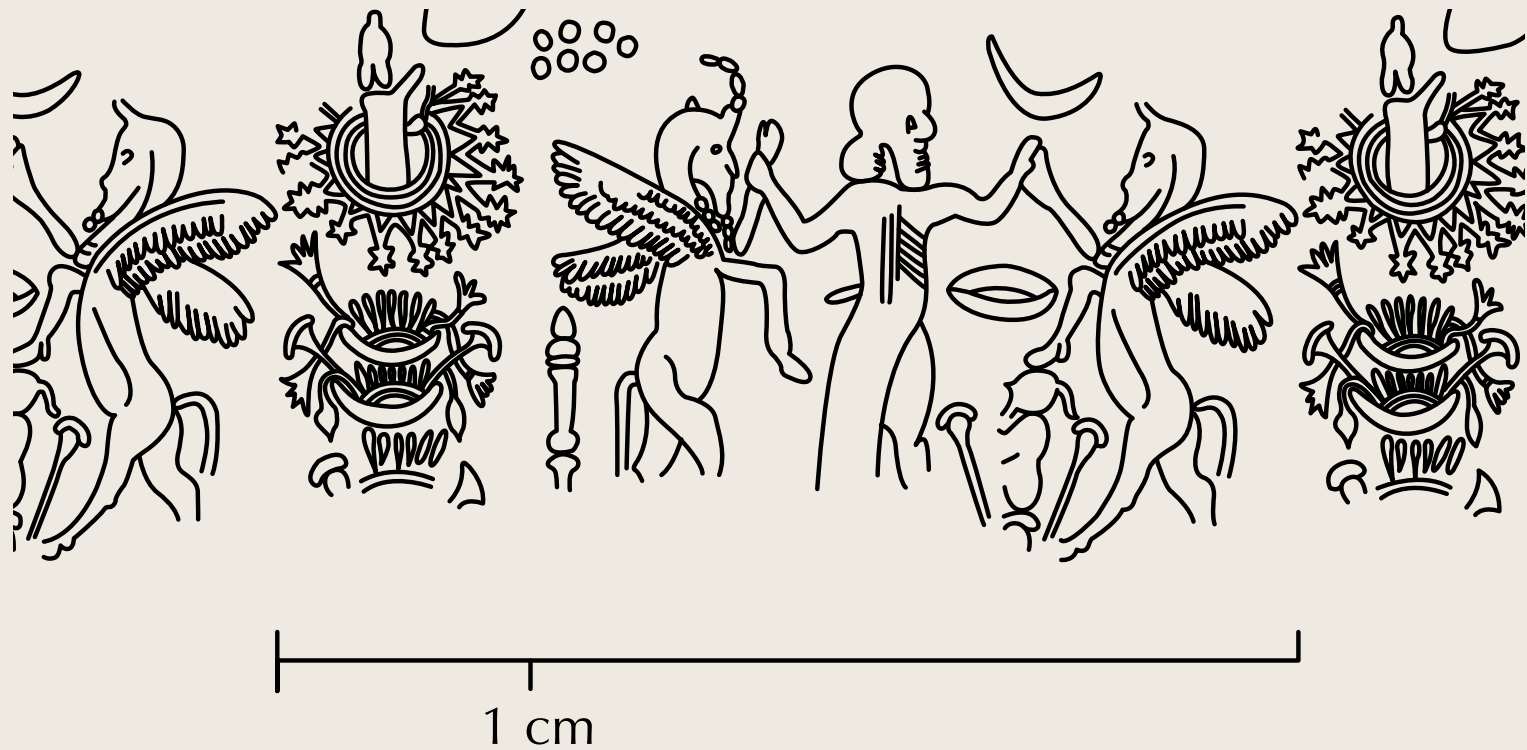
*Margaret Cool Root*



Photographs (three times life-size) of impressions of Irtashduna’s seal on selected surfaces of two tablets



Composite line drawing of Irtashduna’s seal (at actual size and at three times life-size).



# DISCOVERING SOCIAL LIVES IN EMPIRE

## PHOTOGRAPHY—KEY TO OUR DISCOVERIES

We first made a photographic dossier of every sealed surface of every tablet, using three different lighting angles for each shot. Using enlargements at three times life-size, we traced the impression that provided the best overall design template for each individual seal. We then overlaid that preliminary tracing on a photograph of every other impression of the seal to incorporate additional details.

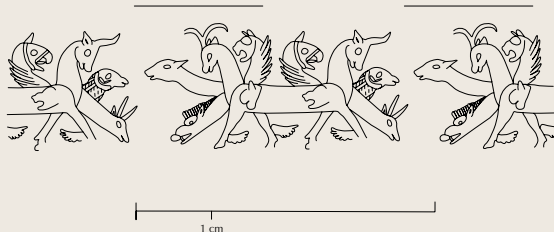
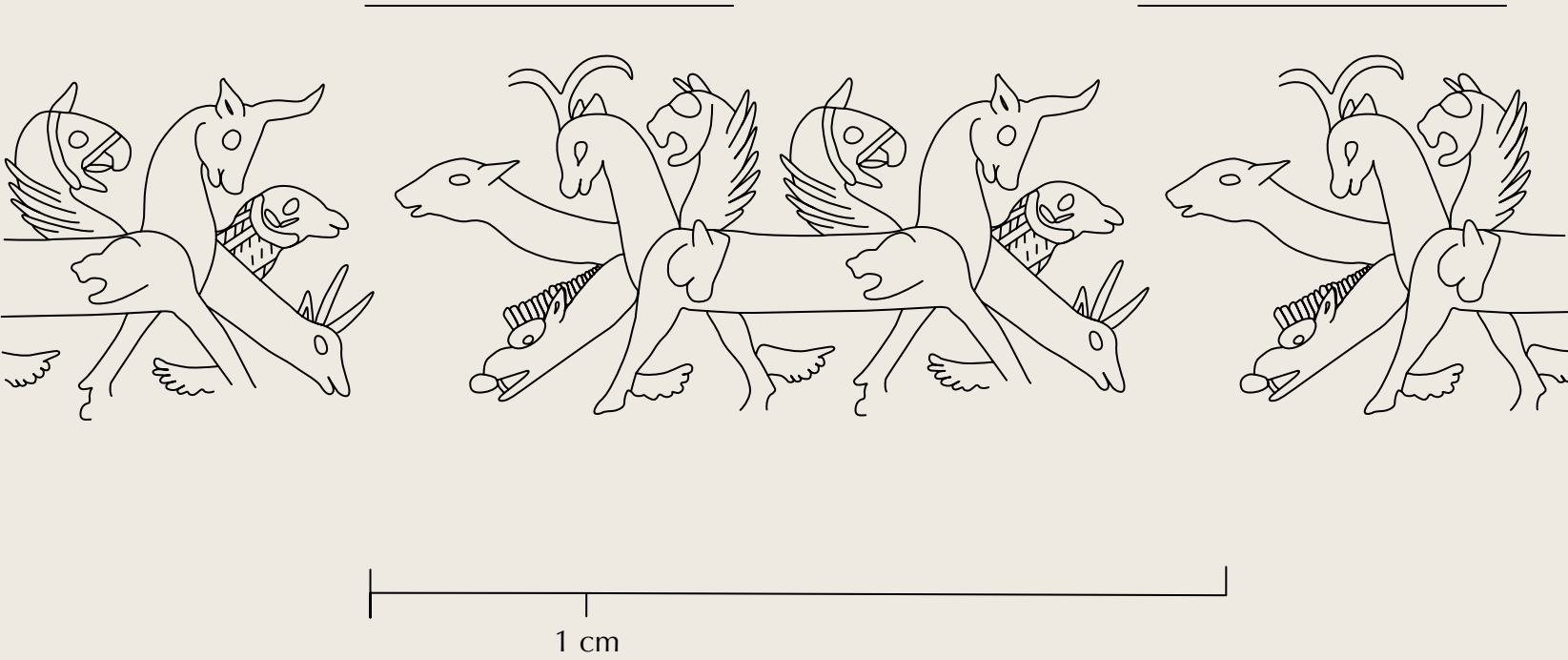
You can replicate our process below, using the seal of Turribadda [tour-ee-BAHda]. He was a supplier of grain, flour, and beer to a lot of people. He applied his seal carefully to 18 tablets. His signature creature has multiple heads emerging from both ends of its body. The design allows it literally to talk to itself when it is rolled so that we see the space where two ends come together. What is your favorite among all the heads on this bizarre creature? Do you notice what it has on its legs?



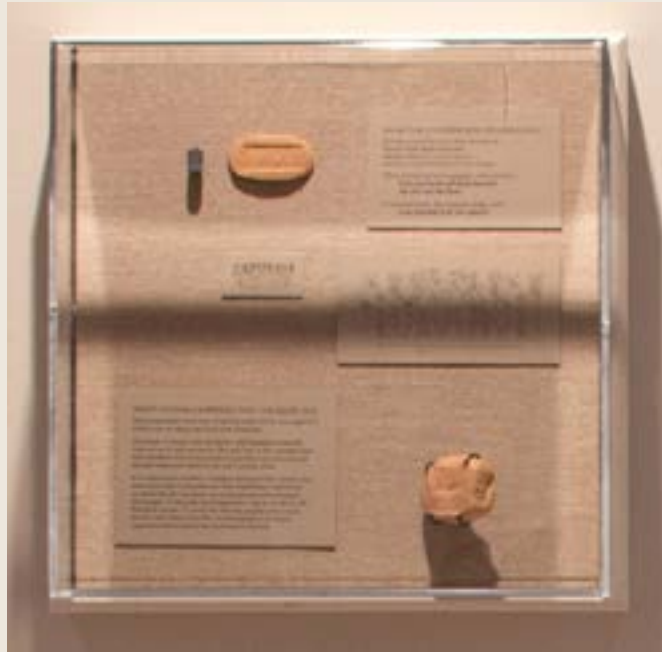
Photograph (at three times life-size) of Turribadda’s seal impressed on one tablet.

Turribadda’s choice of this creature to represent his identity reflects his sense of humor. This quality also shows up when he fools around with another person who is applying his seal to the same tablet. Do you see on this photo where the bug-eyed head with the big nose is poised to gobble up a star? This star actually belongs to the seal of another person. The visual play he and Turribadda created was deliberate: two human beings doing business but having a laugh at the same time.

*Margaret Cool Root*



Composite line drawing of Turribadda’s seal at three times life-size and at actual size.



## AN ACTUAL CYLINDER SEAL OF LAPIS LAZULI

Drawing at actual size and at three times life-size

Museum-made display impression

Akkadian Period (ca. 2350–2193 BC)

Seleucia, Iraq. University of Michigan excavations. KM 94533

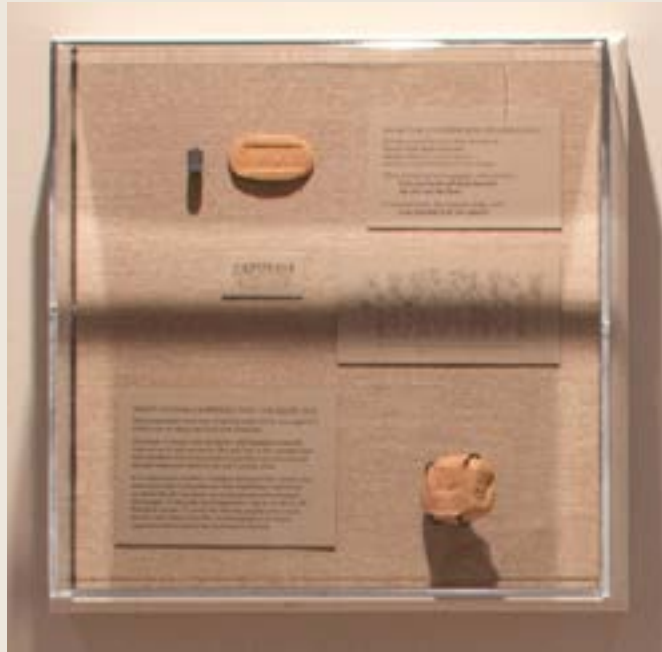
Three humanoid heroes grapple with creatures

**Can you locate all three heroes?**

**Do you see the lion?**

A star punctuates the complete image cycle.

**Can you find it in two places?**



## TABLET FACSIMILE IMPRESSED WITH THE KELSEY SEAL

These impressions show how an ancient owner of this seal might have rolled it out on tablets like those from Persepolis.

Thousands of ancient seals are known, and thousands of ancient impressions of seals are known. But only four or five examples have been identified of an actual preserved seal that is also documented through impressions made by the seal's ancient owner.

If we had to piece together a complete drawing of this cylinder seal with access only to disparate and often fragmentary impressions on tablets like this facsimile, we would proceed using enlarged photographs of each individual impression—just as we did for the Persepolis project. To render this drawing, graphic artist Lorene Sterner used a three-times life-size photograph of the display impression shown next to the actual seal in this case.



## **TRY MAKING YOUR OWN DRAWING OF TURRIBADDA'S SEAL**

### **STATION 1—BEGIN HERE**

Position your sheet of transparent paper on top of this photo so the pre-printed bar lines up with the bar indicated on the photo.

#### **TASKS:**

Trace the outline of the multiheaded creature on Turribadda's seal. (You will notice that the lowered head at the far right is destroyed. You will be able to complete this feature at Station 2.)

Then try to add some interior details to the bug-eyed, big-nosed head appearing at the lower left of this image.

Take your drawing and proceed to your left ←.



## STATION 2

Do you see the place at the far right of this photograph where the two ends of the creature look at each other? Position your drawing on top of this photograph so that the lowered neck at the bottom of the right end of the seal design matches up with its occurrence here.

### TASKS:

Now you can complete the outline of this head!

Then add the repeat of the bug-eyed, big-nosed head you see to the right. This job gives you the space the seal carver left between one end of the multiheaded creature and the other end.

Proceed again to your left ←.

## STATION 3

Position your drawing so it matches up with the partial impression you see here.

### TASK:

Try to add new details to the two heads at the right end of the seal design—especially the ram-head.

All this close looking takes practice. Congratulations on your results! ☺

# DIVERSE METHODS AT KEDESH

**K**edesh of the Upper Galilee is a large tel (22–25 acres) located on the border of modern Israel and Lebanon. Since antiquity the site has been home to a changing tapestry of ethnic groups, including Canaanites, the Israelite tribe of Naphtali, Phoenicians from the nearby city of Tyre, Jews, Greeks, and Romans. The Kedesh excavations focus on the interactions of these groups from about 300 to 64 BC, when Greeks controlled Phoenicia and the Galilee. Our primary goal is to assess how Phoenician material culture continued and changed in the face of interaction with that of Greeks and others. We frame this research in light of the long-running debate about how, and even if, the material record can be validly linked to social identity in ancient times.

Between 1999 and 2012 we uncovered an enormous administrative building (PHAB, about 5,000 m<sup>2</sup>) that was constructed around 500 BC and occupied until the 1st century BC. In one corner of it an archive room held over 2,000 tiny seal impressions (1–2 cm). These sealings display a complex mix of Greek, Phoenician, and Roman images and ideologies. The contrast between the enormous tel and PHAB and the minuscule seal impressions demanded that we use a wide range of archaeological recording tools to do justice to the finds—everything from magnetometry to blimp photography and artifact scanning. Such disparate specialties entailed extensive collaboration among excavators, photographers, artists, architects, and surveyors.

*Sharon Herbert*

## SITE MAPPING FOR EXCAVATION

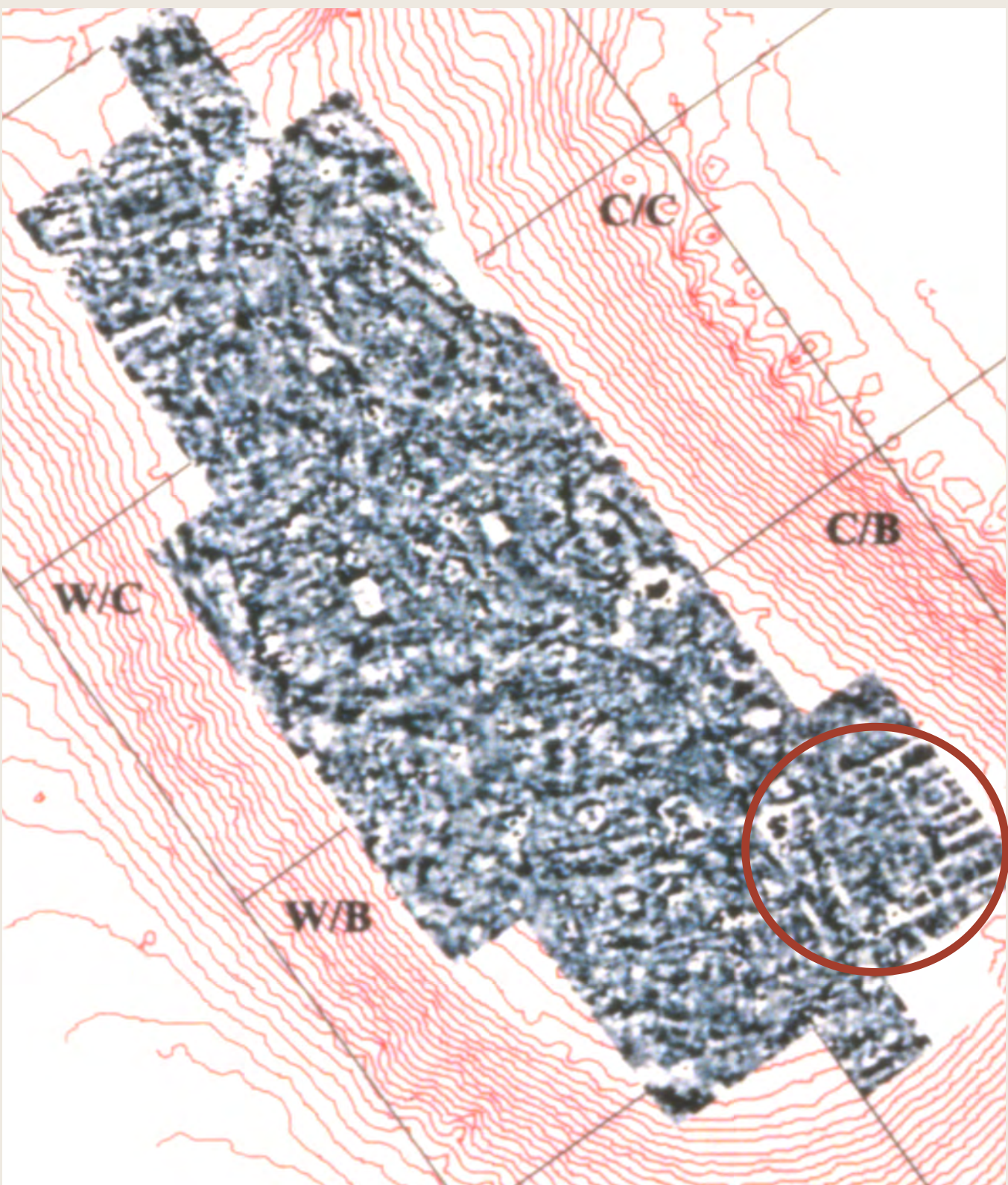
1. Air view of Kedesh from the southwest before excavation (Richard Cleeve).

2. Results of magnetometry, used to target excavation areas. Outline of PHAB circled (Lew Somers).



3A. Functional plan of PHAB (architects Sara Rabe and Molly Lindorfer in consultation with Andrea Berlin and Sharon Herbert).

3B. Air view of PHAB looking north (Skyview).



# DIVERSE METHODS AT KEDESH

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## PHOTOGRAPHING LANDSCAPES USING BLIMPS



Skyview blimp arriving from north (Sharon Herbert).



Andrea Berlin orienting Skyview team (Sharon Herbert).



Tethering blimp at dawn (Sharon Herbert).



Andrea Berlin and Skyview team coordinating plan, computer, and blimp camera (Sharon Herbert).



Airview of PHAB from north (Skyview).



Airview of PHAB from the east, with students standing in for Persian columns (Skyview).

## SEALINGS: DOCUMENTING MINISCULE OBJECTS



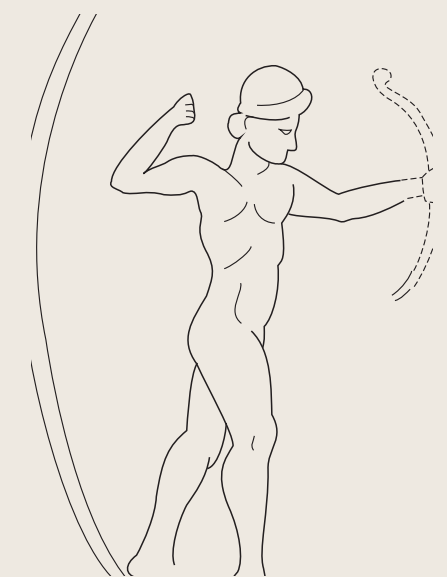
Finding the tiny mud sealing requires screening the dirt with a sieve (Andrea Berlin).



Conservator Brook Bowman examines tiny Kedeshe bullae (Sharon Herbert).



Apollo sealing enlarged (Clare Amit).



Drawing of Apollo sealing. Sealings are drawn by artifact artists in order to bring out details that are not clear in photographs (Lorene Sterner).



Seventy years before the Kedesh team discovered an administrative archive, another Michigan project uncovered two roughly contemporary private archives in houses at Seleucia-on-the-Tigris. The finds from these two sites—including over 30,000 found by Italian excavators in the 1960s and '70s—now constitute more than one-third of all known Hellenistic sealings from excavated contexts. The subjects depicted on the Seleucia sealings are predominantly Greek gods. Apollo was the most popular god and was closely associated with the Seleucid rulers. Private owners of seals might choose lesser deities such as a winged Eros riding a dolphin or heroes like Herakles.

**1–2. Bulla with Seal Impressions Representing Herakles and  
Reconstruction Showing Use of Sealings to Secure Papyrus Document**

Bitumen

294–131 BC

Seleucia, Iraq. University of Michigan excavations 1936–1937. KM 35860

**3–4. Seal Impression Showing Apollo and  
Bulla with Seal Impression Showing Winged Eros Riding a Dolphin**

Clay

294–141 BC

Seleucia, Iraq. University of Michigan excavations 1936–1937. KM 35670, KM 35826



Seleucus I, a Macedonian army officer who rose to kingship following the death of Alexander the Great, founded Seleucia as the eastern capital of his empire. Macedonian identity was signified on seals by attire such as the headgear (*petasos*) featured in the king's seal (above right). The anchor was also a royal symbol, possibly intended as a reminder of the harbors Seleucus built or as a reference to his maritime victories. Its use on seals signified the activities and officials of the royal treasury. Sometimes we can gain an especially keen sense of ancient individuals in action from such artifacts. The fingerprints preserved on the sealing to the right are the byproduct of an ancient official holding the raw material as he made an impression with his seal.

## 5–6. Seal Impressions Showing Hermes or King, and Anchors

Clay

294–141 BC

Seleucia, Iraq. University of Michigan excavations 1936–1937. KM 35584, KM 35707, 35716

## 7. Seal Impression, Head of King

Bitumen

294–141 BC

Seleucia, Iraq. University of Michigan excavations 1936–1937. KM 35715

# 3D MODELING AT THE GABII PROJECT



Jessica Nowlin (Brown University) taking photos that will be used to create a 3D model of a burial. Photos can be taken from flexible positions and angles, a big advantage over traditional methods requiring orthographic, top-down photos.

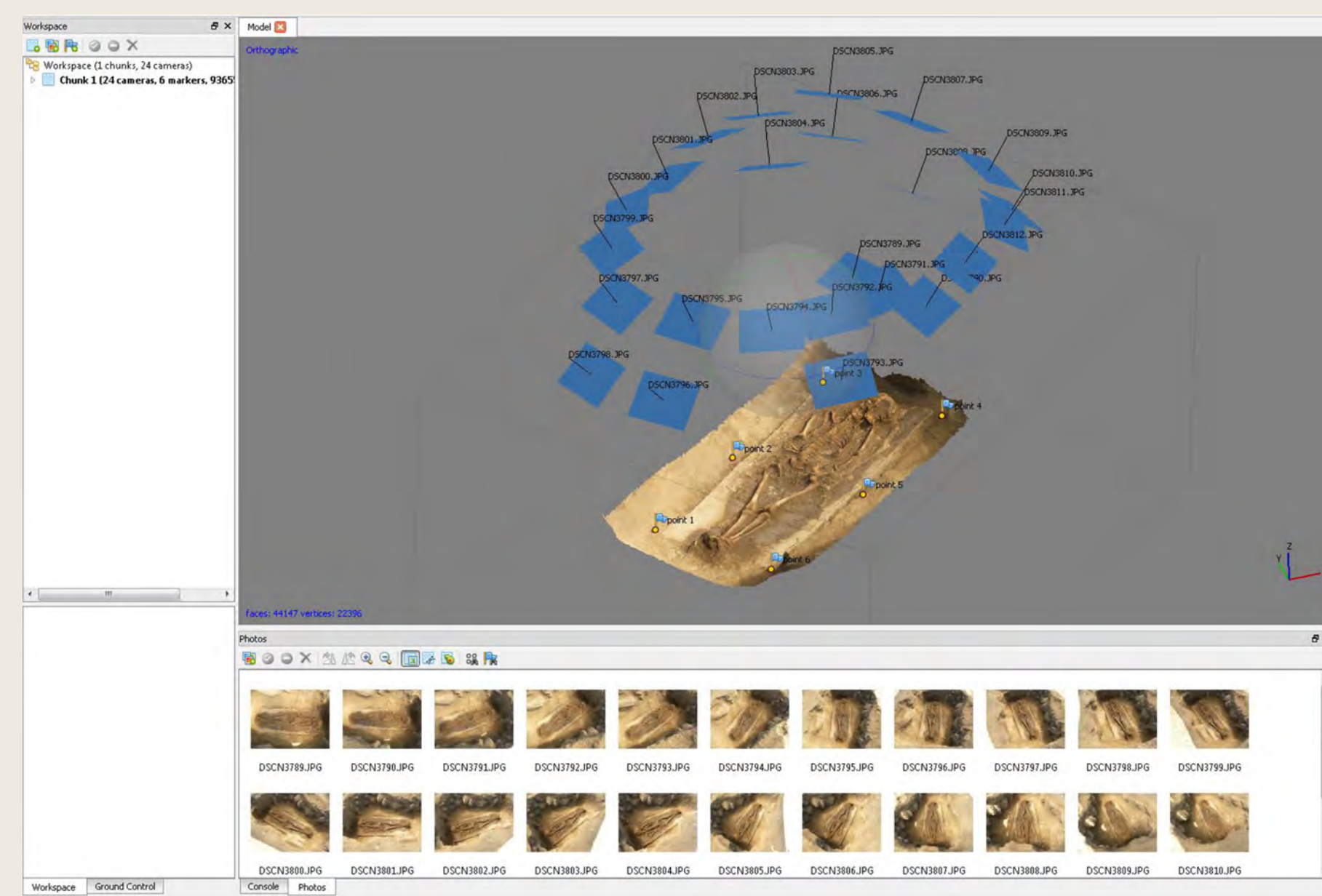
A University of Michigan excavation 11 miles east of Rome is uncovering remains of the once flourishing city of Gabii. The team uses image-based modeling techniques to build realistic 3D models of key features and contexts, from burials to beaten earth floors. Image-based modeling uses the information contained in a collection of overlapping photographs of a scene to create a detailed and accurate 3D model.

Image-based modeling allows us to record quickly and accurately, leaving us enough time to uncover large swathes of the urban core at Gabii, which in turn permits us to draw a holistic and nuanced picture of the town's past.

Agisoft Photoscan software is used to build the 3D models. The camera's position as each photo was taken, shown as blue rectangles floating above the model of the skeleton, is calculated based on the geometric information in overlapping photos and camera parameters like the focal length and lens type. The photos used to create the model are displayed at the bottom of the screen.

The models we make of individual features are assembled into more complicated 3D scenes, grouping together features we think might have functioned together or juxtaposing features built using similar construction techniques. We share these models on site sitting around a table or over the Web post-season, and based on them we discuss, debate, and construct new hypotheses—using the 3D models to develop the future of archaeology as we explore Gabii's past.

*Nicola Terrenato and Rachel Opitz*



A render of the 3D model of a single context, a pilaster located in the middle of a room in an archaic compound.

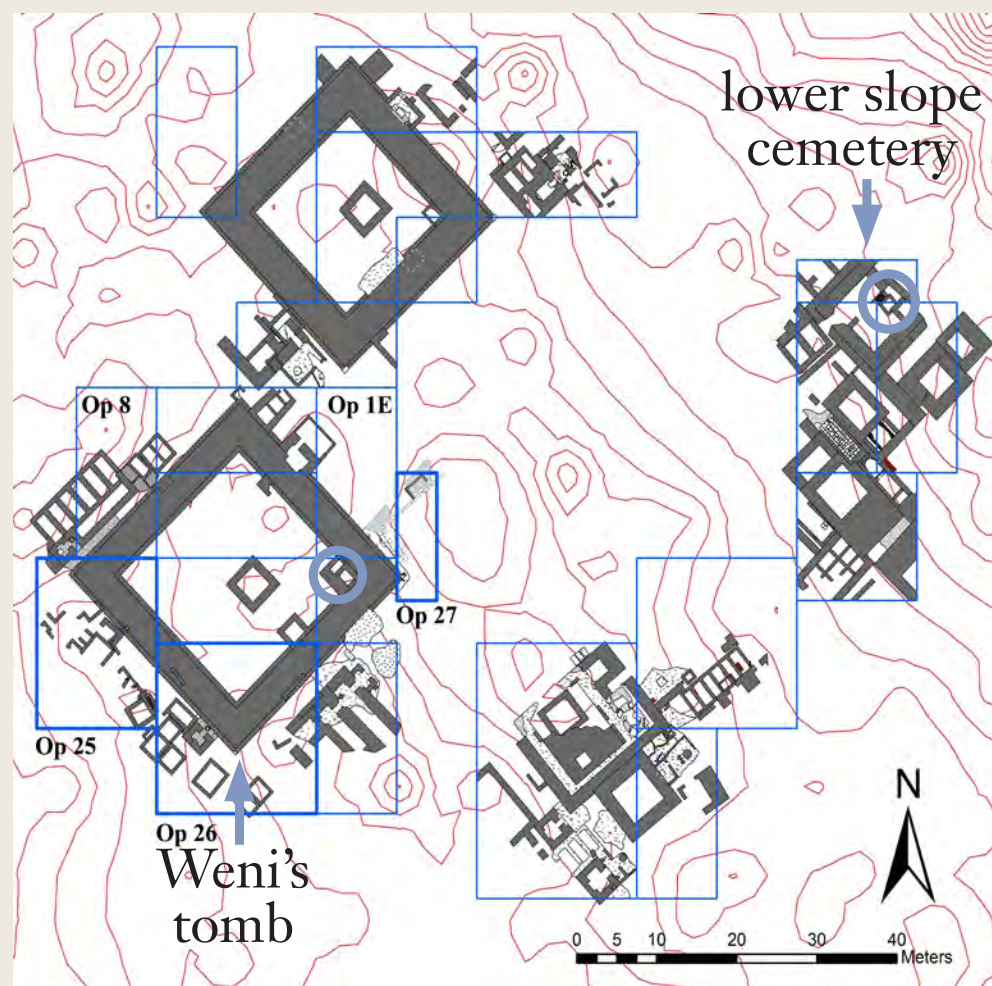
# C O N S E R V I N G

What happens to objects after they are excavated? Because the archaeological record is a nonrenewable resource, responsible excavation and conservation is an important ethical responsibility for all archaeological projects. Conservation is the profession responsible for the preservation of cultural resources like excavated objects, and the people who do this work are called conservators. Conservators do a variety of things to better understand and safeguard archaeological artifacts and sites.

Activities that conservators undertake on archaeological sites include excavation of fragile artifacts, assessment, documentation, treatment, storage of archaeological finds, and research. Kelsey Museum conservators work in the field on excavations alongside archaeologists, historians, and scientists. Every archaeological site is unique, and individual excavations explore different questions. Each excavation also has distinct conservation needs.

Conservation in a museum setting is very different from conservation for an active archaeological project, but the overall goal is the same—long-term preservation of the archaeological record. Museums are repositories for artifacts that have been deliberately collected in an effort to fulfill the institution's mission. Conservators working with museum collections treat every object as if it were priceless and irreplaceable because regardless of an item's financial value, it holds a place in the collection and has a story to tell.

# IDENTITIES AND PRESERVATION AT ABYDOS



Abydos Middle Cemetery Project Excavations as of 2013, with serdabs circled (map Geoffrey Compton).

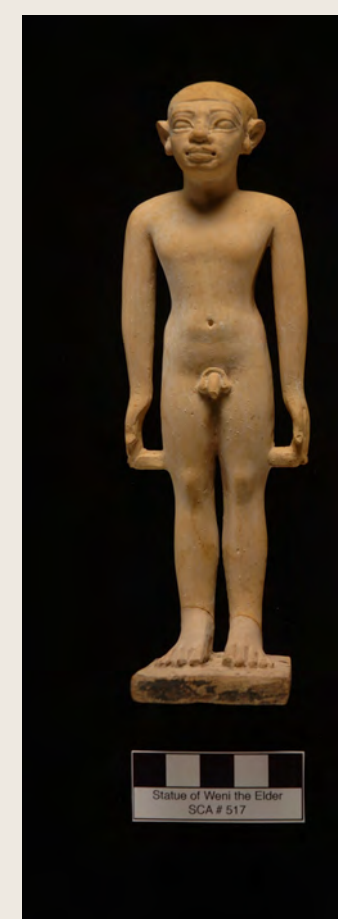
Ancient Egyptians of the later third millennium BC crafted notions of self in the world's earliest narrative biographies, using textual, visual, material, and spatial media. How can we piece together these complex identities, when preservation factors and excavation histories have often resulted in the deterioration and dispersal of their material manifestations? U-M teams excavated two different statue deposits (*serdab*) in the late Old Kingdom cemetery at Abydos, the larger belonging to the 6th dynasty Governor of Upper Egypt, Weni the Elder. That serdab had first been repurposed in antiquity and then destroyed further during the 19th century, so it contained only tantalizing vestiges of Weni's three-dimensional self-presentation.

We also discovered a far smaller serdab of an unknown 5th dynasty individual, who built his tomb in a spatially lower part of the cemetery. Although this deposit was intact, the statues were jumbled and severely deteriorated due to termites and fungi. They were held together only by paint and plaster.

*Janet Richards, Suzanne Davis, and Claudia Chemello*

Left: View of the northern end of the destroyed Weni serdab during excavation (1999), with broken limestone statue dislodged onto the remains of estate activity scenes.

Right: Statue of Weni the Elder as an adolescent, after conservation (photo S. Balachandran).



Left: Fragment of wooden face of Weni the Elder excavated from the serdab debris.

Right: View of the southern end of the Weni serdab after excavation showing deteriorated statue bases of wooden tomb owner figures, both striding and seated.



Top: Lower slope excavations in progress, 2009.

Bottom: View into the serdab. The standing figure in the lower right-hand corner depicts the tomb owner; so does the fallen figure in front of him. The rest are workers on his afterlife estate, including men rowing a boat.

**Can you see the feet?**

**Can you make out the different figures in this view into the serdab?**

# IDENTITIES AND PRESERVATION AT ABYDOS



2013 wood research team in lab and field. From top, Ahmed Abdel-Azeem and Robert Blanchette (microbiologists); Gregory Smith (chemist); Claudia Chemello, Pamela Hatchfield, Suzanne Davis, and Harriet Beaubien (conservators).

Left: Arm and portion of the statue's face during treatment. Right: Statue of tomb owner as a child, during treatment. The gesture of forefinger to lips is characteristic in ancient Egyptian depictions of children.

Can you see that his eyes have been inlaid with metal and semiprecious stones?

Conserving these statues was critical because they could help us to understand the identity of the people in this lower slope cemetery. Were they less wealthy regional elites, in comparison to the central government officials whose tombs lay at the top of the hill?

In 2013, Suzanne Davis and Claudia Chemello convened an international team of conservators and scientists to study the problem of wood preservation at the site. They tested excavation and treatment strategies, as well as looked at fungal spores, pigments, binders, and other factors affecting the objects. This continuing research has already helped us to understand who the occupants of the lower cemetery were. After painstaking conservation intervention, the statue of the tomb owner as a child was revealed to be a wooden artifact of such high quality that it can only have been the product of a royal workshop. So while these lower slope tombs were smaller and might seem less favorably situated, their owners wielded substantial means to signify their elite identities.

*Suzanne Davis, Claudia Chemello, and Janet Richards*



Deteriorated wooden statue from the 2009 serdab deposit, during removal and before treatment (coated in cyclododecane for preservation in storage).





Sometimes we make discoveries about artifacts as we are preparing them for display. Because of her striding posture, this wooden statue of a female servant was probably originally part of a model procession of offering bearers (such as the example from the tomb of Djehutynakht at Bersheh, shown right). One of her feet entered the Kelsey under a different accession number and for years was assumed to be part of a group of stray limbs acquired by the museum in a group purchase. During installation Suzanne Davis and Elizabeth Hart realized the foot actually belonged with the statue.

### 1. Statue of a Female Servant

Wood

First Intermediate Period–early Middle Kingdom

Egypt. Department of Antiquities 1935. KM 88735

### 2. Foot Fragment from a Tomb Figure

Wood

First Intermediate Period–early Middle Kingdom

Egypt. David Askren purchase 1934–1935. KM 88579

### 3. Arms from Wooden Statues

Wood

Late Old Kingdom–Middle Kingdom

Egypt. Department of Antiquities 1935. KM 88754–KM 88758



Ancient Egyptians of the late Old Kingdom–Middle Kingdom periods produced wooden models of boats, food and cloth production, metalworking, and other activities representing all the nourishment, adornment, comfort, and entertainment they wished to enjoy in the afterlife. The individual figures from such models have often entered museum collections with no provenience, leading to misidentification. We piece together an understanding of their original context by comparison with excavated examples such as the intact deposit in Djehutynakht's tomb at el-Bersheh (excavated by the Museum of Fine Arts, Boston, in 1915).

#### **4. Miniature Paddle, Possibly from a Food or Cloth Production Model**

Wood

Late Old Kingdom–Middle Kingdom

Egypt. Department of Antiquities 1935. KM 88756

#### **5. Figures from a Model Granary Scene**

Wood, paint

First Intermediate Period–early Middle Kingdom

Egypt. Department of Antiquities 1935. KM 88747–KM 88748

Saqqara, Egypt. Purchase from Phocion Tano 1952. KM 88804h

#### **6. Vat or Basket from a Model Granary Scene**

Wood, paint

11th–12th dynasty (2040–1783 BC)

Saqqara, Egypt. Purchase from Phocion Tano

1952. KM 88804h



Although part of the same purchase probably in the 1930s or 1950s, these two statues almost certainly did not come from the same serdab deposit. Clues leading to this conclusion are different styles and dissimilar levels of preservation (note the greater preservation of paint on the right-hand figure).

What appear to be wedges on the feet of these statues would actually have secured them into wooden or limestone bases, as seen in the *ka* statue of Djehutynakht of el-Bersheh to the right. Tomb owners often included multiple statues of themselves in their serdabs lined up facing eastward to the rising sun—a key symbol of daily rebirth. Should his body be destroyed, the tomb owner's *ka* could reside in these statues.

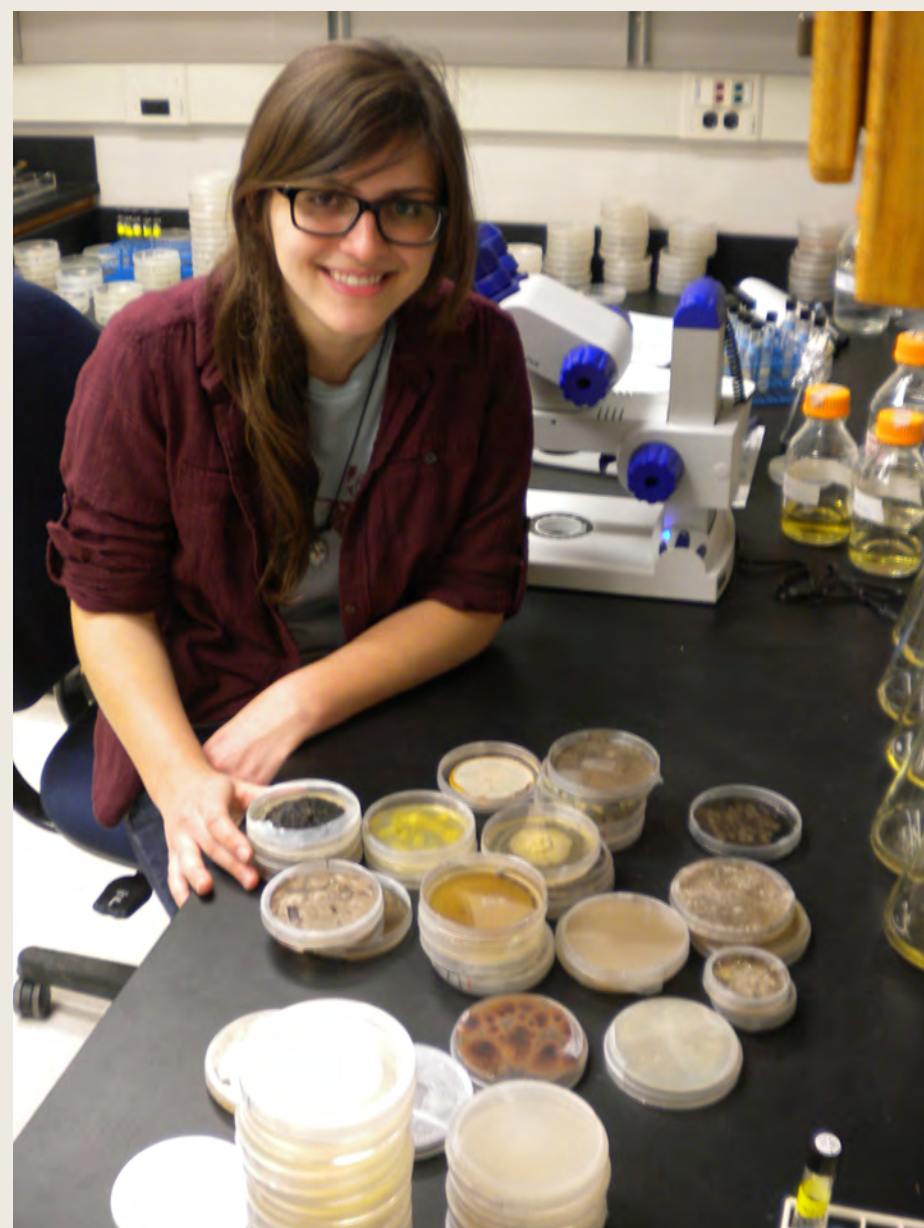
## 7. *Ka*-statues of Tomb Owners

Wood, pigment

Late Old Kingdom/First Intermediate Period

Egypt. Kelsey Museum Collections. KM 88196 and KM 88197

# CONSERVING FUNERARY STELAE



LSA undergraduate Katy Lazarus in the mycology laboratory.



Caroline Roberts testing the solubility of the stela coating in the Kelsey conservation laboratory.

In 1935 the necropolis of Terenouthis was excavated by the University of Michigan. Hundreds of burial mounds were uncovered, many adorned with a limestone stela. A group of nearly 200 of these stelae are preserved at the Kelsey Museum. Carved with a depiction of the deceased, accompanying deities, and inscriptions, the stelae serve as important sources of information to scholars of Graeco-Roman Egypt.

But many of the stelae are in poor condition. Stone delamination, surface powdering, biological staining, and a peeling, darkened coating are the principal forms of deterioration. Chemical spot tests have indicated the presence of soluble salts, and collaborations with the Detroit Institute of Arts conservation science lab have helped confirm these results. Ongoing analysis in collaboration with the James Mycology and Electron Microbeam Analysis Laboratories at the University of Michigan has allowed us to begin to characterize biological staining, extant pigments, and the limestone from which the stelae are carved. This information has helped us create a protocol for treatment.

A number of conservation techniques have been tested in developing this protocol. Consolidants have been tested for the treatment of the powdering surfaces. Methods for stabilizing and reducing the coating, as well as the biological stains, have also been incorporated into the treatment. Monitoring relative humidity and temperature levels in storage and display areas has shown that environmental control will be an important factor in preventing further damage to the stelae from salt weathering, biological activity, and coating deterioration.

*Caroline Roberts*

One group of excavated stelae granted to the Kelsey Museum by the Egyptian Antiquities Organization (KM neg. no. 7.2588).



View of Terenouthis stelae in situ (KM neg. no. 5.4346).



## Funerary Stela

Limestone and paint

Roman Period, late 2nd–early 4th century AD

Terenouthis, Egypt. University of Michigan Excavations 1935. KM 21052

Human activity has a huge impact on the environment and vice versa, with implications for resources, economic activity, beliefs, and politics. Until recently, however, environmental data were underexploited in explorations of past sociocultural systems. It was not until the second half of the last century that archaeologists began to collect and analyze environmental data, such as animal bones, seeds, and pollen, systematically. Such data can help us to understand aspects of past sociocultural systems ranging from economy to ritual to identity.

The University of Michigan boasts a long and distinguished tradition of involvement in bio-archaeological investigation. Researchers affiliated with the Kelsey Museum and other units are busy reconstructing patterns of human–environment interaction in many parts of the world. Their work often involves sophisticated recovery and analytical techniques and is founded on interdisciplinary links to fields such as botany, geology, and zoology. In recent years, they have addressed important questions concerning the economies of Rome and nearby centers during the Early Iron Age, the long-term effects of human activity on the distribution of certain animal species throughout the Mediterranean (how did the African chameleon cross the Mediterranean Sea?), and status differentiations among the people involved in building the late Old Kingdom pyramids at Giza, Egypt.

# STATUS AND DIET AT GIZA



A view to the northwest across the Workers' Town site. The silos of the Royal Administration Building are visible in the foreground (courtesy Ancient Egypt Research Associates).



Pottery Mound (courtesy Ancient Egypt Research Associates).

The builders of the pyramid of Menkaure lived in the Workers' Town at Giza. Investigations there have identified many functional areas within the site, including a workers' barracks, an administration building with silos, elite housing, bakeries, work areas, and a separate, associated village.

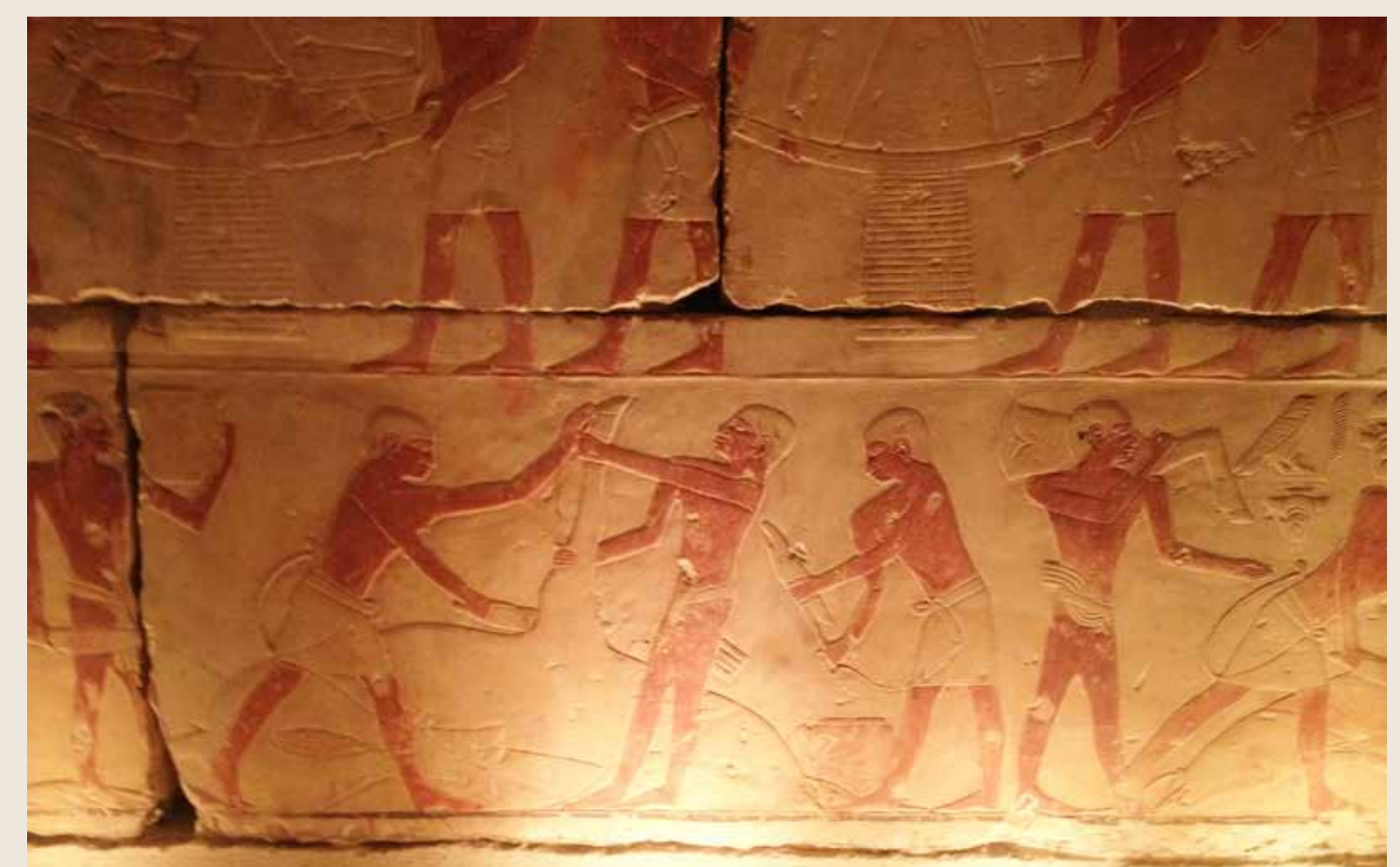
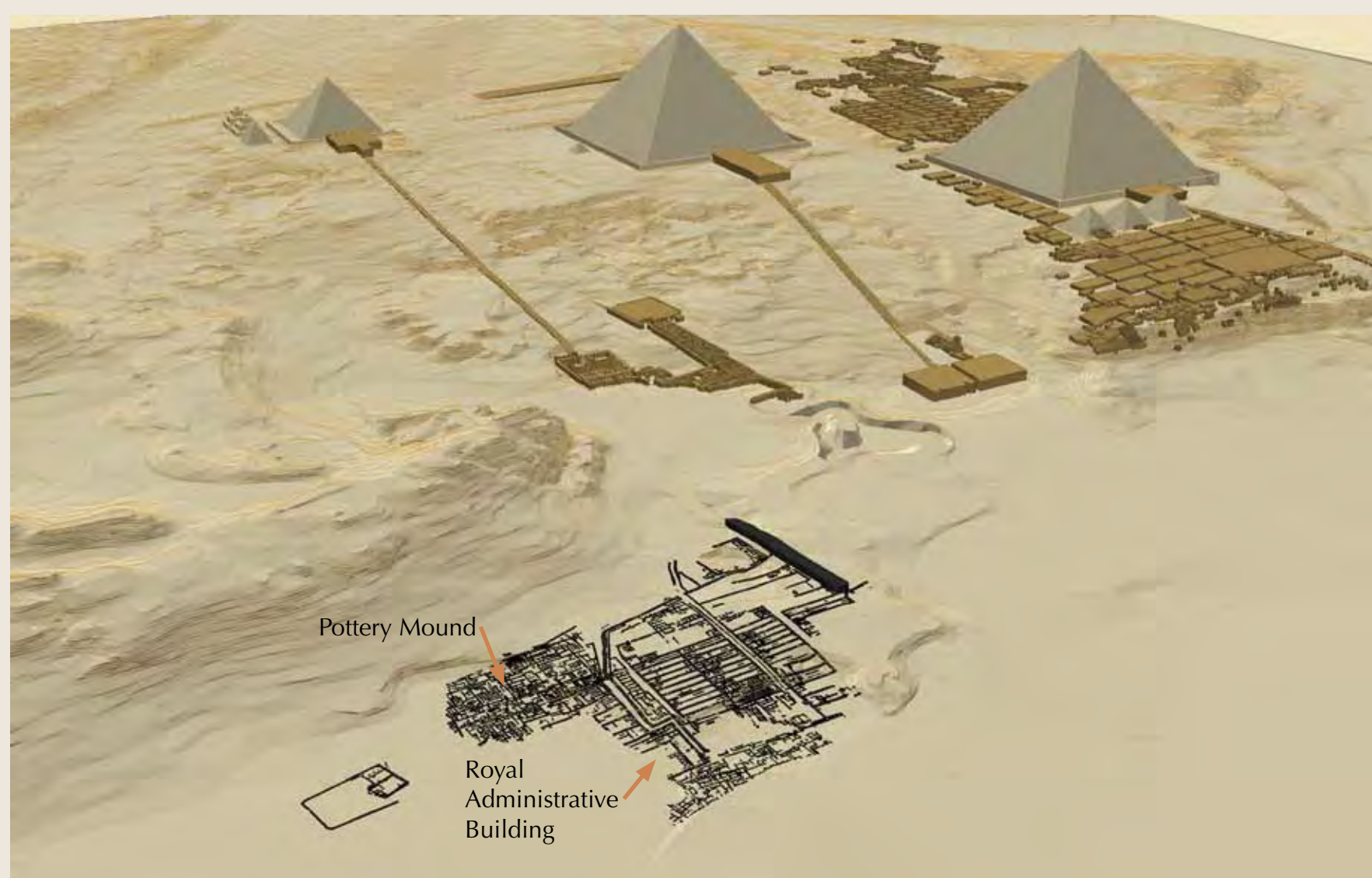
My research at the Workers' Town focused on meat consumption. I have found a strong correlation between status and diet. An example is from the excavation of Pottery Mound, where 85 percent of the animal bone was from cattle less than one year old. I also examined the proportions of cattle limbs, expecting a ratio of hind to forelimb fragments of about 1:1. The ratio I found was about 36:1. Where were all the forelimb fragments?

Drawings of cattle slaughtered for offerings at Giza and Saqqara show that the forelimb is cut off and carried in as an offering. I concluded that the people of Pottery Mound were consuming veal, a choice type of meat, and, although they did not get the best part (the forelimb), they ate the leftover parts of offering animals. These were clearly elite people.

Based on this study, I predicted that if we found an area of the site occupied by offering priests, it might contain predominantly young cattle forelimbs. In 2011 we excavated a building near the valley temple of Khafre. The ratio of fore to hind limb fragments is 15:1 (30:2). Could this be an area occupied by priests who made offerings for Khafre?

*Richard Redding*

3D reconstruction of the royal complexes on the Giza plateau, showing location of the Workers' Town excavation (in black).



Scenes of cutting and carrying off the forelimb from an Old Kingdom tomb (photo Richard Redding).



Ancient Egyptians included butchery scenes in decorative relief in tomb chapels and also represented this important activity in 3D models placed in tomb chambers. The Kelsey Museum's wooden bull and kneeling butcher date to the Middle Kingdom (ca. 2000–1650 BC), but the bull is trussed up in the same fashion illustrated in Old Kingdom tombs. The kneeling butcher originally held a shallow bowl to collect blood from the bull's jugular, as seen in the photograph of a fully preserved model of a butcher's shop in the Metropolitan Museum of Art.

Although its provenance is unknown, the flint knife on display here is very similar to a well-preserved Old Kingdom butchering knife excavated from the Workers' Town at Giza (4th dynasty reign of King Menkaure, ca. 2530–2512 BC). As you can see by comparing the object to the photo, the Museum of Anthropology's knife is broken and is missing the tine that would fit into a wooden handle. Compare this knife to the one shown in the tomb relief on the panel.



## 1. Models of a Butcher and Trussed Bull

Wood and paint

Early Middle Kingdom, 2040–1650 BC

Egypt. Cairo, Department of Antiquities 1935. KM 88740, KM 88759

## 2. Butchering Knife

Chert

Fayum, Egypt. Museum of Anthropology 6944



## BE AN ARCHAEOZOOLOGIST!

Here are bones from a young bull.

Three are from a front leg,  
and three are from a back leg.

Using this diagram of a cow skeleton,  
can you figure out where  
these bones belong?

Can you fit any bones together  
at the joints?

# THE ECONOMY OF EARLY CITIES



Once collected, the seeds must be identified through comparison to known types.



Plant remains are collected by a process called flotation. The excavated dirt is poured into a barrel full of water and the material that floats is skimmed off the top. Once dried, the collected material can be sorted through by archaeologists for plant remains.

Charred plant remains from 7th-century BC Gabii, Italy. Top: different species of small weeds; bottom: barley.

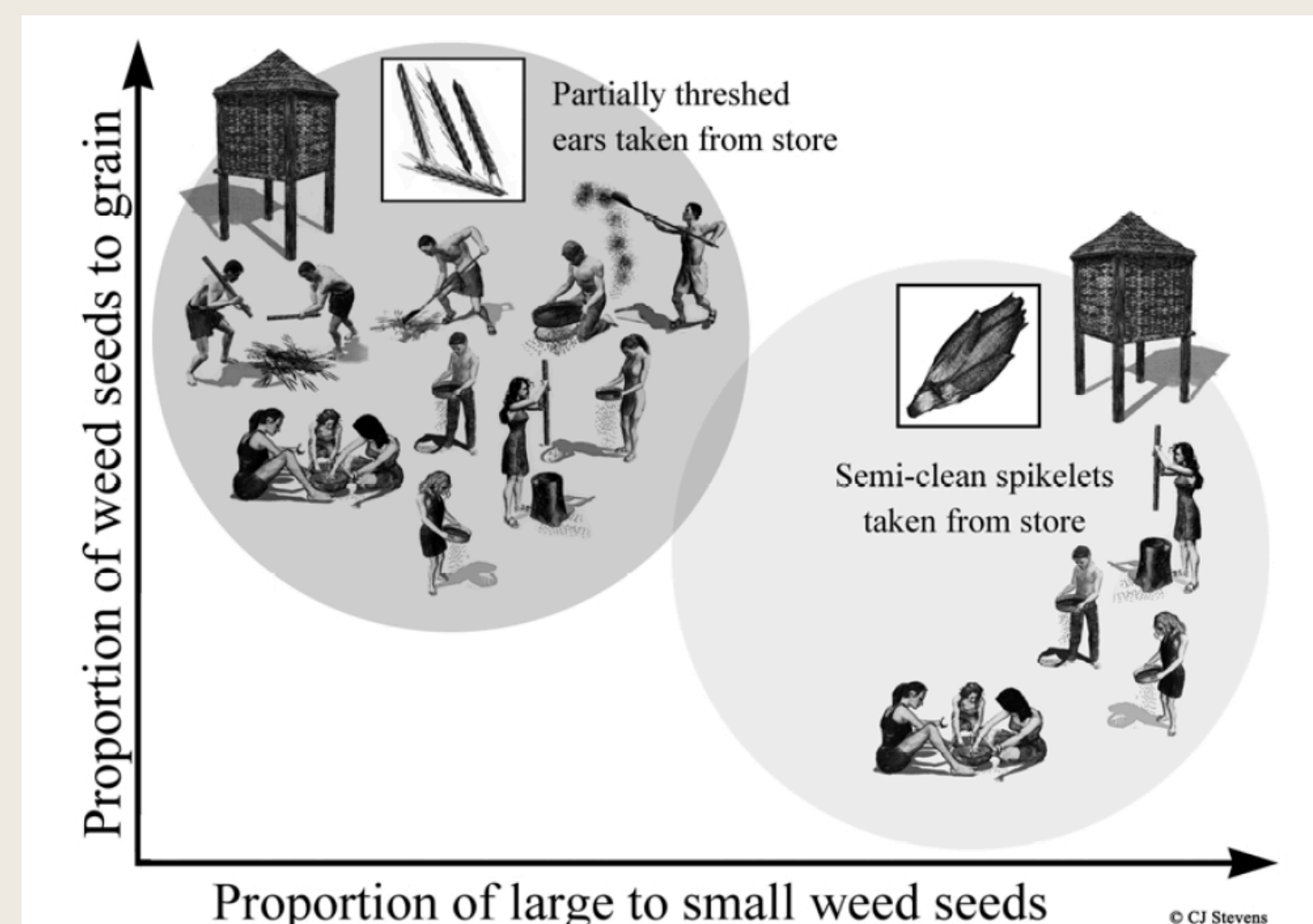
Archaeobotanical techniques have been applied to investigate production and redistribution patterns during the emergence of urban centers in central Italy. My research looks at archaeobotanical data from the sites of S. Omobono and Gabii, excavated by the Kelsey Museum, combined with that from other early Rome contexts.

Plant remains are extremely perishable and do not survive the challenge of time as well as other archaeological materials. Most plant remains are found charred in archaeological deposits, and excavators and specialists spend much time meticulously recovering them.

Charred plant material mainly originates from burnt fuel but also includes residues from agricultural and domestic activities, such as grains, chaff fragments, or weeds. Because these residues derive from refuse disposal and from incidental loss during routine activities related to crop processing and food preparation, they can be studied to reconstruct farming practices, storage systems, labor organization, and, more broadly, the ancient economy.

Examples of how this is done include looking at the proportions of weeds to grains or of chaff to grains. These ratios indicate how crop processing was structured and how the harvest was stored, which have implications for labor organization. The functional ecology of the weeds themselves can be used to investigate cultivation methods. Different types of storage within a site (household, communal, or centralized) illuminate redistribution practices and sociopolitical structure. At a larger scale, sites can be compared within a region to better understand the economic system.

*Laura Motta*



Crop processing stages as indicated by proportions of weeds and grains (© Chris Stevens).



Archaeologists can use the ratios of food plants and weed remains to understand and reconstruct ancient food production systems. Plant remains recovered from archaeological contexts are often charred, such as the specimens to the upper left. Dried plant remains, such as those to the right, are compared with ancient remains to aid identification:

#### CHARRED PLANTS

1. *Panicum miliaceum*; millet (food)
2. *Vicia Faba*; fava bean (food)
3. *Hordeum vulgare*; Barley (food)

#### DRIED PLANTS

4. *Hordeum distichum*; barley (food)
5. *Lolium multiflorum*; rye grass (weed)
6. *Lolium temulentum*; cockle (weed)
7. *Triticum* sp.; wheat (food)



Grains such as wheat or barley were very common food plants in much of the ancient world. Many different steps are required to turn these tiny grains into food, including harvesting, threshing, winnowing, pounding, grinding, and eventually baking or fermenting.

The mortar from Karanis on display here is a deep, sturdy dish basin used for pounding grain. The associated illustrations show how bakers used such an object. In the wooden model from the tomb of Meketre, several stages of food production are depicted, including a man using a mortar and pestle to pound the grain (far right). In this model, the mortar is set into the floor to enhance stability during use.

## Mortar

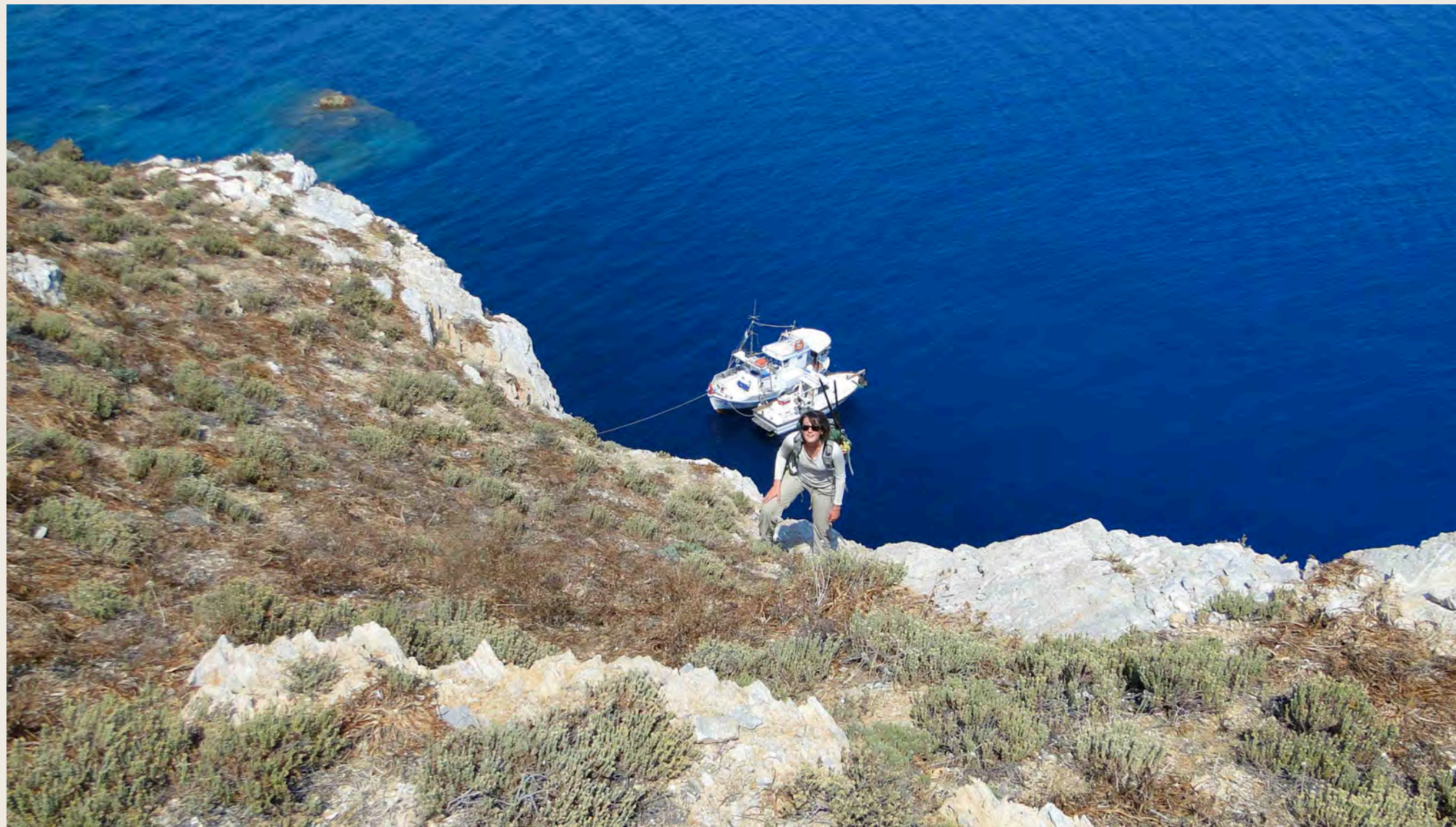
Limestone

Roman Period (2nd–4th centuries AD)

Karanis, Egypt. University of Michigan Excavations 1935. KM 25885

# EXOTIC SPECIES IN THE MEDITERRANEAN

## THE MYSTERY OF PECULIAR REPTILE DISTRIBUTIONS IN THE MEDITERRANEAN



Herpetological fieldwork by U-M students on the Greek Islands.

Recent investigations around the Mediterranean Sea have revealed that a number of reptile species have peculiar geographic distributions. For example, the African chameleon occurs in the Egyptian Nile Valley but also in an isolated population on the Peloponnese.

In other cases, similarities in color and genetics indicate that some populations do not “belong” to a certain region but instead originated somewhere else. The Rough-tailed agamas living near Alexandria, Egypt, are more closely related to animals from the northern shores of the Mediterranean Sea than to those from nearby Syro-Palestine.

### Distribution of the African chameleon



The African chameleon is widespread in the Nile Valley. The only European population occurs near Pylos on the Peloponnese.

Given that neither agamas nor chameleons can swim well, ecologists have been at a loss to explain the mysterious origins of these populations. To solve this biogeographical mystery, we can use evidence from archaeology and history.

*Johannes Foufopoulos and Despina Margomenou*

### Distribution of the Rough-tailed agama



The Rough-tailed agamas of northern Egypt resemble morphologically and genetically the animals of the northern Mediterranean and not those of nearby Syro-Palestine.

# EXOTIC SPECIES IN THE MEDITERRANEAN

## ARCHAEOLOGICAL CLUES: HUMANS AND REPTILES IN THE MEDITERRANEAN

*Arkesilas Cup*: the Cyrenian king Arkesilas watching over the bundling of trade goods for transport.

Can you spot the lizard?



Laconian black-figure cup, from Vulci, Etruria, 556–560 BC. Cabinet des médailles, Bibliothèque nationale de France in Paris (inv. 189).

*Typhon* was one of the most fearsome monsters in Greek mythology.

Can you spot any similarities with the two forms of the leopard snake?



Chalcidian black-figured hydria, ca. 550 BC, Staatliche Antikensammlungen (inv. 596)

Humans have been living and interacting with wildlife around the Mediterranean for millennia, and archaeological, historical, and epigraphic evidence indicates that human societies have shaped biodiversity both intentionally and unintentionally. Could they be responsible for these reptile introductions? How and why?

Reptiles such as the African chameleon were likely transported unintentionally. Chameleons change color and can hide in leaves or reeds. It would be easy to transport them, for example in bundles of animal feed.

Other species may have been transported intentionally. The leopard snake, for instance, probably had symbolic significance. Different kinds of snakes were associated with gods and mythical heroes and were part of religious practices, worship, and healing.

*Despina Margomenou and Johannes Foufopoulos*

The two different forms of the leopard snake and geographic distribution of the species. Populations in the Crimean peninsula and southern Italy are thought to have been introduced.



Justin Michels 2013



Ideas and beliefs about reptiles changed through time and varied among the different peoples of the Mediterranean. The Roman coin depicts the feeding of a snake, a significant aspect of religious rituals in the ancient world.

Snakes were considered dangerous but also protectors, and they were believed to have special healing powers. Throughout the Mediterranean world snakes were connected to various underworld deities, as well as to death and rebirth.

Images of reptiles were also used in coin iconography to identify specific regions in exchange and trade networks. Coins called “Turtles” from the Greek island of Aegina were an important early trading currency.



### 1. Papyrus: Book of Amduat

Ink on papyrus

Third Intermediate Period (1070–656 BC)

Egypt. Samuel Goudsmit gift 1974. KM 74.1.1

### 2. Votive Snake Coffin

Bronze

Late-Ptolemaic Periods (525 BC–AD 285)

Egypt. H. C. Hoskier gift 1925. KM 4672

### 3. Roman Coin with Person Feeding Snake

Silver

AD 251–253

Adon Gordus gift. KM 1995.2.252

### 4. Aegina Coin with Turtle

Silver

404–340 BC

George Monks bequest. KM 1991.2.70

### 5. Chamaeleo africanus

Specimen on loan from the reptile collection of  
University of Michigan Museum of Natural History

The African chameleon is widespread in the Nile Valley but also in an isolated population on the Peloponnese.

# ARCHIVING

I n our studies of the past, we can learn much by establishing links between archaeological data and other lines of evidence, often through collaboration with colleagues in other fields (or in other corners of our own fields!). This can only be accomplished, however, if the information is made available to as wide an audience as possible and is organized systematically, so that it is possible to compare such disparate elements as physical artifacts, documentation of sites and features, textual and artistic evidence, and ethnographic and historical accounts.

The projects highlighted here explore the general challenges posed by constructing integrated, functional databases and consider a specific example of how archival evidence can be used to reveal the ways our disciplinary forebears thought about and approached the past. Archiving touches on socially salient themes and raises some difficult questions: Who should have access to the results of archaeological and historical research? How can we facilitate that access? How is modern research shaped by often stubborn disciplinary tendencies? How do the personal interests of researchers affect what they did or did not document, which in turn affects our perception of the phenomena they recorded?

# DISTRACTED BY MODERNITY



Constantinople. December 9, 1919. “Shop where they pressed the Turkish tabbooses or fezzes” (KM neg. no. KS46.10).

The Kelsey Museum has a large and impressive archive of unpublished photographs from the Mediterranean, North Africa, and the Middle East, taken by George R. Swain in the early 1900s. A commercial photographer who maintained a fruitful relationship with Professor Francis W. Kelsey from 1913 to 1927, Swain also left behind a rare collection of diaries and letters, often keyed to his photographs. The richness of the archive allowed us to write an article on a single day in the life of Swain and Kelsey (December 9, 1919), recreating via letters and photographs, almost hour by hour, a trip that the two took together to Constantinople.

That trip was one of four undertaken by the two men to Europe and the Mediterranean from 1919 to 1926. Although their travels were primarily archaeological in nature, they often became absorbed in more contemporary matters. They witnessed enormous changes in the political landscape of the Mediterranean and Europe just after World War I. Swain was acutely aware that this was a time of disruption and dispossession of identities in the wider Mediterranean. He often turned his camera to the modern world—documenting occupations that soon died out, capturing picturesque scenes that reflected the tenuous economy of the day, and recording various populations whose identities he knew were threatened. We continue to mine the extraordinary collection of archives and photos, with the aim of eventually producing a book on these pivotal years in the Mediterranean, as seen through the eyes of these two extraordinary men.

*Lauren Talalay and Artemis Leontis*

Constantinople. December 14, 1919. “Throng of sailing boats by the old bridge (farther up the Golden Horn than the Galata Bridge)” (KM neg. no. KS45.02).



Constantinople. December 9, 1919. “Young man having a letter written by the old public letter writer, near the Egyptian Bazaar” (KM neg. no. KS47.10).

# DISTRACTED BY MODERNITY

## TRAVELS IN GREECE AFTER WORLD WAR I



1



2



3



4



5



6



7

1. Mt. Athos, Greece. July 10, 1925. "G. R. Swain photographing the monastery [Gregoriou] from the shore to the north" (KM neg. no. KS351.03).
2. Athens, Greece. August 12, 1926. "Women weaving at a rug loom. Suburb near Athens" (KM neg. no. KS387.11).
3. Patmos, Greece. July 30, 1925. "The young potter at his wheel making a jar" (KM neg. no. KS359.11).
4. Patmos, Greece. June 30, 1926. "By the pottery, pot and jars drying in the sun, before being fired" (KM neg. no. KS359.12).
5. Andros, Greece. August 3, 1926. "Looking down one of the streets of Andros towards the bay" (KM neg. no. KS385.06).
6. Patmos, Greece. May 1920. "Monastery of St. John. Four monks playing with mallets on the great 'semandron' in the court. A fifth monk beyond with a small semandron in his hand. The use of these wooden bars is said to have originated in a time when the use of bells was forbidden to monasteries. The great semandron is a bar of oak (25'9" long, 2" x 61.5 section)" (KM neg. no. 7.422).
7. Patras, Greece. June 29, 1920. "Looking down on the row boats at the gangway of the Presidente Wilson, harbor at Patras" (KS216.04).



### 1. Eastman View Camera No. 2

Wood, metal, glass

1914–1925

Eastman Kodak Company, Rochester, NY

Kelsey Museum Archives

### 2. Selection from Swain's Typed and Annotated Records of Travels

From 755-15 George R. Swain Papers Box 2

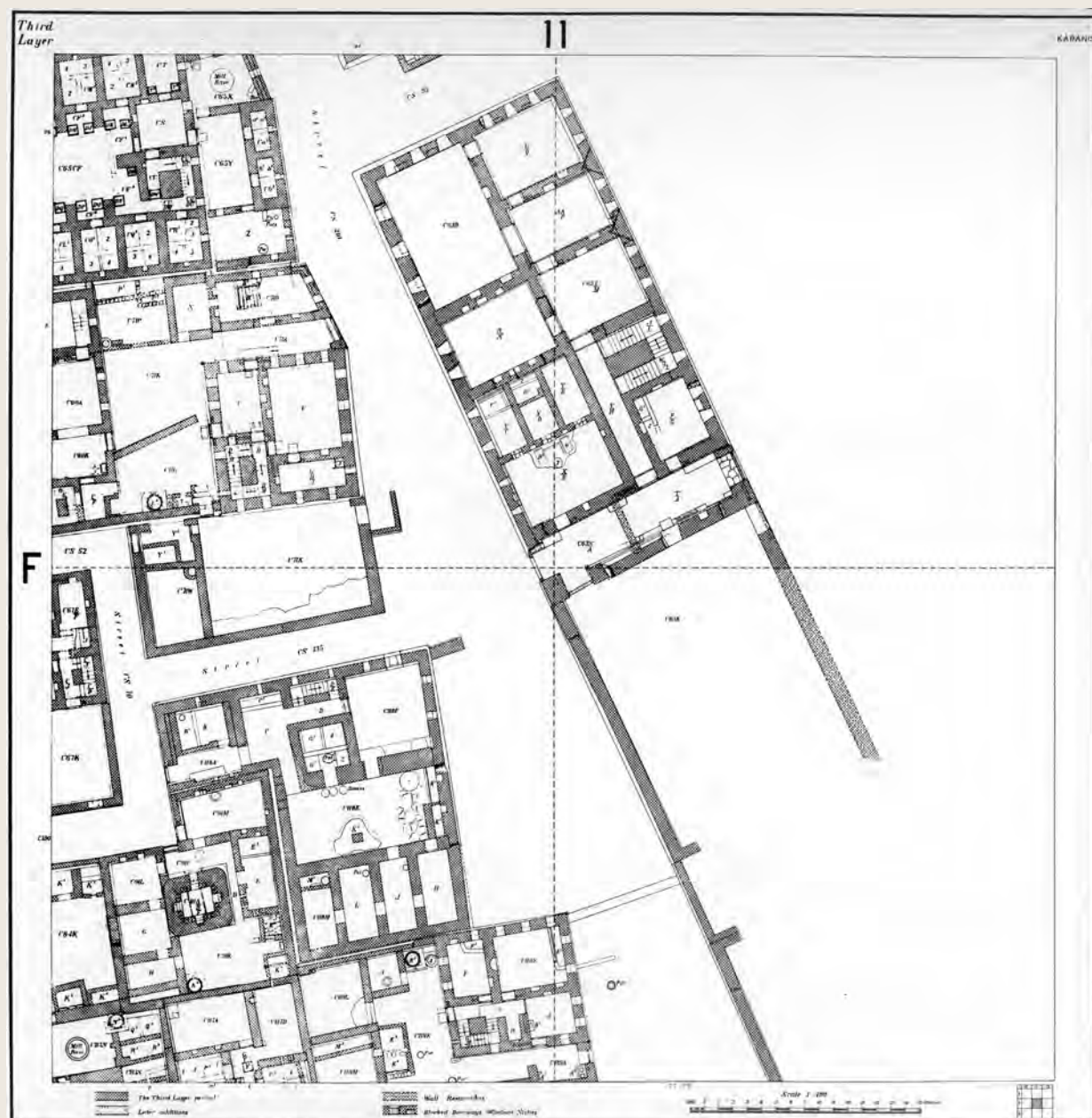
Kelsey Museum Archives

### 3. G. R. Swain Transporting Equipment to Athens

June 21, 1920

Piraeus, Greece. KM neg. no. KS209.01

# CHALLENGES IN DATA MANAGEMENT



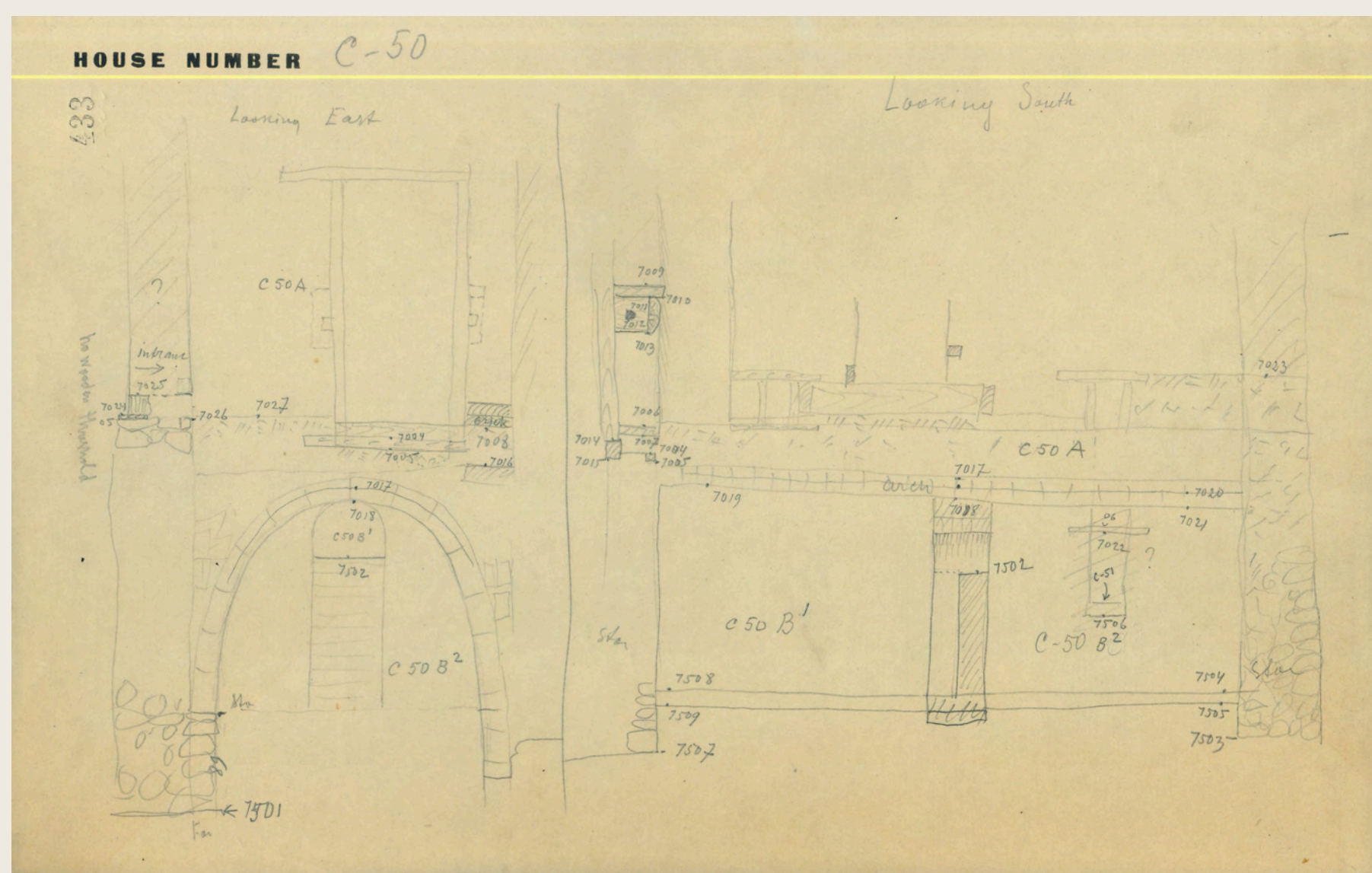
Map showing partial city layout of Karanis. Increasingly maps such as this are generated using not drawings or photographs but computer software. Should an archive save all or only the final version of a drawing? Are those versions stored on a hard drive someone may forget? How often should the files be updated to newer versions of the software to ensure that they will be viewable in the future?

Research has traditionally been disseminated through publication, and this is still the preferred method. But more data and artifacts come to light during excavations than can possibly be encompassed by publication even though researchers are interested in seeing all this information. Older excavations produced journals and maps that are stored in archives, but new projects are increasing the numbers and sizes of digital files. Both analogue and digital materials present challenges for archivists trying to share them with researchers.

As archives collect new file formats, including databases and Geographic Information System (GIS) maps, they must find new ways to make the data available. And those methods must be user-friendly yet still powerful enough to allow project members to continue their own work. Those methods also need to be searchable and constantly accessible.

While technology has evolved to make this possible, there has been no agreed-upon solution. Archivists need to work with archaeologists and information technology staff to ensure a proper solution is devised that will satisfy all concerned parties.

*Sebastián Encina*

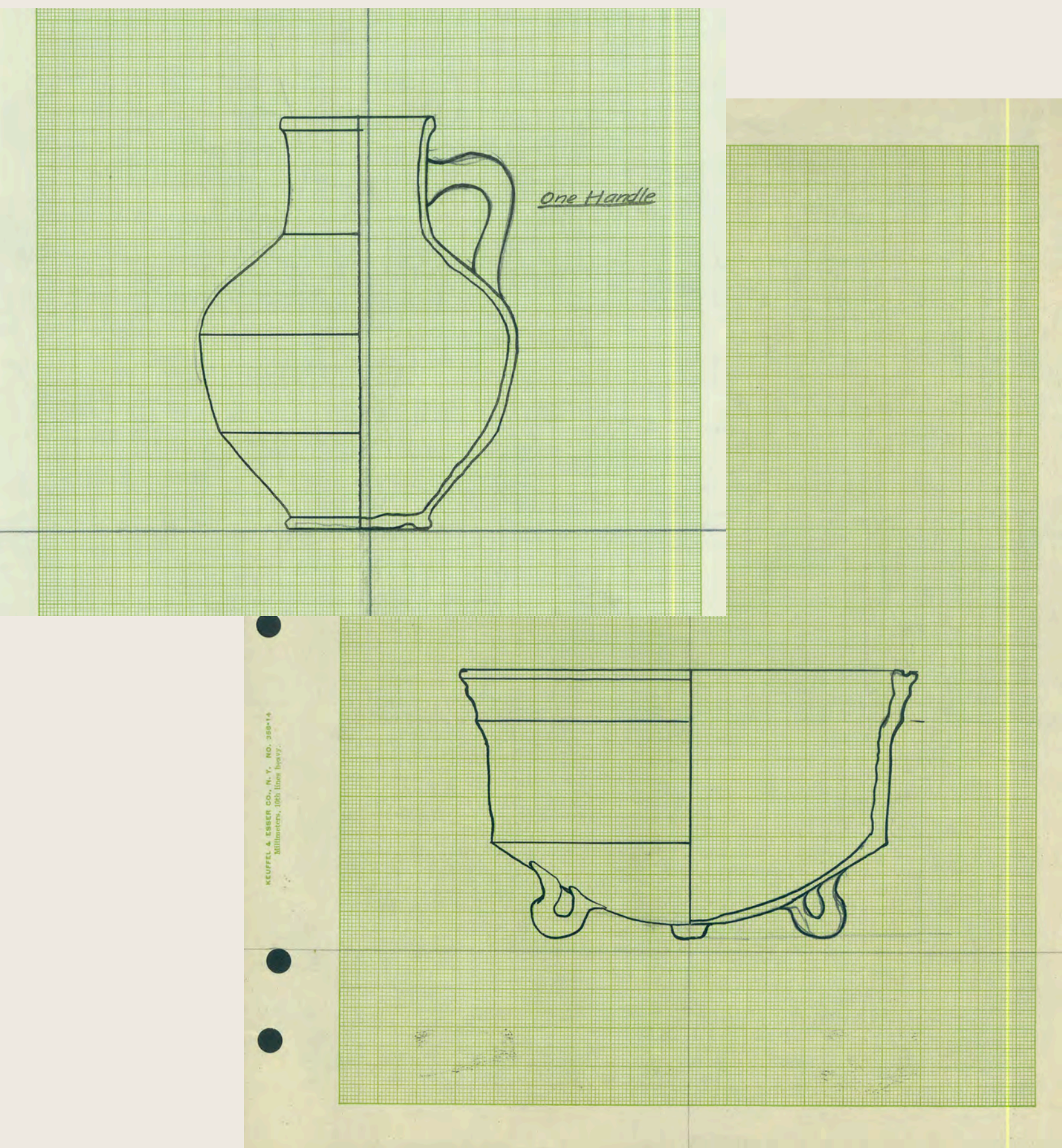


Without proper documentation, archival materials that are intelligible to the originators may be a complete mystery to new eyes. This drawing of a Karanis home has numbers scattered throughout, but the drawing is silent about what these numbers represent. It is only by combining them with journal entries that we know the numbers are height measurements. Materials generated by archaeological projects need to make sense after months, or even years, have passed.

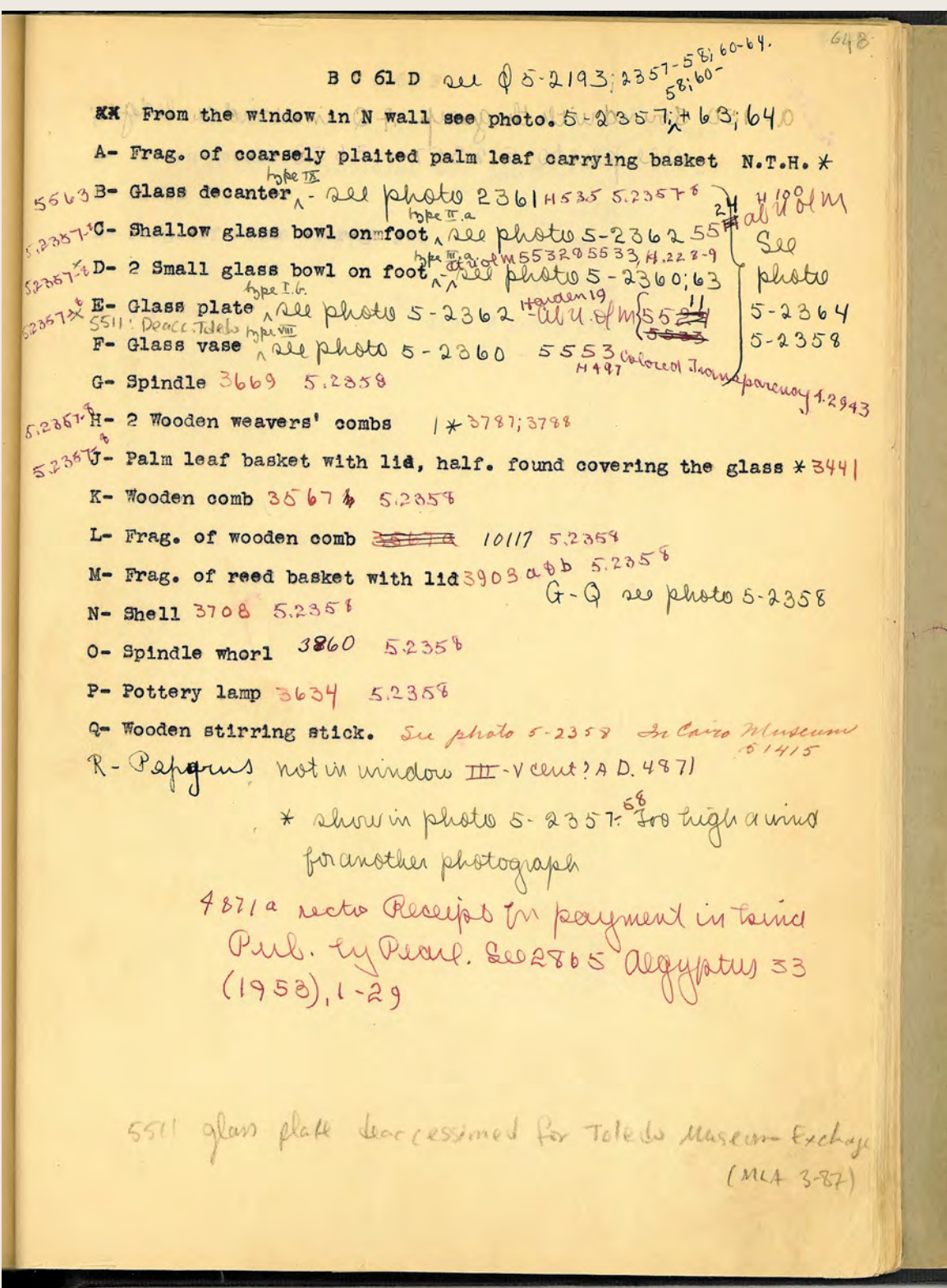


Archives photograph, view overlooking Karanis. Thousands of such images are in the Kelsey's archives, and more, in digital format, will be generated in the coming years. What gets recorded? How do we know what future researchers will be looking for? Do we give the most basic and correct information or venture to guess what someone will want to see?

# CHALLENGES IN DATA MANAGEMENT



Profile drawings of vessels excavated at Karanis. Thousands of these drawings are found in the Karanis archives, as well as other archaeological archives.



Original notes and ledgers often have information that can be lost when transferred to another medium. This page (among thousands in several books) shows the scribbles (in red ink) added years later in the excavator’s handwriting. Since this is an analogue document, it is not “searchable” but provides explanations for the structure, room, or artifact researchers will want to know. How can these be stored in a way that makes their information findable?

Kelsey Museum of ArchaeologyMichigan Excavation RecordsKaranis Report Layout

Book TitleRecord of Objects, Karanis 1930: 132"-152", B168-B243", CS23-CS215, DS100-

SiteKaranisStructureHouseLevelZUnit100

Unit DescriptionThis represents a group of objects found in an underground room of a house excavated by the Sebbakhin. The house was at the lowest level north-west of the

Unit Marginalia

RoomRoom Description

Room Marginalia

Field Number30-Z100-DI

Artifact DescriptionGreen glass bowl on plain ring foot with moulded rim. Sides slightly concave.

Object Marginalia6248 7.2473

Karanis Excavation Records explanations can be found by clicking here:Karanis Excavations

Kelsey Accession Number0000.00.6248Main Record

Original Number

Holding InstitutionU of M, Kelsey Museum of Archaeology

Museum Number

Clicking the above button will open the Kelsey Museum record only.

Object TypeVesselsObject NameBowl

Materials

Locus

Comments

Bibliography

☐ Digital Image Available?Image

Primary Photograph7.2473Photo Captions

Additional PhotographsKeywordsUser Keywords

Screen shot of records from an artifact database. Databases are a changing, dynamic set of records. How does a project properly document its records for easier and complete discovery? How many iterations are saved? How is the database best served so it doesn’t fall into the dark, undiscoverable realm of the Internet? And how is the database saved for future research when the software that created it is no longer in business or no longer opens old files?

Archaeological projects occasionally employ artists to render artifacts and architecture. Do such artworks still have a place alongside digital photography and computer imaging? Should they be preserved, even if we can produce better images using photography? Will scanning them decrease their value, particularly for those in color?

A recent perspective on the past is “sensory archaeology,” or archaeology of the senses. Throughout the gallery so far, you have been able to witness how scholars find, record, and make sense of the sites, structures, artifacts, ecofacts (biological remains), and texts that human beings created, saw, handled, discarded, or affected over deep spans of time. But can we understand their experience of moving through these spaces and interacting with both things that could be touched and “things” that could not be touched? What did people see from their houses or temples, and how did it make them feel? What did it sound like to live in an ancient Egyptian village? How did it smell? How did the food and wine taste? Did people prefer some materials to others in making objects because of how they felt, as much as how they looked or how durable they were?

If a central goal of archaeology is to understand human lives in the past, these sensory dimensions of human engagement with the world are important pieces of the interpretive puzzles we assemble. Such a focus invites researchers to consider not only the large-scale changes that occurred in human history but how they were enacted incrementally, by many individuals navigating a multitude of experiences throughout their lives. By reminding us that past worlds were full not only of things and sights but also of noises, smells, tastes, and emotions, an archaeology of the senses helps to make the past less remote—and more alive.

# SOUNDS OF ANCIENT KARANIS



Microphone destroyed in the context of underwater recording at the Birket Karun, ancient Lake Moeris, near Karanis. Click [here](#) to hear the recording. Modern-day field recordings made at Karanis can help researchers reconstruct the sounds of the ancient village, although such work must be used (and carried out) with caution.



John Kannenberg in the Kelsey museum examining a bronze sistrum, an ancient Egyptian percussion instrument.

Sound is an integral part of most human experience, but study of the ancient world rarely takes sound into account: apart from ancient music, little work has been devoted to the sonic environments of ancient cultures. The soundscapes of the ancient world are significant, however, and cultural historians who study sound can provide new insights into ancient cultures.

The Michigan excavations at Karanis yielded a variety of contexts and materials that can reveal the sonic landscapes of this ancient village. The richness of the material culture of Karanis, and its secure and complex archaeological context, invites a focus on the artifactual evidence for understanding sound. Likewise, the acoustic environments created by the structures and landscapes of ancient Karanis provide material for both actual and virtual investigation. Textual evidence from the site and other contemporary written sources provide supplements to our knowledge of the sounds and silences of a village in Roman Egypt.

Through these sources and avenues of investigation, we hope to arrive at some understanding of the sonic environment of Karanis, grounded in the material culture and archaeology of the site. The results of this study will be disseminated drawing on the concept of “museums of sound” developed by John Kannenberg. Presenting a virtual museum installation drawing on Karanis material transcends the boundaries of traditional publication and conventional museum exhibition.

*John Kannenberg and Terry Wilfong*



Gateway to the “Banquet Hall” of the South Temple at Karanis: Understanding the acoustics and resonances of ancient spaces can help investigators get a better sense of how the sounds of daily life or temple ritual played out in the sonic environments of Karanis (KM neg. no. 5.3403).



Group of bronze bells found in Karanis structure CS48: Non-musical sound and noise-producing objects from Karanis provide valuable clues as to the soundscape of the ancient village, made all the more valuable by their archaeological context (KM neg. no. 5.2603).



### Woven Rattle Containing Glass

Palm fiber, colored glass

Roman Period (2nd–4th centuries AD)

Karanis, Egypt. University of Michigan Excavations 1926. KM 10075

Rattles also produced intentional sounds, either in the hands of musicians as part of a performance or religious ritual, or in the hands of children for their own amusement.

### Unfinished Castanet

Wood

Roman Period (1st–4th centuries AD)

Karanis, Egypt. University of Michigan Excavations 1935. KM 23932

Music—an intentional sound—formed an important part of Egyptian life and religious worship. Castanets are a percussion instrument; this castanet is unfinished, but the accompanying graphic gives you an idea of how it might have been used. A large number of castanets in the Kelsey's collection were found in the same house at Karanis: could it have been the house of a musician?

### Coins from a Coin Hoard

Billon

Roman Period, AD 256/257

Karanis, Egypt. University of Michigan Excavations 1933. KM 42901

Coins such as these, found in a banker's house, would have unintentionally contributed to the sound environment of Karanis as they clinked and jingled when transported or dropped.

# CURATION AND DESIGN

Janet Richards, Curator  
Scott Meier and John Hummel, Design and Preparation  
Peg Lourie, Editor  
Lorene Sterner, Artist  
Ivan Cangemi, Graduate Student Research Assistant  
(Interdepartmental Program in Classical Art and Archaeology)  
Elizabeth Hart, Graduate Curatorial Assistant  
(Anthropology, University of Virginia)

*Installation volunteers:* Jess Pfundstein, Mariah Poastlewait, Julie Knechtges, and Kathie Moore (Bowling Green State University)

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## MAPPING

*The Lost City of Kurru*  
Geoff Emberling, Kelsey Museum of Archaeology

*Villa Life on the Bay of Naples*  
Elaine Gazda, Department of History of Art and  
Kelsey Museum of Archaeology

*Reconstructing Ancient Towns*  
Lisa Nevett, Department of Classical Studies

*Archaeology of Ancient Colchis*  
Christopher Ratté, Department of Classical Studies and  
Kelsey Museum of Archaeology

## TRANSLATING

*From Archaeology to Papyrology*  
Arthur Verhoogt, Department of Classical Studies  
Leyla Lau-Lamb, University Library

*Text and Context in Ancient Mesopotamia*  
Gary M. Beckman, Department of Near Eastern Studies  
Tayfun Bilgin, Graduate Program,  
Department of Near Eastern Studies  
Piotr Michalowski, Department of Near Eastern Studies

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*Discovering Social Lives in Empire*  
Margaret Cool Root, Department of History of Art and  
Kelsey Museum of Archaeology

*Diverse Methods at Kedesb*  
Sharon Herbert, Department of Classical Studies and  
Kelsey Museum of Archaeology

*3D Modeling at the Gabii Project*  
Nicola Terrenato, Department of Classical Studies  
Rachel Opitz, Center for Advanced Spatial Technologies,  
University of Arkansas

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*Identities and Preservation at Abydos*  
Janet Richards, Department of Near Eastern Studies and  
Kelsey Museum of Archaeology  
Suzanne Davis, Kelsey Museum of Archaeology  
Claudia Chemello, Kelsey Museum of Archaeology

*Conserving Funerary Stelae*  
Caroline Roberts, Metropolitan Museum of Art

## INVESTIGATING

*Status and Diet at Giza*  
Richard Redding, Kelsey Museum of Archaeology

*The Economy of Early Cities*  
Laura Motta, Department of Classical Studies and  
Museum of Anthropology

*Exotic Species in the Mediterranean*  
Despina Margomenou, Department of Classical Studies  
Johannes Foufopoulos, School of Natural Resources  
and Environment

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*Distracted by Modernity*  
Lauren Talalay, Kelsey Museum of Archaeology  
Artemis Leontis, Department of Classical Studies

*Challenges in Data Management*  
Sebastián Encina, Kelsey Museum of Archaeology

## LISTENING

Sounds of Ancient Karanis  
John Kannenberg, Graduate Student, University of the Arts,  
London  
Terry Wilfong, Department of Near Eastern Studies and  
Kelsey Museum of Archaeology

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Kitty Picken and the National Geographic Society.

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### *Reconstructing Ancient Towns—Lisa Nevett*

Dr. Sylvie Bouchoule (University of Nancy II), Professor Artemis Leontis (Classical Studies Department), Dr. Carl Longstreth (Map Library), Professor Fani Mallouchou Tufano (University of Crete), and Mrs. Penelope Wilson Zarganis (British School at Athens).

### *Archaeology of Ancient Colchis—Christopher Ratté*

Kelsey Museum, University of Michigan; the Institute for the Study of the Ancient World, New York University; and Otar Lordkipanidze, Center for Archaeological Studies, Georgia National Museum.

### Translating

*From Archaeology to Papyrology—Arthur Verboogt*  
I would like to thank Adam Hyatt, Samantha Lash, and Leyla Lau-Lamb.

### *Text and Context in Ancient Mesopotamia—Gary Beckman, Tayfun Bilgin, and Piotr Michalowski*

Thanks to Sebastián Encina, Kelsey Museum.

### Imaging

*Discovering Social Lives in Empire—Margaret Cool Root*  
This presentation was in collaboration with Mark B. Garrison and the Persepolis Seal Project. The project was funded by multiple grants from the National Endowment for the Humanities (NEH) as well as grants and fellowships from the John Simon Guggenheim Foundation, the Samuel Kress Foundation, and the Iran Heritage Foundation. Internal institutional support has been provided by the Kelsey Museum of Archaeology, the Department of the History of Art, IPCAA, the Horace H. Rackham School of Graduate Studies (Rackham), and the Office of the Vice President for Research (OVRP).

### *Diverse Methods at Kedesb—Sharon Herbert*

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*3D Modeling at the Gabii Project—Nicola Terrenato and Rachel Opitz*  
The Gabii Project is supported by generous grants from the University of Michigan, the Kelsey Museum, NEH, FIAT–Chrysler, the National Geographic Society, the Loeb Classical Library Foundation, and several private donors. The project is directed by Nicola Terrenato, field-directed by Anna Gallone, and managed by Marcello Mogetta. The assistance and support of the Soprintendenza Speciale per i Beni Archeologici di Roma, and especially that of Dr. Stefano Musco, are gratefully acknowledged. The *21st c. Data, 21st c. Publications. 3D Model Publication and Building the Peer Reviewer Community* Project is supported by a generous grant from the NEH Office of Digital Humanities. Rachel Opitz, Nicola Terrenato, and Fred Limp are the directors.

### Conserving

### *Identities and Preservation at Abydos—Janet Richards, Suzanne Davis, and Claudia Chemello*

The Abydos Middle Cemetery Project operates with the kind permission of Egypt’s Ministry of State for Antiquities and has received generous support from the Kelsey Museum, the Department of Near Eastern Studies, LS&A, OVRP, and Rackham at the University of Michigan; the National Geographic Society, the American Philosophical Society, the Antiquities Endowment Fund of the American Research Center in Egypt, the Fisher Community Foundation, Marjorie Fisher, Heather Tunmore, and other private donors. For seasons discussed here, we thank Ahmed Ragab and his staff; Rais Ibrahim Mohamed Ali and colleagues from Quft; MSA Inspectors Adel Makery Zekery, Ali Sadiq Osman, and Mohamed Huseyn; Geoffrey Compton, Korri Turner, Heather Tunmore, Peter Lacovara, Christian Knoblauch, Thomas Landvatter, and Elizabeth Hart. The 2013 wood research team included Ahmed Abdel Azeem (The University of Suez Canal), Harriet Beaubien (Smithsonian Institution), Robert Blanchette (University of Minnesota), Pamela Hatchfield (Museum of Fine Arts, Boston), and Gregory Smith (Indianapolis Museum of Art).

### *Conserving Funerary Stelae—Caroline Roberts*

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### Investigating

*Status and Diet at Giza—Richard Redding*  
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### *The Economy of Early Cities—Laura Motta*

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### *Exotic Species in the Mediterranean—Despina Margomenou and Johannes Foufopoulos*

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### Archiving

*Distracted by Modernity—Lauren Talalay and Artemis Leontis*  
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### Listening

*Sounds of Ancient Karanis—John Kannenberg and Terry Wilfong*  
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