

CONTEXT

New Perspectives on an Old Babylonian City

Archaeology in the Iraqi Desert: the Third Season at Tell Abu Duwari

by John Cuozzo, Charles Pennington, and Thomas Tartaron



Excavations at Kopetra, Cyprus: tomb south of the later church. See page 8.

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As the wheels of Royal Jordanian flight 810 touched down on the rain-soaked runway of Saddam Hussein International Airport on February 1, 1990, we all breathed what may now seem to be a rather ironic sigh of relief. After two days of air travel we had finally reached Baghdad, Iraq, and the third season of work at Tell Abu Duwari, the ancient site of Mashkan-shapir, could now begin. Professors Elizabeth Stone of SUNY, Stony Brook, and Paul Zimansky of Boston University directed the excavations. It was to be our longest season (three months) and would have the largest crew yet. An important season, made even more so by recent events, it was supposed to be the first of many explorations into the form of the ancient Mesopotamian city.

During the season, we completed the survey, begun in 1987 and continued in 1989, of the surface features over the full extent of the site. This included a complete photographic series taken from a camera mounted on a kite flown over the surface of the site. This year also saw the beginnings of much larger-scale excavations. A preliminary geomorphological study of the site, specifically its canals and harbors, was also undertaken. Funding was provided by the National Science Foundation, The National Geographic Society, the American Schools of Oriental Research, the National Endowment for the Humanities, and private donors.

The field crew included John Cuozzo, Charles Pennington, and Thomas Tartaron, graduate students in the Department of Archaeology at Boston University; Cathy Alexander, a former B.U. student; Beth Grindell, Jeff Clark, and Axel Nielsen of the University of Arizona; Scott Bell of the University of Michigan; and David Schofield. Mike Charles was the paleoethnobotanist. Dr. Lisa Wells of the University of California at Berkeley directed the geomorphological work and Edward Luby of SUNY, Stony Brook, came along to study what was thought to be an Old Babylonian cemetery on the site.

The Routine

The workday began early with a light breakfast. The drive to the site required about half an hour, including a twelve-kilometer stretch on dirt tracks that have been different every season. These tracks disappear under shifting sands or become impassable because of the mud that forms after the winter rains. Frequent detours caused the track to move year by year. On site we would work until 10 a.m., and have a second breakfast. Work would then resume and continue until 1 p.m., when we returned to the dig house for lunch and a nap. Our house was really an improvement over the accommodations for the first two seasons with spacious rooms, running water (sometimes), and a hot

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shower. Lab work commenced at 4 p.m. and continued until 6 p.m. Our lab room was well equipped with everything we needed to accurately measure and record our finds. Lab work mainly involved the processing of sherds, counting, weighing, and classifying in a two-tier structure. Approximately three quarters of a million sherds were counted and 20,000 diagnostic sherds were further classified. We would dine at 7 p.m. and later in the evening there were sports contests, one of the most enjoyable being volleyball with a piece of string as a net. Because of the unforgiving nature of the local spined palm trees, we went through many volleyballs. Board games that took days and weeks to play also were a favorite pastime. We worked in the field six days, and on the seventh we did a half day of lab work and played touch football exhibitions on the village soccer field in front of fairly large and very curious crowds. But most of the time was devoted to archaeology.

Excavation

Unlike many tells, Mashkan-shapir, some sixty hectares in extent, was short-lived as a major city, with little later occupation covering or obscuring the form of the city in the period of interest for Professor Stone's research, the Isin-Larsa/Old Babylonian periods. Earlier trial pits and surface finds indicated fairly good preservation and possible evidence of Hammurabi's destruction of the city in the first half of the eighteenth century B.C. Aerial photographs taken during a previous season revealed what appeared to be a major structure of storerooms associated with the palace area in the southwest portion of the city. The directors decided that this area would be a good place to begin excavating.

The excavation, carried out in the first two months of the season, actually revealed two major structures, one of baked brick, the other mudbrick, separated by a street. The mudbrick building was most notable for its large number of fire installations, hearths and tanours (clay bread-ovens still in use in large parts of the Middle East)



Excavations in progress at Tell Abu Duwari.

and a large ash midden in the center. The baked-brick structure lay alongside one of the major canals of the city. Unfortunately we were unable to uncover the plan of the whole structure.

This building is most memorable for us because in one small room the excavator came down upon approximately nine infant burials. It was suspected there might even be more further down. Except for one clay coffin, the infants were buried in urns 25 to 30 cm tall and covered by large flat-bottomed plates. Associated with them were the remains of several different kinds of animals, the backbone of a fish, an articulated goat leg, and a jar that contained a bird skeleton.

The mudbrick building across the street also contained a dead infant room, although these were predominantly buried in large bowls, one placed upside down on top of the other. The burying of young infants under the floors of houses is known elsewhere in Mesopotamia for this time period.

An unexpected but very interesting group of finds were the bits of impressed bitumen, natural asphalt. This material was used to make things watertight, such as reed baskets and, as is believed for much of our material, reed boats. As very little material is allowed out of Iraq, Dr. Stone made impressions of these using a dental molding kit.

Previous seasons produced many fragments of model chariots. Very often the upright shields on the chariots would bear a molded decoration, and several different designs have been identified. In 1990 we added many new shields and several new designs to the corpus. Many of the shields came from an ash dump in the mudbrick building, and several more from the street outside.

For the second year we had large herds of camels moving across the site from east to west, eating the survey



A model chariot base with a molded impression of Nergal, god of death and pestilence.

flags marking the corner points of our 50-m squares and important surface finds. More destructive, however, were the wild boar that inhabited the marshy areas to the south and east of the site. In past seasons we had seen them at a distance, racing around the perimeters of the tell. This year there were twice as many and on several occasions they came right into our trenches. Luckily, their visits were at night; unluckily, the boar rooted around, pulling up our strings and nails and even destroying several carefully excavated features. One day while we were on site, a single boar came up to within fifty meters of the trenches, and gave us a long considering look before racing off to the south-east.

We shared the world with a large number and variety of insects as well, but our relationship with the local fly population was definitely unhealthy for both parties involved. Regarding yet another creature, Charles Pennington recounts the following. "My closest encounter with some of the local members of the animal kingdom came while trowelling away what I thought was some loose dirt. As I pulled the dirt towards me, I looked down upon a very large, very disturbed-looking scorpion. Some of the workmen came to my rescue; I settled back to trowelling, and discovered that the previous scorpion had had children. And yet another scorpion had to be dealt with."

We believe that the directors had hoped we would move more dirt than we did. A delay of about a week at the beginning of the season and an annoying number of adult burials present in the excavated area slowed us down. The excavation of skeletons is very time-consuming, painstaking work. We had hoped to open a very wide exposure taken down to the first living surface. We opened up ten squares, each of them 10 m to a side. Each of us had our own square and an Iraqi workman to help us move our dirt. We generally worked with a hand pick and trowel and could generate quite a bit of dirt if unimpeded by finds or architectural features. The interpretive unit was the locus, primarily architectural by definition.

Everything removed from a locus was given a lot number, whether it is a gold necklace (not this year), a collection of pottery, or a soil sample.

One of the goals of the excavation was to collect as much archaeobotanical information as possible. Mike built a floatation machine for wet sieving of soil samples. This machine generated a large number of "flot" samples and one of the most hated lab tasks. These samples had to be picked through to separate the plant remains from the bone and from the small bits of clay.

Overall, the excavation produced a significant amount of very interesting data that require more work. But the size of the site made what at first seemed to be a large excavation area seem later like only a tiny scratch on the surface. In order to understand more about the site as a whole, we now turn to aerial survey, ground survey, and geomorphological work.

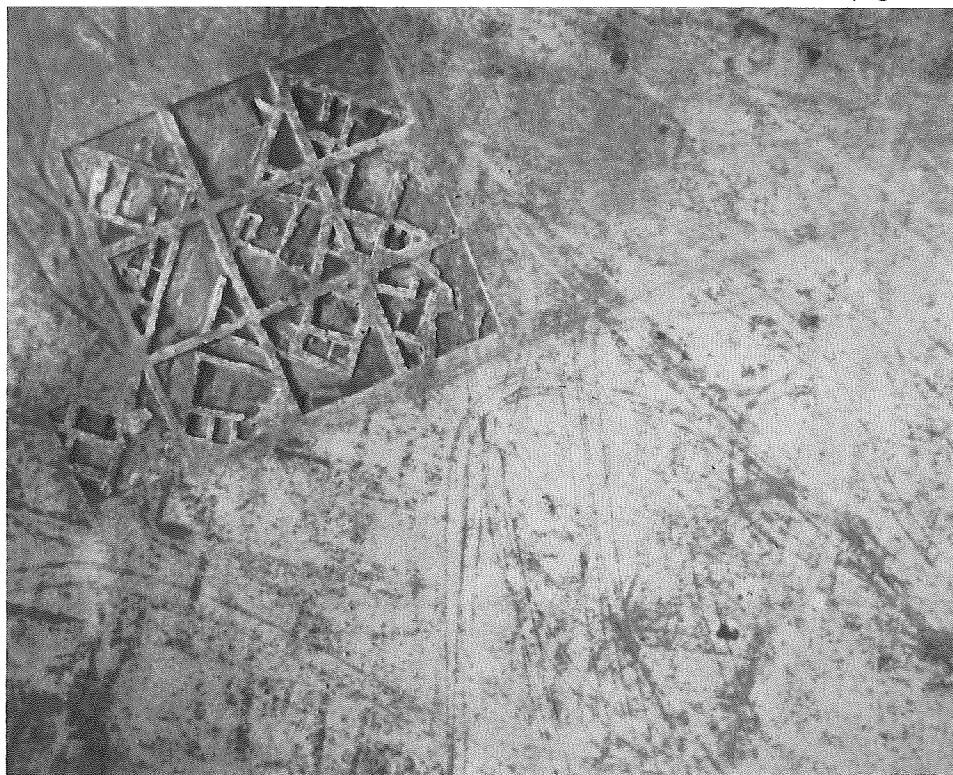
Aerial Photography and Geomorphology

The 1990 season at Tell Abu Duwari provided us with ample time and resources to collect data from the site in a number of different ways. Besides the usual methods of excava-

tion and survey, we also conducted an extensive aerial photographic survey and a preliminary study of the geomorphology of the site using standard coring methods. Both the aerial survey and the coring provided us with a significant amount of very interesting data that are still being processed at this time.

The aerial survey was accomplished by rigging a camera to a large and very colorful kite. The camera had an automatic timer that allowed us to program the amount of time before each picture and the time between pictures. Once we got the kite airborne, the camera was on its own. Getting the kite airborne, however, required a fairly constant and moderately fast wind speed. There were many days when we arrived on site ready to fly only to have the wind die down to nothing. On the other hand, very high winds picked up so much sand that our photos were obscured. High winds also posed a much more serious threat. On our first few attempts at flying the kite, the wind was particularly strong. Its force ultimately overcame the strength of our kite string and all we could do was watch helplessly as the camera plummeted over 300 feet straight down onto the

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Excavated area from the air (kite photograph).

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hard desert floor. The kite would sail for a bit on its own, then would collapse in a heap on the ground. Miraculously, the camera survived the fall and we were able to obtain a stronger kite string.

Once we learned how to maintain the kite at a fairly high altitude in a good wind, we were able to survey the entire site. Before the season began, we had marked the surface of the site with a series of white-painted sherd crosses. Each cross indicated a point on our site grid and all of them were visible from the air. Depending on the wind direction, we would usually drag the kite along one of our transects in one of the cardinal directions. Paul Zimansky would stand directly beneath the camera, noting areas where pictures were being taken.

Because of the high winds in the desert that regularly scoured the surface of the site, many features, including walls, gates, canals, and streets, were visible on the surface. These features show up clearly on the aerial photos. The walls and canals were greatly highlighted after a light rain. Further analysis of the aerial photos, we hope, will allow us to understand more about the organization of an Old Babylonian city.

The existence of canals that ran through the city, along with what probably was a harbor, provoked the curiosity of our site geologist, Lisa Wells. We assisted her in taking core samples from the canal and harbor area and in cultural deposits. We used a simple hand-corer, which, when extended, allowed us to penetrate to a depth of six meters below the surface.

Coring in the desert is hard work. The soil, in most cases, was fairly compact and required a significant amount of energy to break through. The working end of our corer was an open bit. Our general procedure was to drive the bit into the ground—about 25 cm at a time—and remove the bit, now full of soil. The soil was laid out on the ground in the order that it emerged from the core, then the bit was driven back into the ground and the whole process was repeated.

After taking notes on soil composition and color, Dr. Wells proceeded to sample some of the soil for further study. Sadly, none of her samples made it back to her lab because we were limited as to the number of samples we were allowed to bring back. Our results, however, seem to verify the existence of the canals and the harbor. Another important fact revealed by the coring was the depth of the cultural deposit. Prior to the coring work, we believed that the whole site consisted of one or two meters of deposit on the desert plain. The cores showed that cultural material continues beyond a depth of six meters. Our cores were not wide enough to pick up dateable pottery from this depth, but the history of Tell Abu Duwari is considerably longer than we expected.

The aerial photos and the coring gave us a new appreciation for how complex the site at Tell Abu Duwari is, both in terms of its most recent occupation and its unexplored, earlier levels.

Survey

The surface survey, conducted in the final month of on-site activity at Tell Abu Duwari, provided an interesting change of routine, as well as some much-needed relief for aching knees and ankles. In four weeks' time, the survey team completed the 43 hectares within the city walls that

remained uncovered by earlier efforts in the 1987 and 1988–89 seasons (in which a total of 27 hectares was surveyed).

Ours was an intensive survey. The units of analysis were 50-m² parcels of desert whose parameters were defined by the same markers that were used for the aerial survey. Within each survey unit, the following operational procedures were adopted. Beginning at one corner of the square, the team member proceeded slowly and carefully to make a number of passes, back and forth, until the unit was completely surveyed. Given a field of vision ranging from perhaps one to two meters on each side, many passes were necessary to ensure that survey coverage of the square approached 100 percent. At the end of each pass, an orange flag was placed to keep the surveyor from straying off line (a concern especially appropriate in this flat desert, where the topography can seem endlessly homogeneous, and crew members have been known to wander off in wildly incorrect directions).

Certain artifacts and features of archaeological interest were marked with red flags; at the completion of the entire square, these were precisely mapped by triangulating their exact locations. A general sketch was drawn up, incorporating both the triangulated features and less discrete manifestations, such as artifact clusters or large topographical features. Finally, a short narrative summarized the archaeological observations of the team member. Depending on the density of artifacts and the complexity of features, a single survey square might require anywhere from twenty-five minutes to several hours to document.

Various categories of important information can be derived from such an intensive survey of an essentially urban area. In the case of Mashkan-shapir, our knowledge has been enhanced with regard to two important aspects of the city: its topography and the spatial patterning of its internal organization.

Topographical features, especially the location of the canals that traversed the Old Babylonian city, are of great interest for the information they



John Cuzzo taking core samples.

can provide about the political and economic life of the city. The canals gave the city a *raison d'être* by channeling commerce between the Tigris and Euphrates rivers. Combining surface and aerial survey information, the probable courses of the ancient canals are being identified.

Patterns of artifact concentration on the surface can provide clues to the spatial organization of different activities within the city. The 1990 portion of the survey was focused on the eastern and northern mounds, and it was discovered that these areas seem to have been more domestic in function than previously surveyed areas. A dense concentration of rubbing stones in the southern portion of the east mound points to particular manufacturing activities. Many other patterns in the data exist, and will help us to construct a fuller picture of everyday life in the seventeenth century B.C. No pottery was collected during surface survey, but hundreds of exceptional artifacts of other material were collected. Among the most prized finds were several superb cylinder seals, two unusual stamped cuneiform goblet sherds, a few molded terracotta goddess plaques, and various pieces of ceramic chariot models. Other materials recovered included stone and glass beads, polished stone, clay sickles, obsidian bladelets, and many pounds of copper fragments and waste. Numerous *in situ* architectural features, exposed by wind erosion, were noted and mapped.

One of the most notable aspects at the site was the large quantities of dense, black, slag-like material. It bore a close resemblance to basalt and appeared to be utilized in much the same way, for example, as a grindstone. A wet chemical analysis of several samples was performed in Iraq with the help of an American businessman, Paul Servas, who was opening a brass reclamation plant. The analysis showed that the material was not basalt, but we were not able to identify it as the by-product of any metal-smelting process. The Mesopotamian plain has no stone of its own, so it is not impossible that the inhabitants may somehow have been manufacturing their own.

Alexander Marshack Gives Context and Human Society Lectures

Alexander Marshack, the eminent and sometimes controversial specialist in Palaeolithic art and symbolism, gave the sixth Context and Human Society lectures on October 23–25, 1990. The series was sponsored by the Center for Archaeological Studies and the Humanities Foundation at Boston University, and was titled "Time and Reality in Ice Age Europe," offering a broad view of developments in the interpretation of the world's earliest artistic and symbolic representations.

A large audience heard lectures on "Animal Imagery in the Ice Age," "Sexual Imagery in the Ice Age," and "Signs, Symbols and Motifs: the Beginnings of Abstract Thought and Image." Mr. Marshack reviewed earlier theories of Ice Age art as hunting or sympathetic magic, and suggested that the art revealed more complex mental and intellectual attitudes than our early ancestors had been allowed by previous investigators, as well as very precise observation of the seasonal markings of animal species.

All scholarly considerations aside, surface survey in the desert was an experience of cosmic dimensions. Often, in the heat and solitude of the desert, one had the feeling of floating through time and space, at once experiencing a profound sense of peace and a confusion born of oasis effects and the boundlessness of the desert wasteland. Sometimes the strange sights were *real*—Dave's bizarre "survey dance," a frenetic (or should I say spastic), flag-waving two-step perhaps comparable to a Native American ritual, all the more odd when viewed obliquely through a howling sandstorm. Or how can we forget the sandblasted day that a white-shrouded Arab seemingly *materialized* from a thick cloud of sand? Was this a god? A sentinel of the ancient city? A refugee from the Twilight Zone? Nothing so strange—it was just a fellow who got his car stuck in the middle of the desert.



A light moment during Alexander Marshack's press conference preceding his opening lecture. Photo by Michael Hamilton.

Evidence of this concern with time could be seen in the sequential notations on bone objects from some Upper Palaeolithic sites, which exhibit a structure interpretable as a lunar calendar.

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The archaeological work at Tell Abu Duwari was enjoyable for us. The joy of sharing our discoveries with each other, the giddy feeling of finding something really special, and the wildly speculative on-the-spot interpretation that we gleefully engaged in, more than compensated for any discomfort we might have felt working in the hot sun and blowing sand. It is a great site, and we felt a great appreciation of it. New questions spurred by our data may remain unanswered for quite a while, however, because of the war. It may be many years before an American is allowed to walk unguarded on the streets of Baghdad, let alone to fly a kite or take a core in the culturally rich desert of southern Iraq.

The authors are Ph.D. students in the Department of Archaeology at Boston University. For earlier work at Tell Abu Duwari, see the article by Elizabeth Stone and Paul Zimansky in Context, 7, 3-4.

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The Upper Palaeolithic from about 35,000 years ago is the first time that evidence of truly modern mental activities can be discerned in the archaeological record. Or is it? The question was thoroughly aired during a panel discussion on October 25, in

which Alexander Marshack was joined by Professor H. Martin Wobst, from the University of Massachusetts at Amherst, who pioneered a semiotic approach to the Palaeolithic, and Mr. John Shea of Harvard University, an expert in early toolmaking and the mental patterns that this indicates, for

an examination of "The Opening of the Human Mind." Professor Terrence Deacon of Harvard University, a specialist in the early development of the human brain, also took part in the discussion, which was moderated by Professor Mary Beaudry.

The seventh series of Context and Human Society Lectures will be given by Professor Martin Biddle of Oxford University in March 1991. Where Alexander Marshack dealt with the first appearance of intellectual and artistic activity in the archaeological record, Martin Biddle will be examining the problems and benefits of wholly text-aided archaeology in the Middle Ages. Among his topics will be his new, and so far unpublished, work on the Church of the Holy Sepulchre in Jerusalem, which has yielded some surprising and important results. The lectures will be on March 19-21.

Professor Mary Beaudry (left) discusses Marshack's lecture with Professor Clemency Coggins (center) and Ruth Thomas (right), program coordinator of Boston Society of the AIA. Photo by Michael Hamilton.

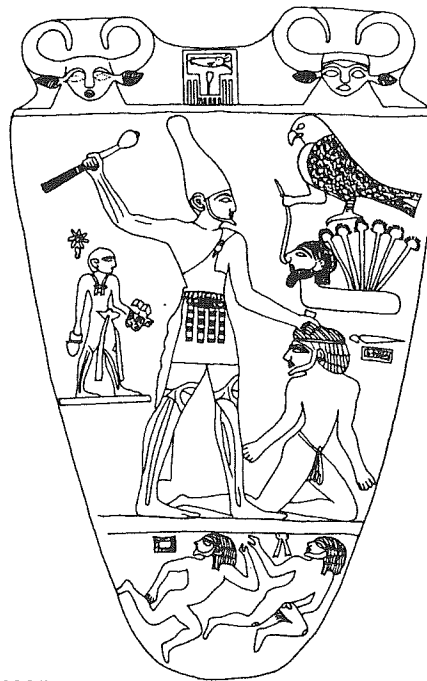


Symposium on the Origins of Civilization in Egypt

A day-long symposium entitled "The Rise of Complex Society and the Early State in Egypt" will be held at Boston University on April 25, 1991. Organized by Professor Kathryn Bard of the Department of Archaeology at Boston University, the symposium will bring together for the first time scholars in Egyptology, archaeology, anthropology, ancient history, philology, geology, and environmental studies to read papers and discuss this major transition in human cultural development. Scholars participating in the symposium will come from Belgium, Canada, England, Germany, Israel, Switzerland, and the United States.

The symposium will be divided into morning and afternoon sessions. The morning session, chaired by Kathryn Bard, will focus on the origins of Egyptian civilization in the Neolithic and Predynastic periods. In the afternoon, Professor Robert J. Wenke of the University of Washington, Seattle, will chair a session on the early state in Egypt and the origins of writing. Discussants in the sessions will be: Dr. Robert L. Carneiro, American Museum of Natural History; Professor Philip Kohl, Wellesley College; Professor Joyce Marcus, University of Michigan; Professor Donald B. Redford, University of Toronto; Professor Henry T. Wright, University of Michigan; and Professor Norman Yoffee, University of Arizona at Tucson.

Center members are invited to attend this important event. The location of the symposium will be announced later in the spring.



"Reverse side of the slate palette of King Narmer. Here appears for the first time the classic motif of the monarch dominating a conquered enemy. Hieroglyphs, some obscure because of the early stage in the development of the writing system, identify the figures. Narmer's name is within the royal serekh that appears top centre." (Bruce Trigger et al., *Ancient Egypt. A Social History*, page 59)

CAS and CRS Host ICOMOS Seminar

by Ricardo Elia

The Center for Archaeological Studies and Center for Remote Sensing at Boston University on November 2, 1990, hosted a delegation of eight senior Ministry of Culture officials from India, Jordan, Morocco, Pakistan, and Syria. The visit to Boston University was part of a Seminar and Study Tour on Cultural Patrimony and Heritage sponsored by the U. S. Information Agency through a grant to the U. S. Committee of ICOMOS, the International Council on Monuments and Sites.

The main purpose of the study tour was to introduce the visiting officials to a representative group of private institutions involved in the preservation, conservation, and interpretation of the world's cultural patrimony. Another goal of the program was to introduce the group to U. S. policies relating to the 1970 UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property and the 1972 UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage.

The study group's visit to Boston University began in the Center for Archaeological Studies, where the Center's Associate Director, Ricardo J. Elia (also chairman of the US/ICOMOS archaeological heritage



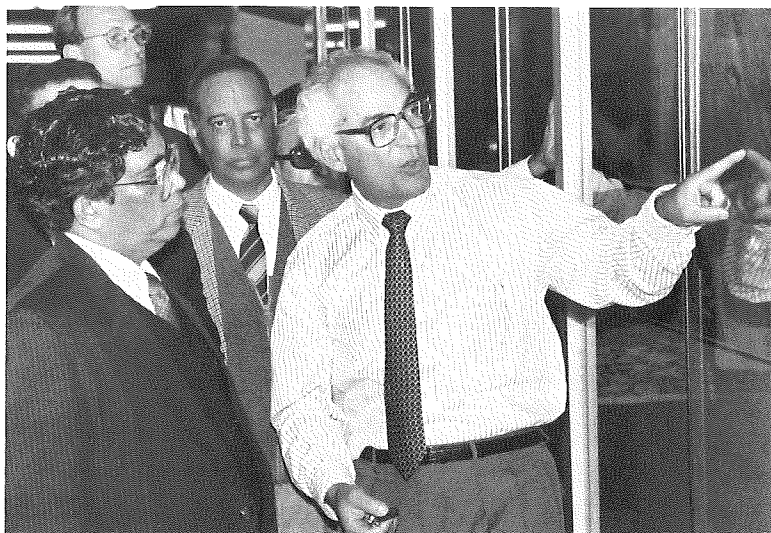
Professor Mary Beaudry describes laboratory processing of artifacts from the Spencer-Pierce-Little farm to members of the Cultural Patrimony and Heritage group. CAS Associate Director Ricardo Elia is at right of Professor Beaudry.

management committee), presented an illustrated slide lecture on his archaeological investigations of the Central Artery Project in Boston as an example of the U. S. cultural resource management system. The lecture was followed by a tour of the facilities of the Department of Archaeology, Center for Archaeological Studies, and Office of Public Archaeology. Included in the tour was a visit to the archaeological laboratories, where Professor Mary Beaudry treated the group to a description of ongoing laboratory processing of a rich deposit of artifacts from her excavations at the Spencer-Pierce-Little farm in Newbury, Massachusetts. John Cuozzo, a teaching fellow in archaeology described the activities of undergraduate students in a laboratory session of AR102, Introduction to Sciences in Archaeology.

The study group next visited the Center for Remote Sensing, where it

was greeted by the Director, Dr. Farouk El-Baz, who described the Center's organization and current programs. Archaeology professor Kathryn Bard gave an illustrated lecture on her ongoing archaeological work in the Hu-Semaineh region of Upper Egypt, and described her plans for using remote sensing there this summer. Professor Bard's lecture was followed by a demonstration of the Center's geophysical prospecting instruments by archaeology graduate student Thomas Tartaron. At the end of the program the study group met CRS and CAS staff in an informal reception.

The visiting delegates included, from India: Dr. S. K. Mahatara (Additional Secretary of Culture and Acting Director of National Monuments of India), Dr. L. K. Srinivasan (Director of Antiquities, Archaeological Survey of India), and Dr. S. D. Gorakshar (Director, Prince of Wales Museum, Bombay); from Jordan: Dr. Ghazi Izzeddien Bishe (Director General, Department of Antiquities); from Morocco: Mrs. Jalila Kadir (Inspector of Historical Monuments, Direction du Patrimoine); from Pakistan: Mr. Shaukat Hussain (Joint Secretary, Ministry of Culture and Sports) and Dr. Farzand Ali Durrani (Professor of Archaeology, University of Peshawar); and from Syria: Mr. Abdul Razzak Zakzouk (Director General, Hama Museum). The study group was accompanied by William Chapman, a member of the US/ICOMOS Board of Trustees.

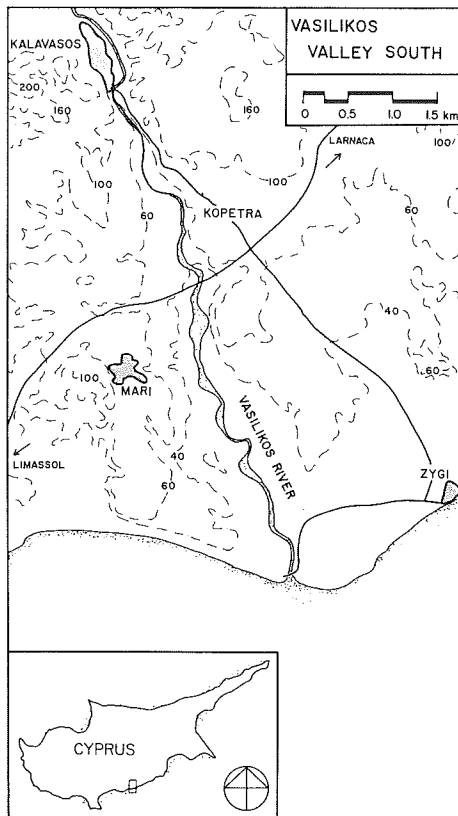


CRS Director Dr. Farouk El-Baz explains satellite image of Jordan to members of the Cultural Patrimony and Heritage Study Tour. Photos at top and bottom by Michael Hamilton.

Classical Archaeology on Cyprus: the Kalavastos-Kopetra Project

by Murray McClellan

The island of Cyprus, tucked into the northeast corner of the Mediterranean, is familiar to most of us in the West as a place from which daily reports are filed by UPI, Reuters, or Mike Theodoulou of National Public Radio monitoring the news from Lebanon, Syria, and Iraq. Others will recall the troubles of 1974, when the



Cyprus (inset), and lower Vasilikos Valley.

Turkish army invaded part of the island, precipitating a division of its population, with Turkish-Cypriots going to the north (where the Turkish army remains) and Greek-Cypriots going to the south. In fact, this buffeting between forces east and west has been characteristic of Cypriot life for millennia. Precisely for this reason, the island has long been viewed by scholars as a perfect laboratory in which to study the interactions of competing cultures.

The study of the archaeology of Cyprus has progressed enormously in the last 120 years, since the haphazard

pillagings of Luigi Palma di Cesnola, who was simultaneously the U.S. and the Russian consul of the island when it was under Ottoman control. Today, researchers studying the material remains of past Cypriot cultures employ a wide range of techniques and, more importantly, an equally wide range of theoretical approaches in an attempt to answer questions not even posed by their predecessors.

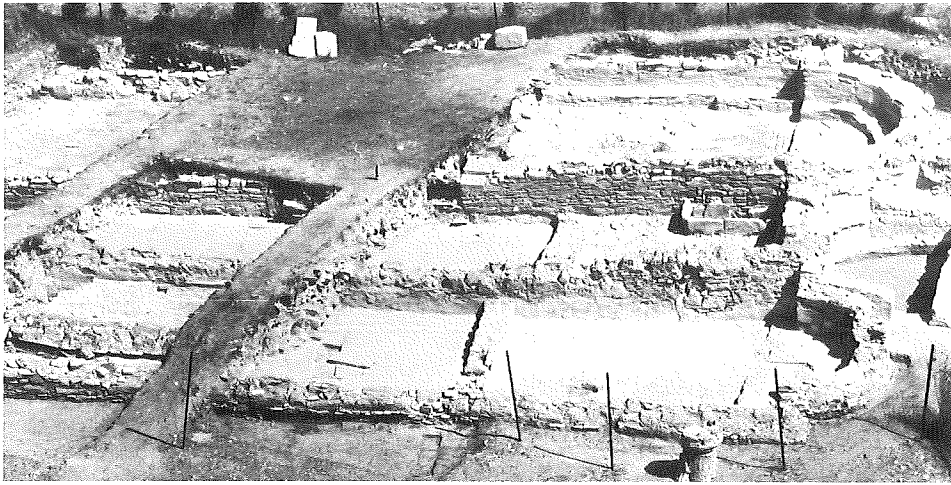
The Kalavastos-Kopetra Project, begun four years ago by Professor Marcus Rautman of the University of Missouri-Columbia and by the author, now a member of the Department of Archaeology of Boston University, is attempting to apply the developments made in the study of Cypriot prehistory to broaden our understanding of the island's historical periods. Our project (the KKP, for short) grew out of the Vasilikos Valley Project, a multidisciplinary diachronic regional investigation of a single river drainage system on the southern coast of Cyprus. The ongoing Vasilikos Valley Project, begun by Professor Ian Todd of Brandeis University in 1976, has nearly completed a systematic survey of the region around the modern village of Kalavastos, from the copper mines four kilometers to the north of the village, to the mouth of the Vasilikos river some four kilometers

to its south. Todd's team has concentrated on the prehistoric periods represented in this region, mounting major excavations at the aceramic Neolithic site of Kalavastos-Tenta and at the Late Bronze Age site of Kalavastos-Ayios Dhimitrios as well as undertaking rescue digs at the Chalcolithic site of Kalavastos-Ayios and at several Middle and Late Bronze Age tombs in the village and in the surrounding countryside.

The major goals of the KKP are twofold. First of all, working closely with Todd, we are reexamining all of the historical-period sites identified in his survey in a study of the changing settlement patterns and resource utilization of the region from the Classical through the Byzantine periods. Secondly, the KKP is concentrating on an investigation of the largest historical-period site in the region, the late Roman (fifth to seventh centuries A.C.) settlement at Kalavastos-Kopetra. The investigation of Kopetra itself is being undertaken in two parts: 1) an intensive surface survey of the site and its immediate surroundings, and 2) a limited set of sector excavations throughout the settlement. The KKP is collecting a large array of information concerning the region's historical periods which includes, in addition to the traditional studies of architecture and small finds, specialist studies heretofore not undertaken for the Roman periods in Cyprus. To this end the staff of the KKP includes a physical anthropologist, a geomorphologist, a palaeozoologist,



A view of the basilica complex at Area I, taken from the northwest. The apse of the basilica is in the upper center of the photo.



A view from the south of the basilica complex in Area II. The southern chapel is in the lower part of the photo, with the southern aisle and central nave of the basilica above.

ogist, and a palaeoethnobotanist, the latter being Professor Julie Hansen at Boston University.

Our investigation of the later history of the human occupation of the entire Vasilikos Valley is only in its initial stages, though we have confirmed the existence of a dozen sites of the late Roman period, including the slag remains of a copper ore processing site in the region of the mines and a port site that has been partially eroded away by an encroaching cobble beach. The site of Kopetra, which lies midway between the slag site and the port, straddling the natural east-west communication routes along the southern coast of the island, seems to have been selected by its ancient inhabitants primarily for its centrality in a larger transportation network, though market and governmental factors may also have been involved. The scanty historical documents for the late Roman period in Cyprus do indicate that, whatever the ancient name of Kopetra may have been, it was not one of the major administrative centers (i.e., *poleis*) of the island. While it is unclear whether Kopetra fell within the local administrative control of nearby Amathus or slightly more distant Kition, we know *a priori* that it was administered ultimately by the capital city of Cyprus, Constantia (formerly Salamis), and through it by the capital of the late Roman empire, Constantinople.

Our investigation of the settlement of Kopetra itself has revealed an agricultural and mining town that,

though certainly peripheral both to the island's centers and to the imperial capital, nonetheless showed evidence of a high degree of contact with the larger eastern Mediterranean communities of the sixth and early seventh centuries A.C. In the systematic survey, which has sampled over 31,000 sq. m. of the site, over one-third of the recovered fine-ware ceramics were imported from Asia Minor, Egypt, and North Africa. An equally high proportion of the dominant ceramic type, the large transport amphora, was imported from the same regions.

Similarly, the sector excavations at Kopetra have revealed a community which, given its limited economic resources, attempted to participate in the cultural life of the late Roman world. To date we have excavated in two sectors, in both of which, as it turned out, we have uncovered ecclesiastical complexes. In the first sector, Area I, there was a small three-aisled basilica constructed in a composite technique that employed locally available gypsum, poured gypsum plaster/mortar, and field stones. This composite technique was clearly a poor-man's version of the expensive imported marble used in the major Christian basilicas on Cyprus. The Area I basilica contained a subterranean crypt which opened off of its narthex and had a miniature, non-functional, synthronos, which, again, imitated a feature of the major basilicas. The Area I basilica apparently suffered a major catastrophe in the

middle of the seventh century A.C., perhaps at the time of historically attested Arab raids on Cyprus. This supposition received added support when we excavated a cistern just to the north of the Area I basilica. The disarticulated remains of an adult male, an adult female, four children, and two fetuses were found in the cistern in addition to the bones of donkeys, dogs, and several rodents and snakes. Evidently the Christian community at Kopetra had suffered some extraordinary disaster for them to have unceremoniously dumped what seems to be an entire family down a cistern.

Recently, the excavations at Kopetra have concentrated on the basilica in Area II. Here too we uncovered a small three-aisled basilica constructed in the same composite gypsum technique as the complex in Area I. This second basilica, which had an attached southern chapel, was more elaborate than the Area I church. The presbytery in the central nave of the Area II basilica was floored with a geometric-pattern mosaic and the interior columns were ornamented with gypsum plaster details, again, cheap imitation of imported carved marble. The Area II basilica was also

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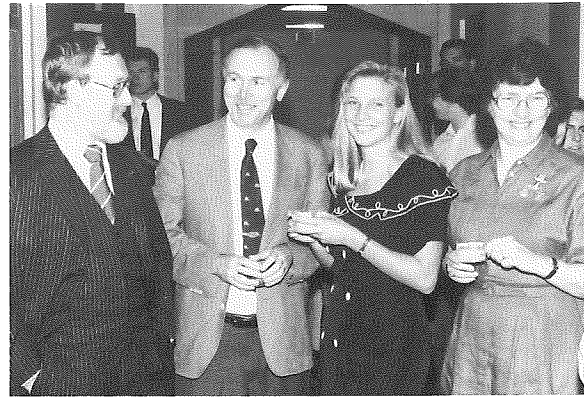


Detail of the central nave of the Area II basilica showing apse, mosaic floor of presbytery, and later benches.

Center Activities...

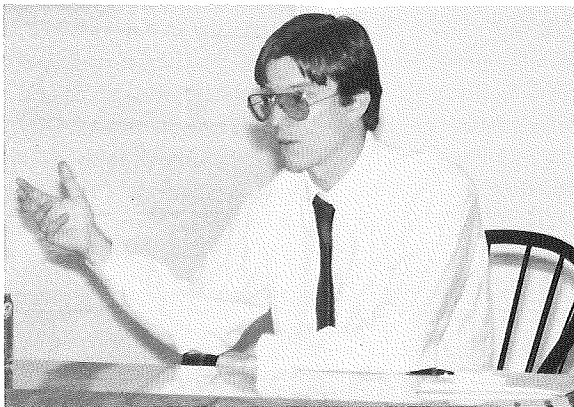
From May through December, 1990, a number of interesting activities were sponsored by the Center for Archaeological Studies and the Department of Archaeology at Boston University. One of the highlights for students, of course, was Commencement when degrees were individually awarded in a special ceremony held in the Department (for a complete list of graduates, see *Context*, Vol. 8, 3-4). Another special event was the Context and Human Society Lecture Series when Professor Alexander Marshack spoke on "Time and Reality in Ice Age Europe" (see page 5 of this issue). A popular event for faculty and students was the noontime lecture series, with informal discussions over a brown-bag lunch. Photographs on pages 10 and 11 by Michael Hamilton.

Professor Norman Hammond (left), who officiated at the Departmental Commencement celebration, presents Matthew Hull the Award for Distinction for his senior thesis on paleoethnobotany of Franchthi Cave. Professor Creighton Gabel (center) participated in the ceremony.

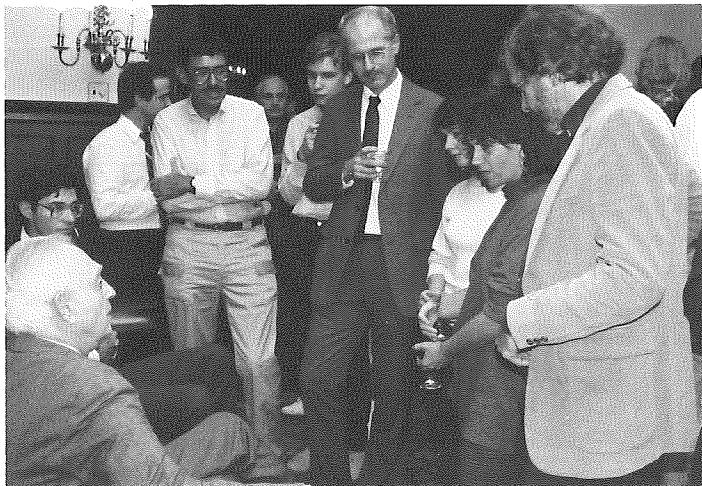


Professor Norman Hammond talks with Juliet Cleaves, who received her B.A., and with her parents, Professor and Mrs. Cleaves, at the Departmental reception following the Commencement ceremony. During the spring, 1990, Juliet participated in the archaeological excavations at K'axob, Belize (see page 12).

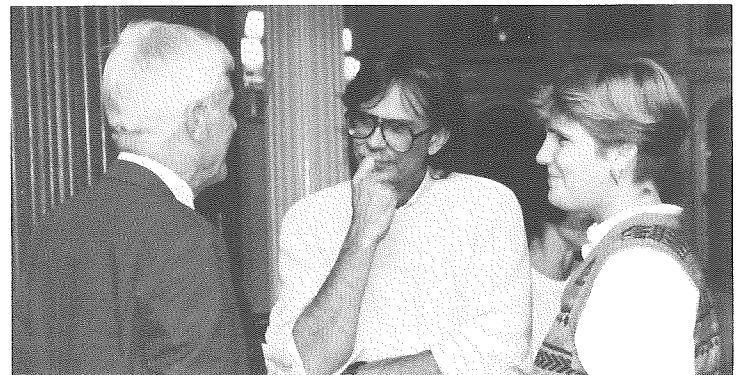
Professor Robert Preucel of Harvard University spoke at a lunch bag lecture on the philosophy of archaeology.



Dr. Julie Benyo (center), Research Fellow in the Department of Archaeology at Boston University, discusses her noontime lecture on archaeological research in Honduras with Professors Clemency Coggins (left) and Norman Hammond.



Professor Alexander Marshack (seated) answers questions during a reception in his honor at Boston University's Castle following his opening lecture.



Professors Creighton Gabel (left) and Timothy Baugh (center) and Teaching Fellow Carol Stein discuss Marshack's lecture at the reception.



The Center for Remote Sensing which was founded in 1985 by the Departments of Archaeology, Geography, and Geology was evaluated in May 1990. Dr. Farouk El-Baz, Director of the Center points out to the Evaluation Committee the plaque announcing the grants from the W.M. Keck Foundation that made possible the establishment of the Center. Members of the Committee are Dr. Anna Roosevelt, Department of Anthropology, American Museum of Natural History; Dr. Ted Maxwell, Chairman, Center for Earth and Planetary Studies, National Air and Space Museum, Smithsonian Institution; and Mohamed El-Ashry of the World Resources Institute of Washington, D.C.

Research Archive of New England Archaeology

The Department of Archaeology, Center for Archaeological Studies, and Office of Public Archaeology at Boston University are pleased to announce the establishment of the Research Archive of New England Archaeology (RANEA). The purpose of the new Archive is to collect in a single research repository all reports, cultural resource management studies, articles, journals, papers, theses, and dissertations relating to the archaeology of the New England states: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

The Research Archive of New England Archaeology is intended to facilitate archaeological research on all aspects of New England's past. At the present time the archaeological literature of the region—especially academic theses and dissertations and the considerable "gray literature" of cultural resource management studies—is dispersed among numerous private, academic, and governmental institutions and agencies. By collecting all materials relevant to New England archaeology, RANEA will facilitate research by scholars, students, professional archaeologists, and planners.

The research value of RANEA is supplemented by the existing archaeological collections of New England prehistoric and historical materials acquired by the Office of Public Archaeology and the Center for Archaeological Studies. Boston University will also entertain applications for curating artifactual and archival data from professional archaeological excavations in the New England area.

The Research Archive for New England Archaeology is housed in the archaeological section of Boston University's non-circulating Stone Library. The archaeological section includes the holdings of the Center for Archaeological Studies, the Department of Archaeology, and the Archaeological Institute of America. The library is also the University's principal repository for the related map and book collections of the departments of Geography and Geology, the Center for Energy and Environmental Studies, and the Center for Remote Sensing. Two other archives curated in the library are the official archives of the Archaeological Institute of America, the photographic archives of the Center for Remote Sensing. The latter includes the J. Wilson and Eleanor Myers archive (in preparation) of aerial photographs of archaeological sites in the Mediterranean area, and the photographic archives of NASA's Apollo missions of Farouk El-Baz, Director of CRS.

The library, headed by David Sauer, is on the fourth floor of the Stone Science Building at 675 Commonwealth Avenue in Boston. Professional archaeologists, students, and other scholars may consult the holdings of RANEA, and are encouraged to send to the Archive copies of their reports, papers, theses, and dissertations. Researchers and consulting firms that regularly produce contract reports are especially urged to make their research available to other archaeologists by establishing a policy of sending a copy of all their reports to the Archive.

For more information on RANEA, hours of operation, and restrictions on its use, contact:

Ricardo J. Elia, Associate Director
Center for Archaeological Studies
Boston University
675 Commonwealth Avenue
Boston, Massachusetts 02215
617/353-3416 or Fax: 617/353-6800

Mr. David Sauer, Head Librarian
Stone Library
Boston University
675 Commonwealth Avenue
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Ancestor Worship and Sanctification of Place: Excavations at K'axob, Belize

by Patricia A. McAnany

During early March of 1990—while Boston was still in the grip of a cold and protracted winter—I departed the campus of Boston University to resume field research in Belize, Central America. I was accompanied by colleagues and staff members Dr. Thomas W. Killion (co-principal investigator), William Van Stigt (head of field logistics and all-around fix-it man), and graduate student Daniel Finamore. Dan was to assist us in getting the project underway and then to proceed to conduct his own dissertation research on the historic logging camps of the New River. Once in Belize we rendezvoused with the students and staff who had been working with Professor Norman Hammond and graduate teaching assistant Elizabeth Platt at the site of Cuello during the first half of the semester.

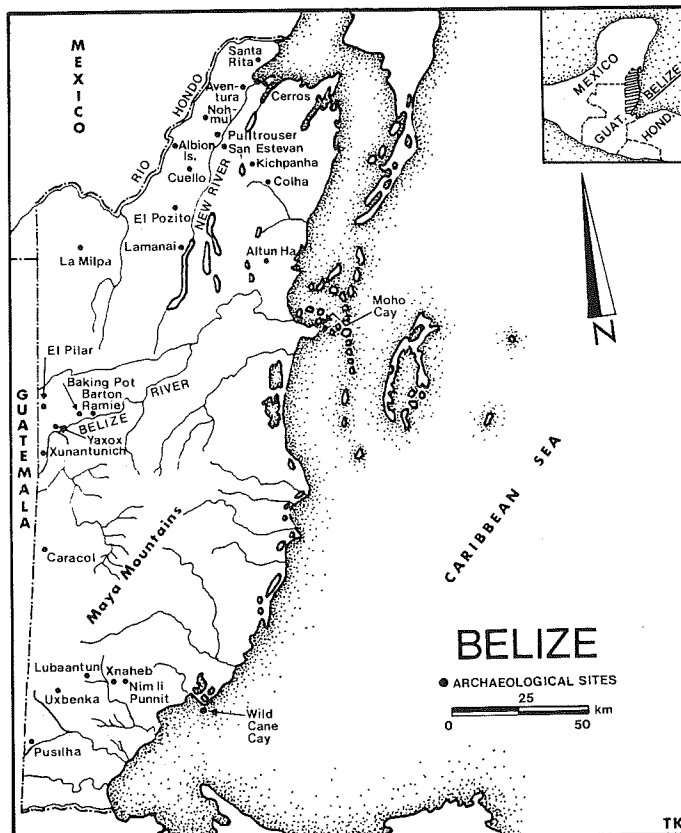
My field research is part of an innovative Field Study in Belize Program

initiated by Professor Hammond and myself. The program involves an entire semester of archaeological fieldwork in conjunction with individualized student research projects. There are no formal lectures in which the student is a passive recipient of knowledge; rather, all learning occurs interactively as the student is completely immersed in all aspects of archaeological field research including survey, mapping, excavation, artifact-processing, analysis, and report writing.

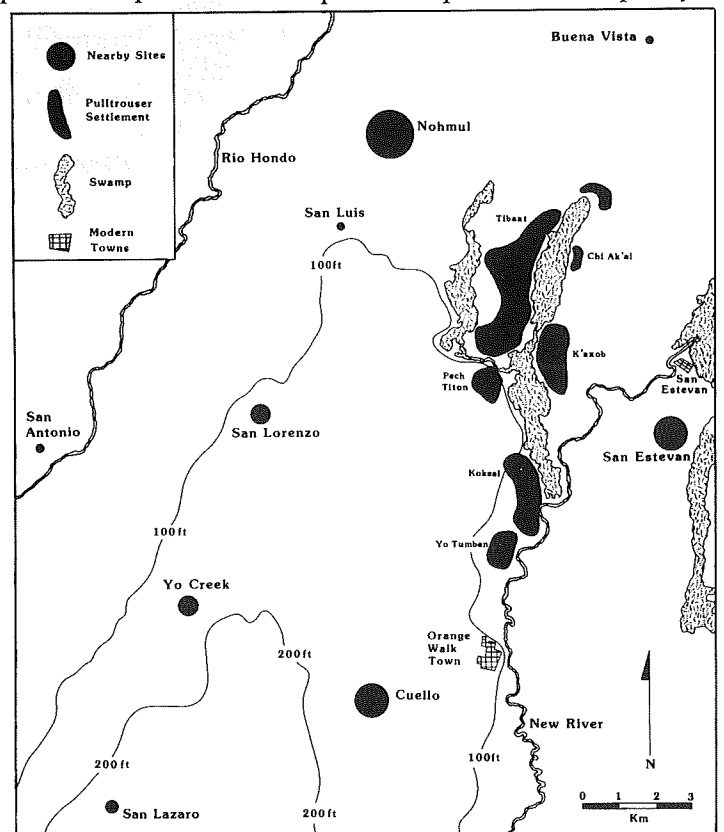
In the previous issue of *Context* Dr. Hammond reported on the first half of the field season during which excavations were conducted in a Preclassic platform at Cuello, Belize. During the second half of the season, we maintained our camp at Cuello and commuted daily over bumpy roads and causeways through swampy marshes to the site of K'axob. At Cuello we continued to enjoy epicurean repasts

prepared by our project cook, Argelia Martinez, who was assisted by all the members of the project (in rotation) and also by her husband, Ovel Martinez, a linchpin in the day-to-day operations of the camp. Camp life at Cuello was relatively comfortable except for the nightly swarm of extremely hungry mosquitos and the periodic tropical rainstorms that thoroughly drenched our every belonging! Cuello is located on a low ridge a few miles to the west of the "modern" town of Orange Walk that, despite its small size (population of about 10,000), is home to no less than seven Chinese restaurants.

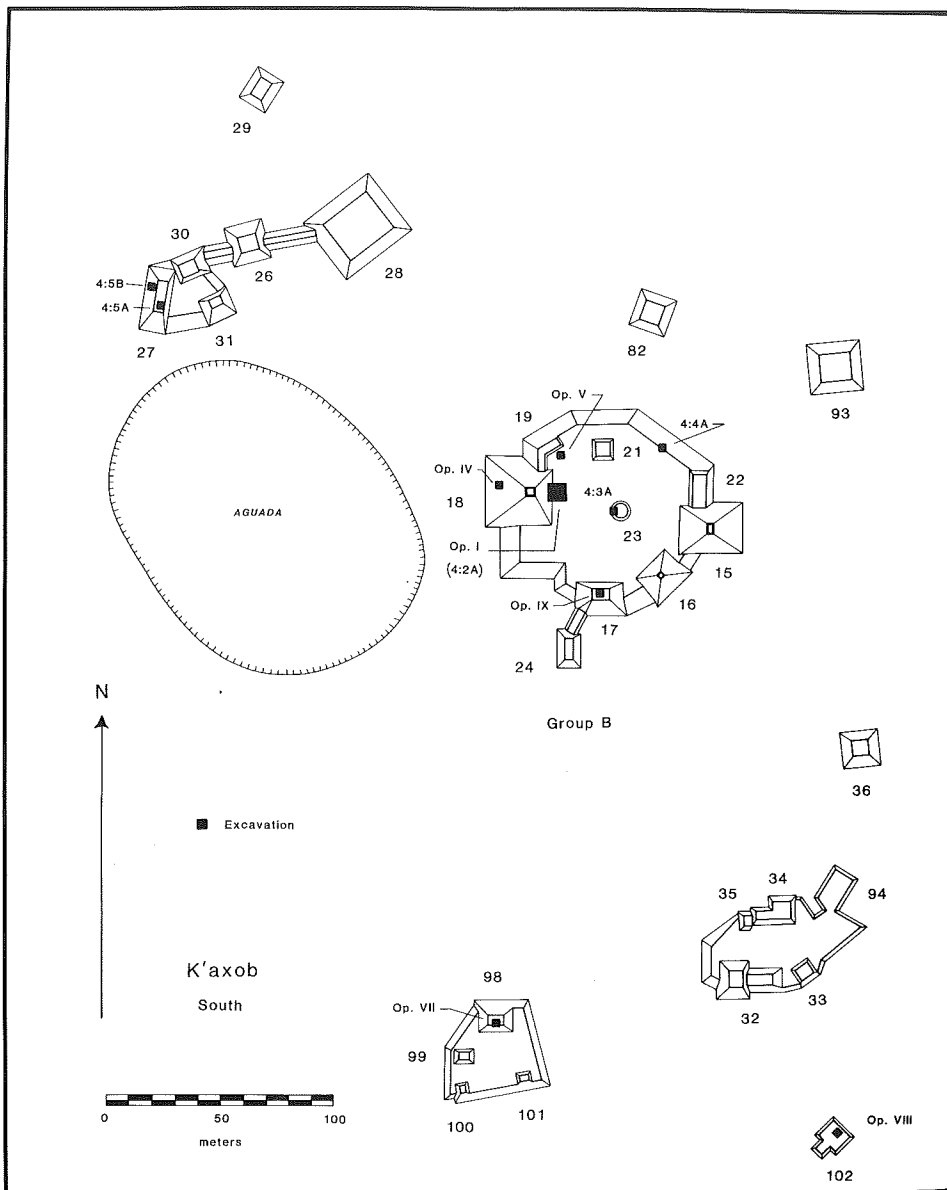
The site of K'axob is situated a few miles north of Orange Walk on a patch of good arable soil. Today, descendants of northern Yucatecan Maya, Rafael Campos and his son Concepción, grow sugarcane and raise cattle on this land. Their hospitality and logistical assistance contributed substantially to the success of the project. To the east of K'axob the New River slowly meanders north to the Caribbean Sea; to the west the land quickly falls away to a large Y-shaped swamp known colloquially



Map of Belize showing Pulltrouser Swamp which is the closest named landmark to K'axob (see adjacent map).



Map showing Classic Maya settlements around Pulltrouser Swamp, including K'axob.



Site plan of the southern part of excavations at K'axob.

as Pulltrouser Swamp. During 1981, as a graduate student on a large interdisciplinary archaeological project, I had been the first to systematically survey, map, and conduct test excavations at K'axob. At that time, the area of Pulltrouser Swamp had been selected for archaeological research by Dr. Peter D. Harrison and Dr. B.L. Turner, not because of massive and ornate temples or pyramids (the traditional criterion employed by Mayanists), but rather because of the small, polygonal platforms that had been built around the shoreline of the swamp. Upon closer inspection these platforms turned out to be remnants of swamp reclamation features constructed 1,500 to 2,000 years ago by the ancient Maya in order to convert the swamp edges into productive

agricultural zones.

Raised fields are not unique to Pulltrouser Swamp; additional research has located similar features to the north in Mexico and to the west in Guatemala. Wetlands, long considered to have been an impediment to the development of Maya society, are now seen as a potentially rich resource for the intensification of agricultural production as well as for the development of fisheries in the canals between the fields. As a result of the faunal analysis now being undertaken by T. Charlene Quirt as part of her Senior Independent Work for Distinction at Boston University, we are learning that the rich and diverse habitat of the wetlands did indeed provide a source of protein (in the form of frog legs, turtles, and estuar-

ine fish) for the ancient inhabitants of K'axob.

From our 1981 field research at K'axob, we learned that the site had a very long occupation that spanned the Formative and Classic Periods (800 B.C.–A.D. 900). Judging from the amount of platform construction material datable to the Late Classic Period, it appears as though K'axob reached its maximum population during this time. All told, the population of this site probably never exceeded 200–300 people. By Maya standards, K'axob is an extremely small site, which makes research at this location all the more valuable since sites on this rung of the Maya site hierarchy are rarely investigated. As a result of this neglect and the relative overemphasis on the monumental cores of large Maya cities, many questions regarding local community autonomy or possible exchange networks have gone unanswered. For instance, as a result of our earlier excavations, we were able to determine that the residents of K'axob and other settlements around Pulltrouser Swamp had participated in an exchange network through which they were provisioned with hand-crafted axlike stone tools. Based upon a wear-pattern analysis, I was able to suggest that these tools were agricultural implements. As such, they are found primarily in the construction fill and domestic middens of agriculturalists and are not commonly associated with pyramids.

During the initial field season at K'axob in 1981, I had excavated one particular test trench that held great promise for further research. Located on top of a 2-m tall platform, the trench was positioned directly in front of a low, 4-m tall pyramidal structure (No. 18) that flanked the southwestern side of a large basal platform. As we excavated down through the layers of Classic Period construction fill, we came upon a stratified sequence of Formative floors and midden deposits. Botanical preservation was exceptional and included a specimen from the tree of the chocolate bean (*Theobroma cacao*)—the earliest yet excavated from the Maya Lowlands.

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Wood charcoal from these midden deposits has yielded a radiocarbon date of 805 B.C. (calibrated), which indicates that K'axob contains deposits dating to a period referred to as the Middle Preclassic—a time when the Yucatan Peninsula was sparsely populated with small villages of maize agriculturalists.

With the assistance of thirteen undergraduate students from Boston University and graduate students Elizabeth Platt and Daniel Finamore, in 1990 we expanded excavations at Structure 18 to an area 6 m x 8 m. The control grid was established immediately to the north of the 1981 test trench. The complex deposits that we were to encounter were tracked by Jacquelyn White, who assembled a Harris Matrix of the stratigraphy as the excavations unfolded. After establishing the horizontal control grid and setting in vertical controls, we removed the collapsed stone and slumped deposits along the front face of the pyramidal structure. First, we found the basal step in the front of the Terminal Classic pyramid and some fragments of red-painted stucco, which suggest that the final structure was painted red, as was commonly the case for sanctified structures among the Maya.

Nothing else remained of the final

structure, so after we photographed and mapped the stones, we continued excavation through a thin Early Classic construction unit that had left no trace in the 1981 test trench. After we removed that layer, the excavation became really interesting. A Late Formative wall that was exposed in the 1981 test trench actually turned out to be the retaining wall of an oval platform. The surface of the platform was riddled with small, bell-shaped burial pits containing some seated and other totally disarticulated burials, each with one or more associated ceramic vessels. The Maya commonly interred their dead under house floors, but seven burials in one floor suggest that this location may have had particular mortuary significance. This idea was born out by further excavations on the opposite side of the excavation unit.

The western edge of the oval platform was marked by the placement of several dedicatory caches. Conceptually similar to the use of cornerstones in our culture, dedicatory caches were interred by the Maya to mark the construction, renovation, and sometimes even demolition of a building. Even modest structures, such as this small oval platform, were dedicated in this sense. One of these cache deposits contained a Terminal Formative flanged vessel on top of a

barrel-shaped vase. Both vessels were surrounded by twelve solid plaster spheres, each about seven centimeters in diameter. A few of the spheres had been broken by the weight of the overlying sediments and they revealed no hidden internal contents. The remaining unbroken spheres will be x-rayed for imbedded objects. Inside the barrel were small carved pieces of shell, jade, and coral, probably once the elements of a mosaic.

To the west of the oval platform, we traced a well-preserved plaza floor that continued to the western wall of the excavation and, most likely, beneath the Classic Period pyramid of Str. 18. Just shy of the western wall of our excavation, there was a low platform, possibly a shrine, covering an oblong trench. The contents of this meter-deep trench included an incredible mishmash of mostly pulverized human bone fragments, including a plethora of toe bones. Associated grave goods suggest that among the individuals who were ultimately interred at this location there were some extremely important members of the community of K'axob. These individuals were buried with a giant cowrie shell; fans with elaborately carved bone handles; a couple dozen shell tinklers perforated for stringing onto a necklace, bracelet, or anklet; a mother-of-pearl shell amulet; four ceramic vessels and one tiny, red ceramic spouted jar. Two of the vessels had a very distinctive cross brush-stroked on their bases (one on the interior and one on the exterior).

The cross motif is somewhat rare in Formative Maya deposits, although the quadripartite partitioning of space is considered to be a basic element of Maya cosmology; during later Classic times, it is found commonly on stone-carved and painted surfaces. We did not, therefore, expect to see this motif again at K'axob. As we began to excavate a small circular burial pit just to the north of the oblong pit, however, we found three more ceramic vessels interred with two individuals. This time all three of the vessels contained the cross motif. In contrast, none of the burials from the oval platform on the eastern side of the excavation had contained



Eastern portion of Operation 1 showing the outline of house platforms being excavated by Boston University students.

vessels decorated with this quadripartite design.

There has been much speculation by the staff regarding the symbolic meaning of the motif. Some distinct possibilities now under consideration include the following. The design is (1) a maker's signature, (2) a lineage icon used by one of the primary families or lineages of K'axob, or (3) an abstract representation of a basic quadripartite form that structured much of Maya cosmology.

As excavations continued in the large 6 m x 8 m square, other students learned the fine art of topographic instrument mapping. The final topographic map of the excavated platform complex is being prepared by Ingrid Martinova. Surrounding areas that were tested by excavations during the latter half of the season were mapped by Ann Cox.

Many of the platforms of K'axob had been sampled during the 1981 field season using a random sampling selection process. But now we wished to know something of the nature and time period of occupation in the other platforms that shared the basal platform of Structure 18 and others of the smaller peripheral platforms that were hidden in the sugarcane fields of southern K'axob. Juliet Cleaves, who now holds an apprenticeship in forensics at the Walter Reed Hospital in Washington, D.C., was charged with conducting a program of test excavations in the low platforms contiguous with Structure 18 in order to determine the extent of structures and debris that could confidently be char-



Carved bone fan handles associated with a multiple burial in an oblong trench.

acterized as residential. We were interested in determining whether the final, Late Classic use of this large platform complex had been purely ritual or mixed ritual/elite residential. Preliminary analysis of the information from the test excavations indicates the presence of residential structures ringing the edge of the large, basal platform.

Co-director Thomas W. Killion also supervised the systematic surface collection of artifacts from the sugarcane field to the south of the large basal platform. As a result of this collection, we are able to pinpoint areas that may contain very low structures not visible on the surface. A magnetometer survey planned for this field will complement the surface collection data. Surface collection was followed by test excavations at two platform locations in this field. Three students conducted these test excavations in ancillary platforms to the south of the main platform. Matt McDermott, who finished the field study program in Belize and then joined a University of Hawaii-sponsored archaeological research team investigating prehistoric Fiji, teamed up with Kate Camilletti, our resident shell-bead expert, to test the deposits of Structure 98. Through their efforts, we discovered that there was a strong Early Classic construction component at Str. 98. Excavations at the large platform to the north, ironically, had revealed very little evidence of construction during the Early Classic Period. To the southeast of Str. 98, Marc Wolf, a creative writing major at New York University, tested a small, low mound that, at the time, was thought to have been primarily a natural hillock. The discovery of several burials interred within lenses of construction fill, located immediately under the modern ground surface, soon put an end to the notion that this location may have been a natural feature. Quite modest in height (less than 50 cm), Str. 102 had been a residence, and the record of its inhabitants was sealed under its many sequences of renovated floors. One of the Early Classic residents had been interred with a large, open bowl supported by mammiform tetrapods.



Ceramic vessel decorated with a cross motif and excavated from the oblong burial trench.

The two-month field season rapidly came to a close, with my two student laboratory directors, Lisa Shaul and Mari Sunahara, directing the careful packing of the artifacts for shipment. With the photographic skills of Matthew Bobo we assembled photographic documentation of unique or otherwise photogenic artifacts prior to shipment. We are very fortunate in that the Belizean Department of Archaeology, under the direction of Mr. Harriot Topsey, granted us permission to export all of the artifacts and related materials to Boston University for intensive analysis. The materials are on loan from the government of Belize for two years.

In the laboratories of the Department of Archaeology, analysis of the material is now underway. As a result of our very aggressive paleobotanical sampling program, Elizabeth Platt is now combing through thousands of fragments of charcoal from tropical woods and charred seed fragments of everything from wild grass to maize kernels. While Charlene Quirt identifies fish bone, Lisa Shaul works laboriously on the refitting of potsherds and the reconstruction of ceramic vessels. Meanwhile, Robert St. Laurent and Ingrid Martinova are learning to draft "camera-ready" illustrations from field maps, plans, and profiles. Lorren Jackson is tackling the complicated burial patterns of K'axob for his Senior Independent Work for Distinction. He is analyzing the burials recorded at K'axob in relation to ethnographic and

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The First Floridians: Underwater Archaeology at Little Salt Spring

by John A. Gifford

From the surface, Little Salt Spring looks much like any of the hundreds of shallow water ponds in the Sandy Flatlands of Southwest Florida. In the 1950s a local SCUBA diver discovered that the spring is actually a sinkhole flooded by the present high water table that characterizes South Florida. Over the next decade human skeletal remains, artifacts, and bones of extinct megafauna were removed from Little Salt Spring in uncontrolled excavations.

During the 1970s, when the spring was owned by the General Development Corporation of Miami, controlled underwater excavations were directed by Carl J. Clausen. As a result of his work (Clausen *et al.* 1979), we know that Little Salt Spring contains an intact sedimentary record

rich in prehistoric human burials, cultural materials, and plant and animal remains. The thickest are in the upper spring basin, which may be envisioned as containing a wedge-shaped ring of sediments, thickest (more than three meters) around the spring's shoreline and thinning to zero at its drop-off, about twelve meters below the present surface. The scattered artifacts and informal hearths revealed in test pits date to 10,000-9,000 radiocarbon years b.p., and are interpreted as representing seasonal campsites of late Paleo-Indian age.

Evidence of early Palaeo-Indian activity was discovered on the so-called "26 meter ledge" deep in Little Salt Spring. There, in absolute darkness on the floor of a low, shallow cave that circles the entire spring

throat, rests a 1-m thick deposit of limestone rubble and mud enveloping the bones of extinct megafauna such as giant ground sloth, mammoth, and giant land tortoise. A sharpened wooden stake found in direct association with the tortoise shell was radiocarbon-assayed at 12,030 years b.p., thereby making Little Salt Spring the site of the earliest dated human activity in Florida.

It is not only the great age of the Little Salt Spring cultural deposits that accounts for the site's unique value, but also the nature of the things preserved. Deep groundwater welling up from limestone strata thousands of feet below the Florida Peninsula contains high concentrations of dissolved minerals and almost no oxygen; consequently none of the bacteria and other micro-organisms that are found in most groundwater can exist deep in the spring's muds. What this means for our knowledge of Paleo-Indian subsistence in the southeast is simple: the evidence is preserved. Humans have always used a wide range of natural materials to fashion the artifacts they used to survive to obtain food and shelter. The stone tools—arrowheads and spearpoints—that characterize most prehistoric sites are common only because all the other materials (reed baskets, vine ropes, sinew cords, skin hides, wooden and bone tools) have disintegrated, leaving just the nearly indestructible

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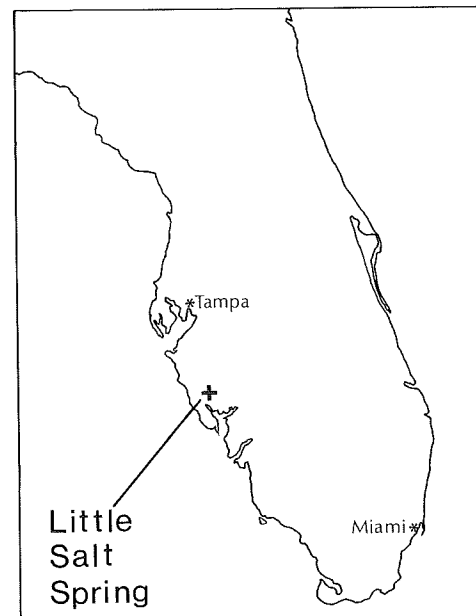
ethnohistoric documentation of ritualized corpse treatment surrounding the interment of the dead, particularly in societies in which ancestor worship is practised. Lorren is also developing a taphonomic model of bone attrition, which he will apply to the burials from K'axob in order to separate out the anatomical parts that have decayed from those that were not interred originally with the body.

In very general terms, our research at K'axob has chronicled the progressive sanctification of a location that began as a small, Middle Formative residence. Over hundreds of years, many people lived, died, and were buried at this spot (including presumably members of the community). Within many agrarian cultures close links with the ancestors and with the agricultural land that was originally claimed by them are extremely vital to status and continued access to resources. In such cultures, the places at which the ancestors of long-lived households are buried can become sanctified places. At K'axob, a pyramid was raised eventually over the entire Late Formative mortuary com-

plex. This progressive ritualization of a residential locale suggests amazing stability in the occupation of K'axob over a two-thousand-year period. A key concept that describes a settlement such as K'axob is residential stability. Over this long period of occupation, this large platform complex and its ancillary platforms, which were probably inhabited by related members of a large extended family, became distinctive cultural landmarks on the relatively flat landscape of northern Belize. They may not always have been occupied by the same family, but our excavations indicate that they were seldom abandoned for long periods of time while the settlement remained vital.

Completion of the excavation at Structure 18 and associated programs of field research will require approximately two more seasons. Pending funding, the next season of research at K'axob will be during the summer of 1991.

Patricia McAnany is an Assistant Professor of Archaeology at Boston University. She is co-editor with Barry Issacs of Prehistoric Maya Economies of Belize (J.A.I. Press: 1989 Greenwich, Connecticut).



Map of Florida.



Low-angle oblique aerial view of Little Salt Spring, looking westward toward the Gulf of Mexico, about eight miles distant.

stone artifacts behind. Clearly, we have a far better chance of reconstructing a picture of daily life in Florida more than a hundred centuries ago than might be done from the excavation of almost any other site of comparable age in North America. This is the essence of Little Salt Spring's uniqueness.

No excavation was conducted at Little Salt Spring between 1980 and 1986. In 1982 the site and 100 acres of surrounding bayhead hammock were donated to the University of Miami to hold in trust as an archaeological and ecological preserve. Thanks to a small grant from the University of Miami's College of Arts and Sciences, I was able in 1986 to resume excavation there on a small scale. A test trench four meters square was placed just south of the floating dock on the west side of the basin edge. Excavation was continued down to a level of pure eolian quartz sand containing shaped and fire-hardened oak wood fragments that are very firmly dated to 8,000 radiocarbon years ago.

At the same time that this square was excavated, the square immediately to the southwest produced an Archaic burial in peat deposits overlying the quartz sand. The neural tissue contained in this individual's skull was immediately frozen in liquid nitrogen and samples sent to

Svante Paabo of the Department of Biochemistry, University of California, Berkeley. Using sophisticated analytical techniques that he pioneered for this application, he was able to reconstruct mitochondrial DNA sequences from the tissue, radiocarbon-dated at 7,000 years b.p. (Paabo *et al.* 1988).

The anoxic nature of the excavated deposits in the basin and on the 26-m ledge suggested that similar conditions exist at the bottom of Little Salt Spring. In March of 1990, with funding provided by the National Geographic Society, we obtained cores for palaeoenvironmental analysis from the bottom, at a depth of sixty meters below the spring surface.

We used a submersible vibracorer to obtain seven cores in disposable aluminum tubes four inches in diameter and forty feet (12.2 m) long. The vibracorer proved to be the ideal sampling device for these unique conditions, and allowed the recovery of perfectly undisturbed sediment sequences from the bottom deposit.

The lowermost sections of all the 12-m long cores contain a mixture of quartz sand in which we have recovered ecofactual and artifactual material, such as oyster shell (*Crassostrea virginica*) and large wood fragments, some of which exhibit worked surfaces.

So far we have processed one radiocarbon sample, a live oak (*Quercus virginiana*) fragment from near the bottom of Core I, about eleven meters below the sediment surface (71.8 m below the spring surface). The date returned (Beta-36,591) is 9,660 +/- 60 radiocarbon years b.p. (uncalibrated). This is unexpectedly young given the sample's depth, and needs confirmation by means of dates on some of the many other large wood fragments present in the cores.

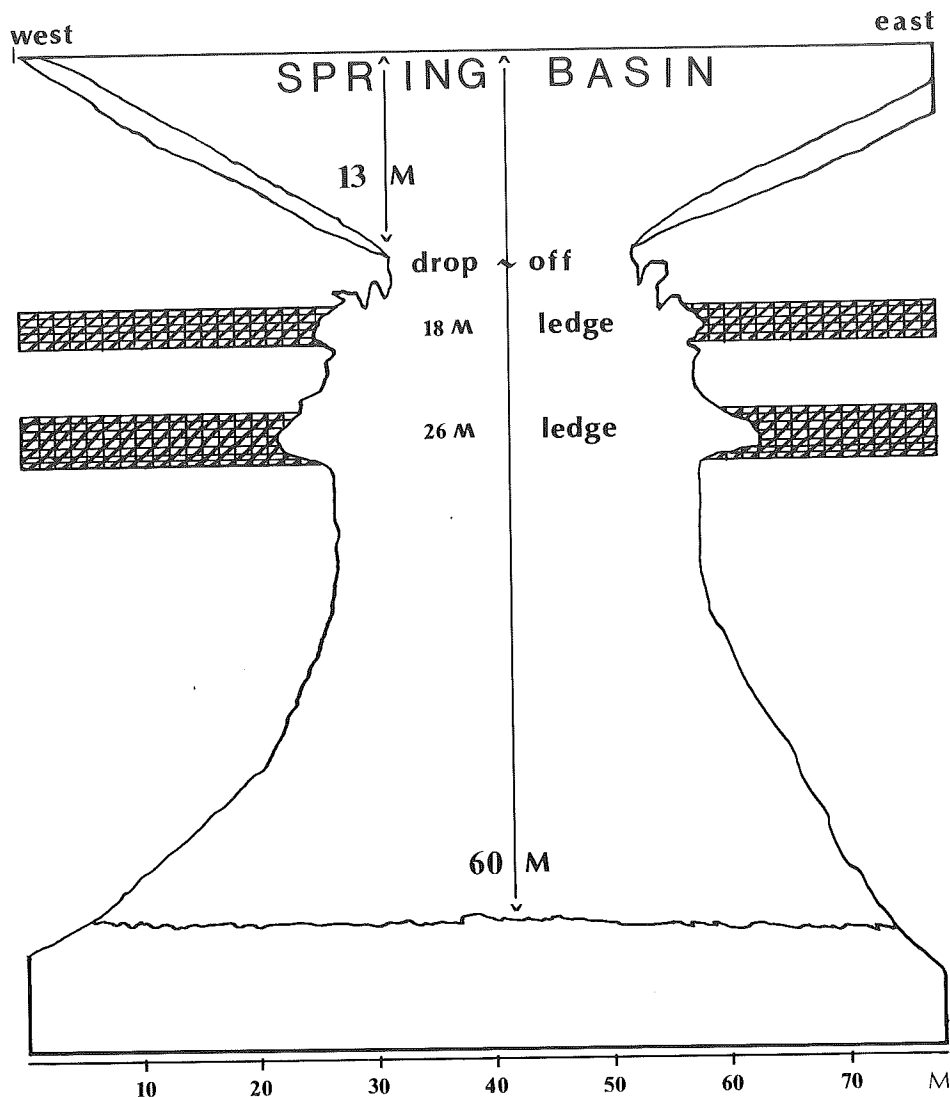
Little Salt Spring is the deepest water body so far cored in Florida. If the single date is correct, it indicates an extraordinarily high rate of sedimentation (about 1 cm/yr) for the spring in Mid to Late Palaeo-Indian times, at the beginning of the Holocene Epoch. Possibly some major change in the depositional environment in the spring happened about then. Laboratory analyses of core samples for microfossils such as pollen, ostracods, and cladocera are underway by various specialists around the country, and synthesis of the results will allow the reconstruction of the Holocene palaeoenvironment at Little Salt Spring.

In addition to the recent palaeoenvironmental research at Little Salt Spring, major underwater excavation also will resume in the near future. A

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Work in the 1986 test pit on the southwest side of the spring circumference. The diver is kneeling, at about two meters below the spring surface, on the quartz sand surface that pre-dates 8,000 radiocarbon years b.p.



Schematic cross-section of the spring, illustrating the classic karst sinkhole morphology and identifying the areas where cultural material has been found in test excavations.

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grant is expected to be made from the state of Florida (through the Division of Historical Resources of the Department of State), which will fund a four-month excavation season in the spring basin during late 1991.

Because Little Salt Spring is a unique site, it invites the use of unique and innovative techniques in its excavation, in order to maximize the efficiency of data gathering and manipulation. Techniques of underwater excavation necessarily differ from those used in land operations because of the surrounding medium. The underwater environment, even where relatively shallow, as in the Little Salt Spring spring basin, requires that the sedimentary matrix be removed using injection dredges, which will be powered by electric pumps. Such equipment was used

very successfully in the 1986 test excavation.

Basic excavation technique involves the complete documentation of *in situ* features, ecofacts, and artifacts in order to record their context before removal for conservation and analysis. Archaeological excavation underwater is no different in this respect from its terrestrial counterpart. Underwater recording, however, is particularly time-consuming, given the reduced visibility and light levels.

In the past, recording of shipwreck sites in the Mediterranean has been automated to a great degree by applying the techniques of stereophoto mapping (suitably modified for the underwater environment) to the gross recording of shipwreck hull elements (e.g., Bass 1987). In the planned excavations at Little Salt Spring we will extend this automated recording tech-

nique to its next logical evolutionary step: the application of high-resolution underwater videocameras capable of capturing an optically corrected digital image of the excavation surface, at a scale suitable for resolving the smallest objects seen by the excavators (1-2 cm in maximum dimensions). Thus we will record the three-dimensional provenience of artifacts accurately and rapidly using a stereo videographic camera system. Each 2 x 2 m square will be treated as four quadrats in terms of provenience recording. All discernible features (e.g., pits, burned areas, burials) will be treated as separate analytical units.

The full range of ecofacts (plant remains, animal bones and possibly soft tissue, and sediments) recovered from the basin operations during this project will allow us to reconstruct the daily activities of the First Floridians with a degree of detail and authenticity that is impossible for most other sites at which preservation is only average. All the palaeoenvironmental and cultural information generated from these recently completed and planned projects will allow, for the first time, some valid conclusions to be drawn concerning the nature of the deposits in the Little Salt Spring basin and their spatial distribution, and suggest the best path for management of this unique underwater cultural resource.

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Profiles of the Past

Our Archaeological Heritage

by Ricardo Elia

A Whydah "Museum" Is Not a Good Idea

A shortened version of this article appeared in the Op-Ed section of the Boston Globe on September 10, 1990.

The controversy surrounding the commercial salvage of the pirate ship Whydah is entering a new phase as the project is seeking support for a pirate museum in Boston. The Whydah investors hope to team up with a developer interested in bidding on a site near the Boston waterfront. The current site of choice is Central Wharf, now occupied by the New England Aquarium, which will be relocating to the Charlestown Navy Yard. There are also reports that the project may be arranging a temporary conservation exhibit in a museum on Cape Cod.

Setting up a museum to house and display the artifacts recovered from the Whydah, which sank off Cape Cod in 1717, may sound like a good idea. But is it really in the public's best interests?

The wreck site of the Whydah was

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destroyed, apparently in the same mid-seventh century raids. Unlike the complex on Area I, however, the Area II basilica was partially rebuilt, with two small churches being constructed in the sanctuaries of the basilica and the southern chapel. The church built within the central nave reused the apse and mosaic floor of the presbytery and had low benches running along walls constructed on the lines of the earlier colonnade. In an exterior space between these later churches we uncovered a simple slab tomb with the remains of two elderly men, perhaps associated with this later rebuilding.

The KKP still has much to do in

discovered in 1982 by treasure hunter Barry Clifford. From the start, the salvaging of artifacts from the site was undertaken not for research but for profit. Since 1987, the project has been financed by the Whydah Partners, a limited partnership organized by E. F. Hutton and Whydah Management Company. In all, some \$6 million of venture capital has been raised from investors wishing to capitalize on the recovery of artifacts from the site.

Archaeology, as a scientific discipline, was not intended to be part of the original Whydah project; it came about only after the intervention of state and federal authorities who wished to impose professional archaeological standards on the treasure-hunting operation. Between 1983 and 1988, Clifford's firm operated under an unenlightened state law, still in effect, that encourages commercial salvage of shipwrecks in return for some measure of archaeological control and a share of the value of the recovered artifacts. Clifford, under protest, agreed to the state's condi-

order to fulfill its potential for increasing our understanding of the end of antiquity in Cyprus and the eastern Mediterranean. Aerial photographs of the site, taken last summer from a Cypriot army helicopter lent to the project by the President of Cyprus, remain to be analyzed. The modern use of Kalavassos's gypsum resources has been documented, and comparative samples of ancient and modern gypsum and gypsum plaster need to be studied. Further digging in the settlement proper is essential to provide a complete picture of this regional community caught between east and west.

Murray McClellan is Visiting Assistant Professor of Archaeology at Boston University.

tions and eventually won control of the site from the state after a five-year legal battle. Despite this victory, the project must still comply with archaeological procedures required under a 1985 agreement with the U. S. Army Corps of Engineers.

Most archaeologists and preservationists believe that the excavation of archaeological sites for commercial purposes and the buying and selling of artifacts for personal gain are unethical, even though such practices may be sanctioned by regressive laws. Many professional archaeological organizations, including the two largest groups of American archaeologists, have taken ethical positions against the commercial exploitation of archaeological sites. One of these, the Society for Historical Archaeology, censured the Whydah project at its last two annual meetings by banning papers from the project's principal investigator, an archaeologist hired by the treasure hunters.

The current plans to create a museum raise several important questions.

What kind of museum is being planned? According to the Whydah Joint Venture, which consists of the Whydah Partners and Clifford's Maritime Explorations, Inc., there would be a "themed pirate attraction," including a floating replica of the Whydah serving as a museum to exhibit artifacts and staffed by guides in pirate costume. There would be a pirate tavern, souvenir shop, and a working conservation lab demonstrating how recovered artifacts are restored.

Would the new museum qualify as an accredited maritime museum? This seems doubtful. The bylaws of the Council of American Maritime Museums, whose 48 member institutions include the Smithsonian, Mystic Seaport, and the Peabody Museum of Salem, prohibit the acquisition and display of artifacts recovered from commercially exploited sites.

Would any of the artifacts be sold? This is an important issue. One of the criticisms of commercial salvage operations is the inevitable loss of information that results when the collection is broken up and
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CALENDAR

February 21, 1991

Dr. Phil Kohl, *Preliminary Archaeological Investigations in Transcaucasia*.

February 28, 1991

Dr. Steven Pendery, *The Archaeology of Brook Farm*.

March 14, 1991

Dr. Anthony Aveni, *Order in the Nazca Lines*.

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sold off piecemeal. The Whydah Joint Venture claims to want a "permanent" home for the Whydah, but there is nothing to stop them from selling the marketable artifacts, especially the coins, while retaining some of the collection for display. Despite current talk about keeping the collection together, the joint venture made a consulting agreement with Sotheby's auction house in 1987 with a view to auctioning the artifacts. If artifacts are destined to be sold, the "museum" could, in effect, become a pre-sale public showcase for the investors.

When a Whydah museum was being proposed for the Custom House a few years ago, the proposed museum was only intended to be a temporary display while the artifacts were being conserved. The current plans to include a working conservation lab suggest a similar marketing strategy. What happens after a few years when all the artifacts from the Whydah are conserved? Will the museum go away, or will it become a base for the commercial salvaging of other shipwrecks?

The public deserves straight

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March 19-21

Dr. Martin Biddle, Three Context and Human Society Lectures. **March 19:** *The Tomb of Christ: Investigating the Church of the Holy Sepulchre, Jerusalem, 1989-90*; **March 20:** "And they conquered the kingdom," *The Viking mass burial of A.D. 873-74 at Repton*; **March 21:** *King Arthur's Round Table: An archaeological detection*.

answers to these questions. In the final analysis, however, the most important issue is not whether some, all, or none of the Whydah artifacts will be sold to the highest bidder. What is important is whether or not a proposed "museum" devoted to treasure hunting and "archaeology" for profit should receive support as a cultural attraction. Eyepatches and fowl-mouthed parrots aside, a Whydah pirate theme park on Boston's historic waterfront—or anywhere else—would be a disgrace to a state that prides itself on its historical awareness, historical preservation, and a maritime history second to none. By all means, let's have a real, accredited maritime museum on Central Wharf—but let's make it one that would teach our children to regard our dwindling inventory of underwater sites as precious archaeological resources for everyone, not as sources of profit for a few.

Ricardo J. Elia is Director of the Office of Public Archaeology at Boston University and Chairman of the US/ICOMOS Archaeological Heritage Management Committee. Profiles of the Past appears as a regular feature in each issue of Context.

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April 11, 1991

Dr. Richard Meadow, Current Research in Harappan Archaeology in Pakistan.

April 25, 1991

Symposium: *Rise of Complex Societies and the Early State of Egypt*
Dr. Kathryn Bard, moderator.

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