

CONTEXT



Maya carved lintel from excavations at Dzibilchaltun in Yucatan (see page 22).

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Satellite Imagery, Survey, and the Earliest Humans in Greece

The Discovery of a Palaeolithic Handaxe at Kokkinopilos in Epirus

by Thomas Tartaron and Curtis Runnels

For archaeologists studying the Palaeolithic in Greece, a handaxe is like the Holy Grail. A handaxe is a large flaked-stone tool that has been taken as the characteristic marker of the Lower Palaeolithic (about 1,000,000 to 125,000 years ago) in Europe since the famous discoveries of Boucher de Perthes in France over 150 years ago. It comes as no surprise, therefore, that the discovery of a well preserved handaxe in a secure geologic context at Kokkinopilos near Preveza by members of the Nikopolis survey team on Monday, June 3, 1991, quickly became a major news story. But to understand how the Nikopolis team came to be in the arid badlands called Kokkinopilos, we must first say something about the Palaeolithic in Europe and Greece.

The Palaeolithic, or Old Stone Age, spans the period from 2.6 million to 10,000 years ago and is well known from many archaeological sites that have produced characteristic stone tools and fossilized remains of early humans in Africa, the Near East, and Asia. The first humans to colonize Europe, however, made their appearance sometime within the last one million years. The first humans in Europe found cool, dry glacial conditions that continued with short intervening warming periods known as "interglacials" until the end of the Palaeolithic.

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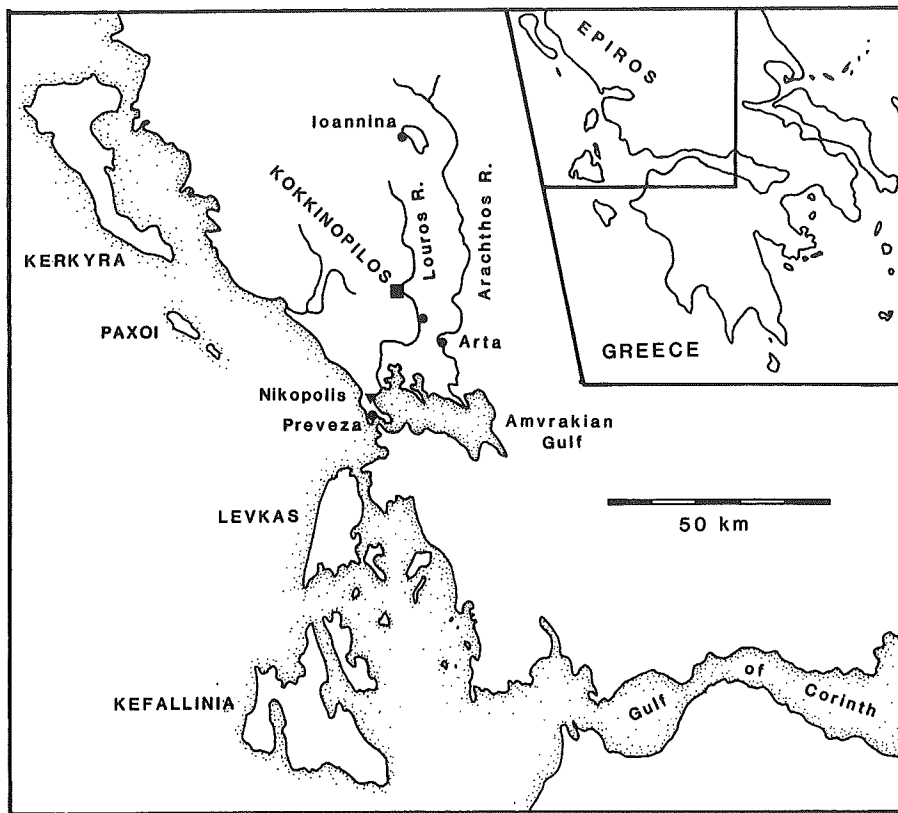
Archaeology and Remote Sensing in the Region of Nikopolis, Greece

by James Wiseman

The use of satellite imagery in archaeological survey dominated the concerns of archaeologists and geologists involved in the 1991 survey project by Boston University in the region of ancient Nikopolis, Augustus Caesar's "City of Victory" in southern Epirus, Greece. Although the most spectacular result of the summer was the fortuitous discovery of an Acheulean handaxe, the first reliable evidence for human presence in the Balkan peninsula during the Lower Palaeolithic, (see the article by Tartaron and Runnels in this issue of *Context*), most of the staff's efforts in this initial field campaign were directed towards identifying on the ground landcover and features recorded by remote sensors on spacecraft, gaining first-hand familiarity with the varied terrain, and laying plans for a longer-term archaeological and geological survey of southern Epirus.

This new project of the Center for Archaeological Studies and the Department of Archaeology is sponsored by the American School of Classical Studies at Athens, and is a joint undertaking with the Greek Archaeological Service. It has as its broad, general aim the explanation of the changing relationships between humans and the land and resources they exploited in this large region (about 400 square kilometers) of northwestern Greece (see map). In this investigation of land-and-human

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Map of northwestern Greece, showing Kokkinopilos and Nikopolis.

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relationships from earliest times to the mediaeval period, the multidisciplinary team is studying the cultural remains in their environmental settings.

Imagery, Maps, and Ground-Truthing

Prior to departure for the field, staff member Carol Stein, a doctoral candidate in archaeology, subdivided parts of the multispectral (MSS) images the Project had acquired from the French satellite system, SPOT, into twenty scenes of the survey area, each depicting an area of twenty square kilometers and equivalent to a scale of 1:50,000, the same as the series of Hellenic Army maps also used by the Project. She then classified the scenes into fifty types of landcover, and printed five transparencies with ten false-color classifications on each to use as overlays on prints of the background images.

These copies of the computer images were taken to Epirus where one of the principal tasks of the summer was to identify the different types

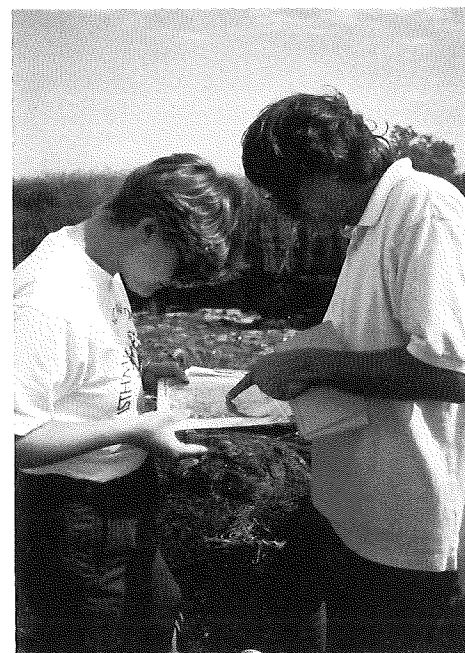
of landcover represented by the false colors of the classified scenes. The prints of the enhanced imagery were used by ground-truthing teams in combination with panchromatic SPOT images of finer resolution, aerial photographs, and both 1:50,000 regional maps as well as 1:5,000 maps for more precise location. The teams routinely determined the latitude and longitude of their locations, as a check against the maps, by making use of global positioning stations (GPS), which obtain the data by communication with the navigational satellites now orbiting earth.

The ground-truthing teams, led by Professor Timothy Baugh, identified twenty-seven kinds of landcover, including almost all of those represented in the images by significant clusters of pixels, or picture elements (the smallest feature the sensor could detect). The success in identification of the false colors with specific kinds of vegetation — or, most often, combinations of vegetation and other natural or man-made features — led to the formulation of a reverse of the methodology more suited to the kinds of archaeological problems the survey

poses. That is, one of the hopes of the Project is to be able to identify in the images false colors and delineations that indicate either cultural remains or the kinds of physical settings in which cultural remains of a specific kind are known to exist. Towards that end, the teams made detailed observations at known ancient sites that could be located on the images, with the plan in mind to discriminate specific classes for those sites (termed "training areas") in the computer lab back in Boston.

This process is being applied to ancient quarries, fortified hilltop settlements, portions of the Roman aqueduct, and the eroded landscape of Kokkinopilos, where the Acheulean handaxe was discovered. If the methodology is successful, it should be possible eventually to identify, or at least postulate, similar features in the images by means of their "spectral signature." It is significant in this regard that just by using the distinctive coloration for the Kokkinopilos landscape as it appeared in the MSS background image, the ground-truthing teams were able to locate other similar landscapes, which, when they were visited, also yielded Palaeolithic stone tools.

The satellite imagery is also being enhanced for other purposes, such as



Graduate student Carol Stein and Professor Timothy Baugh review multi-spectral images while ground-truthing.

The Nikopolis Project: Funding, Equipment, and Facilities

Most of the equipment used by the Project in 1991 and that will be used in 1992 is provided by the Center for Remote Sensing and the Department of Archaeology, including geophysical prospecting equipment, electronic total station, two global positioning stations, blimp with all peripherals, cameras, multispectral scanner, and computers. Computer analysis and image enhancement are carried out on the extensive computer lab facilities of the Center for Remote Sensing. The Earth Observing System of NASA at the Stennis Space Center also provides assistance with computer analysis. The City of Preveza, the University of Ioannina, and the Greek Archaeological Service provide facilities and logistical support in Greece.

Support for all preparatory work in 1989 through 1991 came from individual research grants and from the Center for Archaeological Studies and the Center for Remote Sensing at Boston University. Greek staff members are supported by funds, separate from the operating budget, provided by the Greek Archaeological Service, the City of Preveza, and the Committee for the Preservation of Nikopolis. The operating budget for the 1991 field season and lab analysis in the months following have been funded by the Earth Observing System of NASA, the W. M. Keck Foundation (through the University's Center for Remote Sensing), and private donors.

delineating the line of the Roman aqueduct that brought water to Nikopolis from springs some forty kilometers away. The images will be a major feature in the eventual development of a graphic database, known as a geographical information system (GIS). GIS makes possible graphic representations of layers of such different kinds of data as, for example, the locations of town sites of different time periods, the topography of the terrain, road systems, and soils.

Database

Robert Deroy, lab manager of the Center for Remote Sensing, oversaw the computer operations among other duties on the Nikopolis Project. Using the software, Foxbase, he developed a database for the observations made by the ground-truthing teams that allows ready access to all data, and enables computer searches for various groups of data (for example, the locations of specific landcovers above, or below, specific elevations, etc.). This and similar databases will be used when appropriate to organize and store other kinds of data gathered by the Project, some of which will be used in creating the GIS referred to in the preceding paragraph.

Geological and Palaeoenvironmental Research

Tjeerd van Andel concentrated on Pleistocene geology and was part of the Palaeolithic survey team with

Curtis Runnels and Priscilla Murray. George (Rip) Rapp focussed mainly on coastal geomorphology and palaeoenvironmental data, and made plans for the taking of geological cores in 1992. In addition, both geologists consulted with the director and staff on a variety of specific geological matters, including databases, logistics, and geoarchaeology in general.

Archaeological Research

The 1991 season was too abbreviated to allow intensive surface survey for archaeological remains. As noted above, however, a number of known sites were visited and detailed observations on landcover were made. At the same time, preliminary notes on the visible cultural remains and other information were gathered for a computer database that will eventually include all archaeological sites and scatters of artifacts. This second major database will be augmented by data that are currently stored on cards in the Archaeological Museum of Ioannina, and which represent the work of generations of Greek archaeologists who have previously worked on sites in the area. The museum is the base of the Prehistoric and Classical Ephoreia, one of the two archaeological *ephoreiai* (the responsible regional government office) cooperating with the Nikopolis Project. The director there is Angelika Douzougli and the senior archaeologist is Kostas Zachos, one of the Greek
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Staff members of Nikopolis Project at Kokkinopolis where the handaxe was discovered.

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co-directors of the Project. The other Greek co-director is Frankiska Kephallonitou, who heads the Byzantine *ephoreia* centered in Ioannina.

Aqueduct

The extensive remains of the Roman aqueduct near its source in the modern town of Ayios Yeoryios was studied and mapped by a team of American and Greek archaeologists, surveyors, and drafting specialists. Special attention was paid to the channel on the slope above the left bank of the Louros River that once supplied two branches of the aqueduct, which are carried on arched bridges across the river. Portions of the channel, including an access shaft and the two supply manifolds, were cleared, studied, and drawn.

The aqueduct, which carried water to Nikopolis, becomes a tunnel through the mountain not far south of Ayios Yeoryios, extending below the prehistoric lake bed at Kokkinopilos. A complete study of the aqueduct will require a map of all known segments and other detailed measurements for additional elevations. In preparation for this work, preliminary observations were made at a number of localities where segments of the aqueduct are preserved.



Roman aqueduct crossing the Louros River near Ayios Yeoryios.

Future Investigations at Nikopolis

A larger team will return to Nikopolis in the summer of 1992 and devote two months to a more extensive program of archaeological and geological investigation. Plans are now being laid for both regional archaeological survey in selected areas of the survey zone and intensive survey at a few of the known ancient sites. These efforts will be supplemented by aerial photography and multispectral scanning from a tethered blimp, and in some cases by geophysical prospection.

The Palaeolithic team will return for additional work and there will be continued ground-truthing of satellite imagery. Geological investigations include extensive coring, observations on the geological settings of ancient sites, and perhaps offshore seismic sonar profiling of portions of the coasts both on the Ionian Sea and in the Ambracian Gulf.

The Department of Archaeology also will offer in 1992 an archaeological field school, whose students will be fully integrated into the research project (see Calendar on page 28).

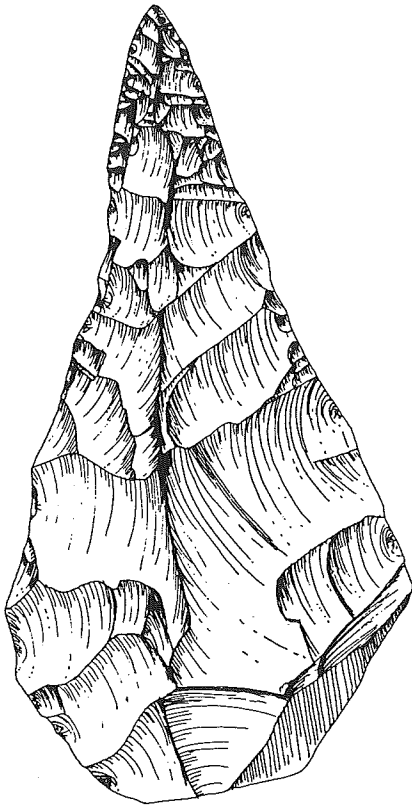
James Wiseman, Director of the Nikopolis Project, is Chairman of the Department of Archaeology and Director of the Center for Archaeological Studies.

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Archaeologists have recovered the artifacts of these early humans (assemblages of flaked flint cores, flakes, scrapers, and handaxes known as "Acheulean" after a site in France where they were first recognized) across Europe in association with remains of extinct Ice Age mammals, including elephants, rhinoceros, bison, and deer.

Palaeolithic sites in the Near East, such as Ubeidiya, may date to as many as 1.4 million years ago, but sites in Europe are much more recent. The oldest site was discovered at Isernia near Rome, where, thanks to the site's location in one of Europe's few volcanic zones, a date of approximately 730,000 BP ("before present") was obtained using the potassium-argon method for the volcanic ash overlying the archaeological horizon. At a somewhat later time, 500,000 to 300,000 years ago, sites with remains of animals and Acheulean tools are found widely distributed in Europe and the Near East. We can only make guesses about the humans who left their stone tools at these sites, because the surprisingly few fragments of fossil humans still defy classification. Therein lies an enigma: Greece has produced almost no signs of human presence at this time, and yet Greece must have been one route followed by early humans as they moved into Europe.

In high glacial times, when large volumes of water were locked up in glacial ice, sea level dropped, exposing wide and fertile coastal plains that attracted both animals and early human hunters. Early humans may have spread westward from the Near East to Turkey and ultimately across the Balkans into Europe, a hypothesis supported by the recent discovery of Lower Palaeolithic remains in Yarimbuzgaz Cave near Istanbul. Only a few isolated and controversial finds, however, hint at a human presence in Greece during the Lower Palaeolithic. The few sites in Greece tested by excavation belong chiefly to the Upper Palaeolithic (35,000 to 10,000 years ago), and the majority of our evidence for the Greek Palaeolithic comes only from scat-



The Palaeolithic handaxe found at Kokkinopilos. Drawing by Curtis Runnels.

tered finds of flaked-stone tools of flint and chert.

The most important find until now was a hominid skull discovered by local villagers in 1959 in a cave at Petralona in the Chalkidice peninsula in northern Greece. The classification and dating of this fossil presents a problem. It has been variously classified as *Homo erectus*, Neanderthal, or an early form of anatomically modern humans, and even its date is an open question because it was found on the surface in the cave, although most estimates place it in the range of 200 to 400 thousand years ago. Curiously, no archaeological sites belonging to this period have been reported from Greece in the thirty years following the Petralona find. An Acheulean-type handaxe was picked up in a mountainous region of northern Greece by British archaeologist Eric Higgs in 1962, but any attempt to date this isolated surface find must be viewed with skepticism. Similar tools continued in use after the Palaeolithic into the Bronze Age and later.

Thus the Greek Lower Palaeolithic remains elusive, but definite evidence for this period has begun to appear in the last few years. In 1987 and 1989 in the region of Thessaly in central Greece (for details see *Context* 6[3-4]: 1-7) a search yielded thirty-two findspots of Palaeolithic age. Hundreds of stone artifacts, mostly large flakes and other tools typical of a tradition known as "Mousterian" current in the later Middle Palaeolithic (ca. 50,000 to 35,000 BP), were collected along with bones of extinct Ice Age mammals. Late in the 1989 field season, however, our hopes for evidence of even earlier human activity were heightened by the discovery at Findspot 30, that simple cores, flakes, and other stone tools were associated with an ancient river terrace representing an assemblage possibly much older than the other finds in Thessaly.

We returned to Thessaly in June 1991 to continue the investigation of Findspot 30 along with renewed reconnaissance in the general area. Some 210,000 years ago or more, the area where the Peneios River flows began to sink as a result of the earth's tectonic movement, forming a wide basin. The terrace with which Findspot 30 is associated is an erosional remnant of the pre-subsidence Peneios River terrace, and consequently must be older than 210,000

years. Thus the simple pebble and flake tool industry is to be assigned to the last part of the Lower Palaeolithic. We collected sixty-five artifacts from the terrace at Findspot 30 in 1991. The prehistoric toolmakers at Findspot 30 relied primarily on quartz as a raw material to produce a wide variety of large core tools and sharp flakes that were worked into more specialized tools.

Elsewhere in Thessaly, terraces of suspected Palaeolithic age exposed by road, field, and stream cuts were intensively searched and six findspots were discovered. At three of the findspots, artifacts were found embedded in profiles of Pleistocene soils. Although these findspots have not been directly dated, the association of artifacts with Pleistocene soils is a good indication that these sites are Palaeolithic in age.

If we consider the Greek Lower Palaeolithic in a wider context, the Thessalian sites produced artifacts very similar to the Lower Palaeolithic industries recovered in excavations in Europe, which have been provisionally dated to about 200-350,000 BP. Further investigation and comparative research remains to be done, but it is clear that the prehistory of Greece can be pushed back some two or three hundred thousand years.

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Staff of the Nikopolis Project in 1991

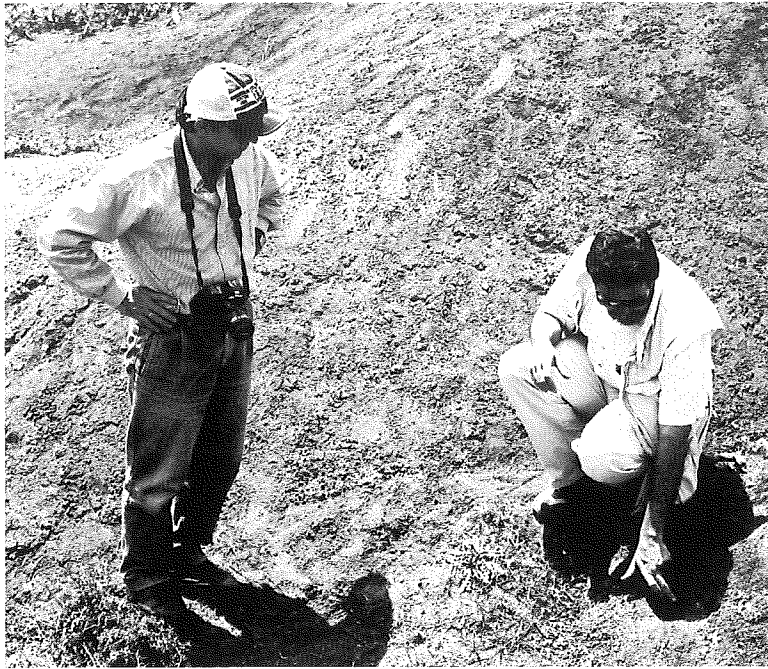
Archaeologists and Administration: James R. Wiseman, director (archaeology); Kostas Zachos, Greek co-director (archaeology); Frankiska Kephallonitou, Greek co-director (Late Antique and Byzantine archaeology); Timothy Baugh (archaeology, remote sensing); Curtis Runnels (archaeology); Priscilla Murray (archaeology, drafting); Lucy Wiseman (archives, administration).

Geologists: George (Rip) Rapp (geochemistry, geoarchaeology); Tjeerd van Andel (geomorphology, geoarchaeology).

Computer Engineering and Remote Sensing: Robert Deroy.

Topographic Survey and Drafting: David Clayton (survey, drafting, archaeology); Kostas Papavasileiou (architect, drafting); Athina Kotsani (drafting).

Students: Stephen Agnew (Boston: archaeology); Katerina Dakaris (Ioannina: archaeology); Michele Miller (Boston: archaeology); Carol Stein (Boston: archaeology); Thomas Tartaron (Boston: archaeology); Elizabeth Wiseman (Colorado: art, photography).



Curtis Runnels points out to Kostas Zachos the spot where the handaxe was found.

geological evidence of prolonged submersion under water, and this suggested to us a lacustrine origin. An artifact found in one of these lower levels would have to be older than the stone tools at the surface.

At first we found nothing at all in the lower layers, and it was only when we were leaving that I found the handaxe with its tip protruding out of a layer of lacustrine deposits a full sixteen meters below the old soil surface. It was the chance selection of that particular ravine that led to the discovery, but I knew with the first glance that it was a handaxe. The large tip showed clear traces of bifacial flaking, and was obviously part of a much larger tool, and, more importantly, it was clearly embedded in a layer that would give it a secure geological context. The uneroded, sharp, and fresh cutting edges, along with its horizontal position, indicated that the handaxe had been dropped in this spot soon after its manufacture and not moved by erosion or running water.

Here then was the Holy Grail of the Lower Palaeolithic, the characteristic artifact in a geologic context that clinched the recognition of this period in Greece, allowing archaeologists to assess the Palaeolithic of Greece in relation with Europe and the Near East. It was a moment to savor a great discovery and to thank the fortune that put it into our hands rather than let it erode away with its surrounding deposit, eventually to become part of the shapeless gravel that lines the bottom of the Louros River. In the days that followed there was much work to do, studying the context, documenting the findspace, and discussing the find with our colleagues.

What does the handaxe tell us about Greek prehistory? First, let me describe it. The handaxe of white, heavily patinated flint proved to be about twenty-two centimeters in length, weighing more than a kilogram. Completely intact, it has the form of an elongated teardrop with a rounded butt and two long cutting edges that converge at one end to form a razor-sharp point. This particular type of handaxe is called

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Unfortunately, sites of this age are very rare, and we had to widen our search to find the oldest sites.

Now we have come full circle to Epirus and to Kokkinopilos. These striking badlands of intensely eroded red clays were first discovered and investigated by the late Eric Higgs of the University of Cambridge, who noted the large number of Middle Palaeolithic stone tools (ca. 50,000 BP) that litter the surface of the valley. Surveys and excavations by archaeologists from the University of Cambridge continue in Epirus today under the direction of Dr. Geoff Bailey, and these investigations have produced large numbers of artifacts belonging to the later Palaeolithic period. When James R. Wiseman proposed a survey of the Nikopolis region with its proven potential for Palaeolithic finds, an opportunity was offered to extend our search for the earliest Palaeolithic in Greece to this area. Our visit to Kokkinopilos, a site well known to archaeologists, was intended to acquaint us with the local geology.

One of us (CR) led the team on that cool June morning. *(The following account was written by Curtis Runnels.)*

* * *

Although I was not planning to search for Palaeolithic artifacts at this site, our visit began auspiciously with

a cuckoo calling to us as we climbed a narrow goat path up from the Louros River valley to the deep ravines and bare slopes of Kokkinopilos. With me were Tjeerd H. van Andel, a geologist at the University of Cambridge and a Senior Research Fellow of the Department of Archaeology at Boston University, and my wife, Priscilla Murray, an archaeologist who is known to many as the Programs Administrator of the Archaeological Institute of America. As we began our inspection of the site, we came quickly to recognize that the deposits were probably the remains of a seasonal lake that had formed in a doline (a natural sinkhole that forms in limestone country) during the Pleistocene (the later Ice Age). The clay deposit consists of four distinct layers, each as much as ten meters thick, with artifacts eroding from the uppermost layer. At several locations we noted that the artifacts were embedded in a soil, a geologic feature that develops in place when the surface of a deposit is exposed to weathering for prolonged periods of time. We considered this fact as especially significant because the soil preserved in patches at the top of the sequence of deposits contained Middle Palaeolithic implements dating to about 60 to 30,000 years ago. This circumstance indicated to us that the deposits below the level of the soil were older. In addition, the lower deposits showed clear

Micoquian after the site of La Micoque in France and it belongs to the latest Acheulean culture of Lower Palaeolithic Europe. Dates for layers containing similar handaxes in western Europe are hard to determine because we have few means of measuring the age of deposits that are beyond the range of the radiocarbon method (about 50,000 years or less). Using new techniques, such as uranium series dating, which rely upon radioactive isotopes contained in some inorganic materials, and the similar technique of Electron Spin Resonance, archaeologists have dated handaxe cultures in western Europe to about 250 thousand years ago.

The position of the handaxe in the clay layers of Kokkinopilos is the subject of a scientific paper that has been prepared by myself and Tjeerd van Andel, and it certainly allows an age of this magnitude. Also unanswered is the most basic of questions: who made the handaxe? Was it *Homo erectus*, a Neanderthal, or an early version of our own species? It is significant that the Petralona hominid skull may date to the period of two to four hundred thousand years ago, and thus it is possible to see this human ancestor as the probable maker of our handaxe.

Alas, we have more questions to offer than answers, as is so often the case in archaeology. But our find has confirmed the existence of the Greek Lower Palaeolithic, and it has drawn attention to an exciting new field. To begin with the earliest inhabitants at the dawn of time is also a promising start to the survey of the Nikopolis region, a region that continues to play an important role in the history of Greece.

Thomas Tartaron is a Ph.D. candidate in archaeology at Boston University where Curtis Runnels is Associate Professor of Archaeology.

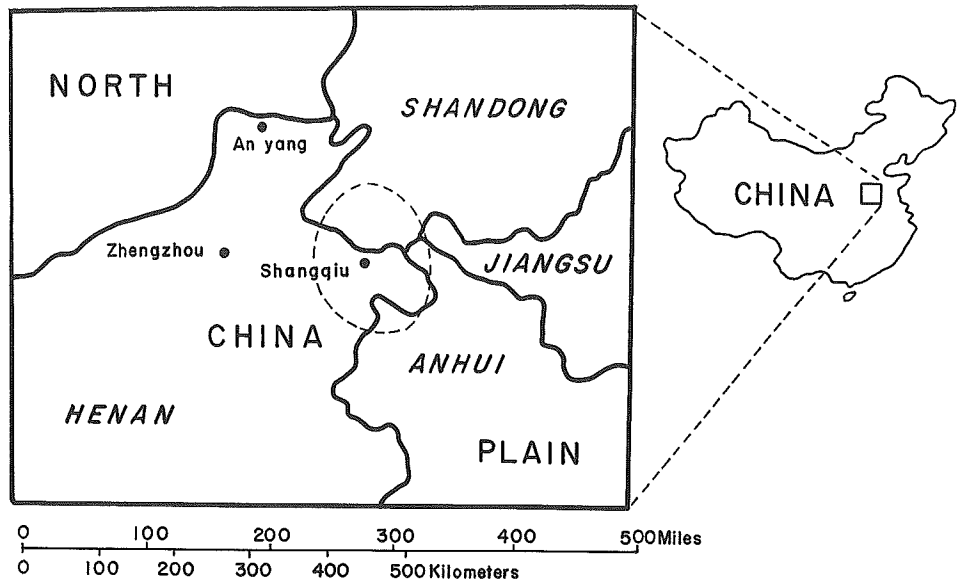
News items about alumni/ae of the Department of Archaeology and members of the Center are welcome, and may be sent to the Managing Editor, *Context*, Boston University, 675 Commonwealth Avenue, Boston, MA 02215.

Geological Investigations in the Search for the First Capital of the Shang Dynasty

by George (Rip) Rapp, Jr.

A cooperative project between the Chinese Institute of Archaeology and Harvard University is underway to locate and excavate the legendary origins of civilization in China, the first capital of the Shang Dynasty. This project is the first of its kind, allowing foreign archaeologists to work in China in periods later than the Palaeolithic. Boston University Research Professor Rip Rapp heads the geoaerchaeology team.

combined geological and geophysical investigation of the region around Shangqiu in northeastern Henan province. The co-directors of the project, Dr. Xu Pingfang of the Chinese Institute of Archaeology and Professor K.C. Chang of Harvard, asked me to direct this phase of the effort. My geoarchaeology Ph.D. student at Minnesota, Jing Zhichun, and I have now undertaken two



Map showing the region of China where the first capital of the Shang Dynasty is thought to be located.

According to early texts, the founder of the Shang Dynasty, T'ang, established his capital in the region of northeast Henan where four modern Chinese provinces come together (see map). Later Shang capitals at Zhengzhou and near An yang have been located and excavated by the Chinese. The importance of these excavations to Chinese archaeology cannot be exaggerated. The location of the original capital, however, has proved to be elusive. It is believed to lie buried under a four- or five-meter-thick blanket of Yellow River floodplain sediments, thus frustrating the normal methods of archaeological surveying.

With funds provided by the Malcolm Wiener Foundation, the first phase of the search for this site is a

expeditions to the region to try to unravel the late Holocene (last 5,000 years) geology and geomorphology of the region. During August and September we drilled 28 cores, probing up to nine meters below the floodplain surface, which is now under intensive agriculture. The fieldwork was guided in part by Landsat satellite imagery analyzed at Boston University's Center for Remote Sensing.

Currently the 150 or so samples of the sediments from the cores are being analyzed in the Archaeometry Laboratory in Duluth. Combined with published and unpublished data from Chinese geological and hydrological investigations and radiocarbon dates from the drill cores, we expect

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The Archaeology of Sugar and Slavery: Excavations at Estate Whim, St. Croix

by Donald G. Jones

In 1991, the St. Croix Landmarks Society, in association with the Center for Archaeological Studies at Boston University, initiated an interdisciplinary, multi-year research and education program at Estate Whim Plantation Museum on the island of St. Croix, U.S. Virgin Islands, formerly the Danish West Indies. Based on the success of this first season of fieldwork, the Center, in conjunction with the Landmarks Society, is currently developing plans for subsequent seasons of research that will expand beyond the boundaries of Estate Whim to investigate the cultural heritage of St. Croix and to incorporate more broad-based programs of community involvement in historic preservation. The report that follows was prepared by the director of the project.

The scores of stone windmill towers that dot the landscape of St. Croix are perhaps the most visible reminder of the plantation society that for two hundred years dominated social, political, and economic developments not only on St. Croix, but throughout the Caribbean islands. Owned by privileged Europeans and worked by enslaved Africans, sugar plantations

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to reconstruct the landscape of the Shang Dynasty period, especially the location of the major river courses, to establish target areas for ground-based geophysical prospecting. As early as April, 1991, geophysical work using a magnetometer, an electrical resistivity meter, and an electromagnetic terrain conductivity meter will be undertaken to pinpoint possible buried structures of Early Shang origin.

George (Rip) Rapp, Jr. is Research Professor of Archaeology at Boston University; Professor of Geology and Archaeology and Director of the Archaeometry Laboratory at the University of Minnesota-Duluth; and Professor in the Center for Ancient Studies at the University of Minnesota-Minneapolis.

once covered virtually the entire island of St. Croix, making vast fortunes for some through the exploitation of slave labor. Today, the remains of these sugar plantations are rapidly being destroyed by natural and human causes and, with them, our ability to gain a better understanding of the cultural heritage of St. Croix is diminishing.

The Estate Whim Project was initiated in part to promote public understanding of and involvement in the preservation of the cultural heritage of St. Croix through an interdisciplinary research program. To this end, the 1991 excavation season was designed to provide an assessment of the archaeological potential of Estate Whim Plantation Museum in order to develop both research priorities for future work and management recommendations for the Landmarks Society to aid in the continued preservation of the site's cultural resources.

History of St. Croix

St. Croix is the largest of the more than forty islands and small cays that comprise the U.S. Virgin Islands. The Virgin Islands are situated just east of Puerto Rico and at the northern end of the long arc of islands known as the Lesser Antilles that extend down to the South American coast. St. Croix covers approximately 85 square miles or 54,000 acres in area and contains diverse topography consisting of high mountains along the north coast, a broad rolling plain on the south coast, and low hills at its eastern end.

The early history of St. Croix, like that of most Caribbean islands, is one of successive ownership and occupation by competing European interests. Although the island was inhabited during prehistory, when the first European settlements were established on St. Croix by the Dutch West India Company in 1643, the island was found to be uninhabited. The Dutch claim to the island was short-

lived: within three years, the island was taken by the British, and then by the Spanish, French, the Knights of Malta, and then again by the French.

The Danish West India and Guinea Company, which had been established in 1671 by King Christian of Denmark, expanded its interests in the West Indies by purchasing St. Croix from the French West India Company in 1733. The Danish company subsequently maintained the longest tenure of political control over St. Croix in the history of the island. St. Croix remained under Danish rule for nearly two hundred years when, in 1917, the island was purchased along with St. Thomas and St. John by

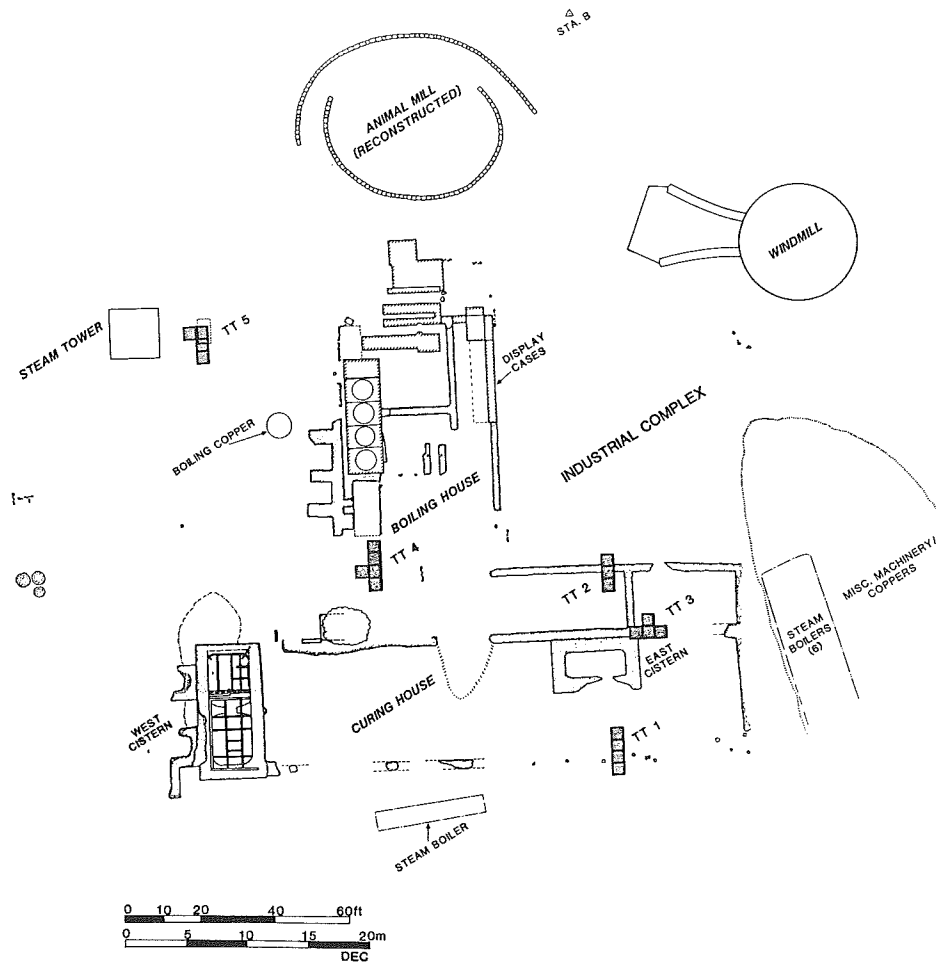


Nicole Missio measures the ruins of the sugar-processing buildings at Estate Whim Plantation. The stone tower of the windmill dates to the 1780s, but the sails, or vanes, are modern reconstructions.

the U.S. Government for strategic military purposes.

Sugar Production at Estate Whim

When it acquired St. Croix, the Danish company almost immediately set in progress an ambitious plan to survey the entire island. Between 1735 and 1755 the island was divided into a grid of over 300 plantations, each consisting of approximately 150 Danish acres of land (or 147 U.S. acres).



Archaeological plan of the ruins at Estate Whim; note the T-shaped sugar factory.

Estate Whim Plantation was settled shortly after its boundaries were surveyed in 1742. Situated on the rolling plain in the southwestern portion of the island, Estate Whim was first devoted to cotton cultivation, but within ten years the plantation was converted to the production of sugar, the single most lucrative cash crop in the West Indies.

Sugar plantations were more than agricultural enterprises; they were also industrial ones. In addition to extensive fields for growing sugar cane, sugar production also required a complex of buildings devoted to extracting and refining sugar and distilling its by-product, molasses, into rum. Sugar production also required a large labor force which, in the West Indies as elsewhere, consisted of enslaved Africans. Estate Whim was operated as a sugar plantation by a succession of owners and overseers for 170 years, before sugar production stopped there in 1924.

The St. Croix Landmarks Society began restoration of the estate in 1958, and since then a number of structures have been stabilized and restored. Estate Whim Plantation Museum today consists of only twelve acres (U.S.) of the 150-Danish-acre historical parcel, but the museum grounds encompass the area where most of the domestic and industrial activities took place.

Results of the 1991 Excavation Season

Prior to initiating the 1991 excavations at Estate Whim, historical research was conducted by the museum staff and especially by two individuals who are associated with the museum. George Tyson, an independent historian who lives on St. Thomas, and Svend Holsoe of the University of Delaware compiled a history of Estate Whim based on extensive investigations of the collections of the Danish

West India Company, including tax rolls, censuses, mortgage records, and probate inventories; records of the U.S. National Archives; and business accounts and private correspondence. The historical research documented over 40 buildings or structures on the plantation, revealed a series of eighteenth- and twentieth-century maps of the estate, and uncovered previously unknown censuses of the slave population at Estate Whim.

The archaeological survey was designed to explore the extent of archaeological resources located within all areas of the museum grounds. The excavations focused on the industrial complex, which included remains of the mills, the boiling-curing-still house, and other structures; the slave village, which was relocated several times throughout the plantation's history; and the owners' domestic complex, including the buildings and grounds surrounding the Great House.

Industrial Complex

Archaeological investigations in the industrial complex consisted first of clearing and mapping the extensive network of foundation walls that were visible on the surface and then excavation within and around selected buildings. The resulting site map, prepared by David Clayton, site surveyor for the project, shows the layout of the complex.

The basic technology for producing sugar is well known. Sugar cane stalks were crushed in the various mills by being passed through iron rollers. The sugar juice flowed from the mills into the boiling house where it was boiled in a succession of iron pots, also known as "coppers," until it became a thick syrup, or magma. The magma was ladled into wooden trays where it cooled and crystallized into sugar. The sugar crystals were then packed into earthenware containers and placed in the curing house, where the sugar was refined by passing a variety of solutions containing clay and lime through it. The molasses that drained from the sugar was

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collected and a portion of it distilled into rum.

The test excavations revealed several episodes of construction at the industrial complex. The boiling house, which was probably constructed in the 1750s, originally may have been separate from the curing-still house; these buildings may have been joined together when the plantation's sugar-producing capacity was greatly increased at Estate Whim during the late eighteenth century. Other changes in the physical layout of the sugar factory were related to improvements in sugar-making technology. A steam-powered mill was added to the plantation in the mid-nineteenth century, but all that remains of the steam mill above ground is the tall stone tower, which served as a chimney for the boiler.

Excavations at the base of the tower revealed an interesting feature consisting of a brick wall and ramp. It is not yet known what this structure represents, but it will certainly be a priority in future excavation seasons. More extensive excavations in the industrial complex will address how the physical complex was altered to adapt to fluctuating economic conditions and technological advancements in sugar production.

East Slave Village

When the plantation was established in the 1740s, the slave village consisted of at most six structures that were located directly behind the Great House. By 1778, a larger slave village was constructed east of the Great House and north of the industrial complex. This east slave village even-

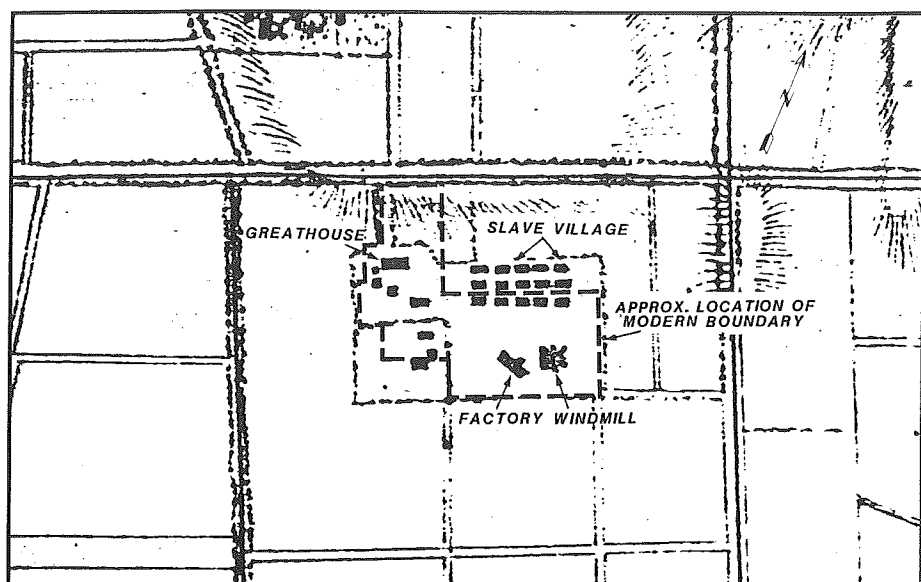
tually contained as many as twenty-one stone houses arranged in three parallel rows. Sometime during the nineteenth century, the slave village was again relocated, this time to the west of the Great House.

A comparison of modern survey data of the museum grounds with historical maps indicated that the southernmost row of structures in the east slave village were located within the museum property. In contrast to the industrial complex, the surface remains of foundations in the east slave village were very limited, but the ground surface is littered with a variety of artifacts, such as fragments of historical ceramics, glass, and iron objects. Archaeological testing in the area of the east slave village revealed portions of a stone wall or foundation that may represent the remains of one of the slave dwellings.



OPA archaeologists (left) lay out a test unit at the base of a mid-nineteenth-century steam tower. Excavations (below) at the base of the steam mill tower revealed a subterranean brick feature of unknown function. This structure will be a priority in subsequent excavation seasons at Estate Whim.





Detail of 1778 Oxholm map of St. Croix showing layout of buildings of Estate Whim.

A large amount of pottery, often referred to as Colono or Afro-Cruzan ware, also was recovered from this area. It is thought that this pottery was either made locally or on nearby islands and was used primarily by slaves for cooking and storage of foodstuffs. The excavations at the east slave village indicate that further archaeological research could provide important information concerning the lifeways of the slave population at Estate Whim, an aspect of the plantation history for which information from other sources is extremely limited.

Owners' Domestic Complex

Excavations within the owners' domestic complex revealed the remains of two mid- to late-eighteenth-century structures in the rear yard of the Great House. The functions of these structures are not yet known, but they may have been one of the service buildings, such as a sick house or carriage house, that are listed in eighteenth-century inventories of Estate Whim. Evidence that may eventually aid in determining the date of construction of the Great House was also recovered by excavating within the Great House cellar and dry moat that surrounds the structure.

Excavations within the rear yard of the Great House also revealed that extensive landscape improvements

were made in the late eighteenth century. The rear yard initially sloped down to the south and contained a seasonal stream. As part of the extensive rebuilding episode documented for the plantation sometime after 1780, a stone-lined drain was constructed extending from the Great House cellar through the yard, and a large amount of fill, up to three feet thick, was deposited to raise the level of the yard. The placement of the fill may have inadvertently aided in the

preservation of earlier archaeological deposits, for artifacts dating from the mid-eighteenth century were recovered from the lower levels of test units excavated in this area. It is hoped that more extensive excavations in the rear yard will produce additional evidence of the early period of occupation of Estate Whim, including possibly the earliest slave village on the plantation.

Public Education and Community Involvement

To aid in the Landmarks Society's efforts to increase public awareness of St. Croix's cultural heritage, a public component was incorporated into the archaeological survey. During the course of the 1991 season, over 1500 schoolchildren from numerous public and private elementary and secondary schools on St. Croix visited Estate Whim specifically to tour the excavations. Students enrolled in a video journalism class at the University of the Virgin Islands also toured the site, and several students used the excavations and student tours as subjects for their class projects. Claire Carlson, site interpreter for the project, led three or four tours for school groups each day. At the

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Nicole Missio, laboratory supervisor for the Estate Whim Project, shows artifacts to St. Croix students touring the excavations.

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end of each tour, the students visited the archaeological field laboratory at the museum where a variety of artifacts were displayed. Nicole Missio, laboratory supervisor for the project, explained how the artifacts were processed and how archaeologists identify historical artifacts to aid in interpreting the site.

The success of the public outreach program can be measured in part by the large number of students that visited the excavations. The field season concluded with a free public lecture on the archaeological survey presented by the author at the museum.

Future Excavations

The results of the initial archaeological survey prove that there is much to be learned from further excavations at Estate Whim. In contrast to the 1991 season, future excavations will be more extensive and will be conducted to answer specific research questions about the site. Also in contrast to the initial season, the public outreach component will be one of public participation rather than simply increasing public awareness. Subsequent excavations will include workshops for students and volunteers who are interested in getting hands-on experience in archaeological excavation. Plans are also being made to incorporate a field school that will allow local college students to work with the archaeologists to gain college credit. Plans for the 1992 field season are moving ahead rapidly. Several of the participants in the 1991 excavation season will present research reports in a symposium on various aspects of the Estate Whim Project at the 1992 annual conference of the Society for Historical Archaeology in Kingston, Jamaica.

Carlsberg Foundation Grant for Estate Whim

The Office of Public Archaeology at Boston University recently was awarded a challenge grant of \$10,000 from the Carlsberg Foundation of Copenhagen, Denmark, for the Estate Whim Project, and fund-raising for

Experience in Conservation at York

by Howard Wellman

Howard Wellman is a Master's candidate in the Department of Archaeology. He spent two and a half months in the summer of 1991 working as an intern in the Conservation Laboratory of the York Archaeological Trust in York, England. In the following narrative, he recounts his experiences there as he was introduced to the techniques of archaeological conservation.

The York Archaeological Trust was set up in the 1970s to undertake the organization and management of archaeological digs in the city of York, England. Since almost any hole dug within the mediaeval city walls will turn up materials dating from the Roman to the Victorian eras, the Trust has become a large establishment with several semi-independent internal organizations. One of these is the Conservation Laboratory, whose mission is to preserve the excavated artifacts and structures for future research and display.

the match is already under way. Volunteers will also be solicited to participate in the 1992 season. Based on the results of the 1991 excavations, the Estate Whim Project promises to contribute to our understanding of the past while encouraging the preservation of the cultural heritage of St. Croix for the future.

Donald G. Jones, Assistant Director of the Office of Public Archaeology, is Director of the excavations at Estate Whim.

Contributions for the support of the Estate Whim Project may be sent to:

**Estate Whim Project
Office of Public Archaeology
Boston University
675 Commonwealth Avenue
Boston, Massachusetts 02215**

Because of the high watertable and low-lying geography of the Vale of York, archaeological sites in York are generally waterlogged below all but the most recent strata. These anaerobic waterlogged sediments yield volumes of preserved organic materials including wood, leather, and textiles. The Conservation Lab has a separate facility just to deal with waterlogged items such as these.

I was initially put to work where I could do the least amount of damage, cleaning and recording wooden architectural timbers from a number of excavations around the city. This work involved washing off the encrusted mud which sometimes yielded shells, potsherds, and other objects, and recording pertinent data such as dimensions, tool marks, joinery, nails or other hardware, identifying the wood species where possible, and counting rings for growth rates or dendrochronology. More specialized data included tool signatures (a nicked axe blade leaves a very identifiable mark that can be followed from cut to cut, timber to timber), or evidence of reuse (e.g., a jointed framing timber reused as a wharf piling by sharpening one end). These data tell the archaeologists several things: what tools and techniques were being used by the carpenters, whether they were forced to reuse wood, whether they were exploiting wild wood or managed timber tracts, and whether certain species of wood were more available or preferred for certain jobs.

The artifacts were recorded in several ways, depending on the nature of the data being recorded and the uniqueness of the object. Thumbnail sketches of all pieces were made on the report forms, and 1:1 tracings on mylar were made of some structural pieces, which allowed for detailed notes on wood grain, tool marks, etc. I prepared detailed scale drawings of a few timbers with unique joinery and a dug-out coffin for the Illustration Department to turn into publication-quality illustrations. Objects with imbedded metal were usually X-rayed for better understanding of the metal inclusions. Photographs generally were taken only of very special objects or features, such as a Nine-

Men's-Morris game board scratched into a coffin lid.

Preserving the waterlogged artifacts is a time-consuming process. Wood, leather, and other organic materials can be preserved by soaking the object in a solution of polyethylene glycol (PEG) in order to drive out the water in the cell structure and replace it with wax that will "shore up" the decaying cell walls. The calculations of PEG molecular weight, solution concentration, and soaking time are dependent on the density and volume of the material to be treated. Some large timbers have been in the Trust's treatment tanks for two years, and have a year left to go. Freeze-drying speeds the process, since a lesser amount of wax is needed, the remainder of the water being drawn off by the freeze-dry process. Some wax is needed, even in freeze-drying, to keep the wood from shrinking and breaking up as the cell walls collapse.

The lab deals with other materials besides wood. I was given opportunities to work with a few other types of artifacts and materials. Iron nails and joining hardware, heavily corroded, are first X-rayed to determine how much good metal is left and to get a better idea of the original shape of the object. The X-ray is then used as a guide while the corrosion is abraded off using a desktop sandblaster that can deliver a jet of abrasive less than a millimeter across. I cleaned painted plaster from a Roman mural using water and a cotton swab. A lot of detail can be exposed this way.

Unless the object is falling apart and in need of stabilization, most materials and objects at this initial stage of conservation are handled with very basic mechanical cleaning techniques. Scalpels, dental picks, cotton swabs, and toothbrushes are the most common tools in the lab. Only after this basic cleaning are the more exotic chemical or physical treatments performed to keep the artifact in a chemically stable state in its new environment. Sometimes treatment is not feasible, and the storage environment must be altered instead. It is standard practice at the lab to store all iron objects, cleaned or not, in

Troy on the Dardanelles: Round Four

by George (Rip) Rapp, Jr.

In six major campaigns between 1870 and 1890 Heinrich Schliemann began the excavation of the mound at Hisarlik in the Troad in northwest Turkey, which he believed to be the Troy of Homer's Iliad. This story is well known. His assistant, Wilhelm Dörpfeld, continued with two significant excavation seasons in 1893 and 1894. Round three went to the Americans as Carl Blegen and the University of Cincinnati conducted careful excavations in seven seasons from 1932 to 1938. Round four began in 1988 under the general direction of Professor Manfred Korfmann of Tübingen University. Scholars from

many countries are involved, but it is primarily a German/American effort with major contributions especially from specialists from Turkey. Korfmann is considering a fifteen-year excavation.

My own involvement in studies of Troy (hereafter in this article, Troia, as the best compromise among German, Turkish, and English spellings) began in the middle 1970s when Jack Caskey, one of Blegen's chief associates and his successor in the chair at Cincinnati, asked me to undertake a scientific study of 353 samples of archaeological sediments collected during the Blegen excavations. When he asked that I publish the results as one of the *Supplementary Monographs* in the Princeton Press series, I expanded the scope of the project to include, with others, a

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The walls of Troy VI-VII (Middle and Late Bronze Age).

sealed containers with silica gel (a desiccant) in order to keep them dry. Chemically treating each piece would be prohibitively expensive in time and materials. Wood is typically kept in a damp environment, either a wading pool or wrapped in wet foam rubber, until provisions for treatment can be made. Cold storage is another viable way to store waterlogged materials. More stable items, like copper alloys, ceramics, or glass, are individually bagged and packed.

The most enlightening experience I had was when I realized just how

much the conservators contributed to the archaeological investigation. The conservators had the opportunity to see small details of the artifacts, such as tool marks on a timber, nail positions in a plan, encrustations on a coffin timber, or stitching patterns in shoe leather, that the field workers may have overlooked. The conservators were doing far more than just preserving the objects; feedback from the lab may give the archaeologists or other researchers new directions of thought concerning the creation, use, or deposition of artifacts.

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broad study of the geoarchaeology of Troia, published as *Troy: The Archaeological Geology* (1982).

Why another excavation at Troia? Is there anything left to excavate? There are multiple answers to these questions, and they involve the three major concerns of participants in round four: "(1) archaeological science, (2) historical Troia (New Ilium), and (3) site preservation." The new investigations also keep in mind that within the prehistoric fortified citadel the top layers of Bronze Age Troia were "planed off" by the Hellenistic and Roman inhabitants in the process of building their monuments, and that excavations in the nineteenth and twentieth centuries destroyed most, but by no means all, of the remaining Bronze Age strata.

The observable remains of Troia, some uncovered more than a century ago, have suffered the fate of all excavated sites—the relentless geological forces of weathering and erosion coupled with the unavoidable damage associated with innumerable tourists vicariously in contact with the heros of the Iliad. A significant thrust of the new excavation is site preservation. The new excavation also is programmed to use scientific methods of analysis not available to earlier excavators. Many senior archaeometrists have been engaged to analyze the newly recovered material, but it is too early to note results of most. These investigations will be published in a

new journal *Studia Troica*, the first issue of which is currently in press.

Schliemann, Dörpfeld, and Blegen all focused on excavating the Bronze Age citadel, an area no more than 200 by 160 meters. New Ilium by contrast is more than an order of magnitude larger and basically unexcavated. Excavation of New Ilium is the responsibility of the University of Cincinnati contingent.

Senior American participants in "round four" include Professors Machteld Mellink of Bryn Mawr College; Stella Miller and Brian Rose, both of the University of Cincinnati, and myself. Stella Miller and Brian Rose have the responsibility for the excavation of New Ilium; Machteld Mellink is Korfmann's senior advisor; and I have a variety of responsibilities for geological studies. Support for these geoarchaeological studies was provided by two grants (\$15,000 in 1990; \$18,000 in 1991) from the Institute for Aegean Prehistory.

My colleagues Ilhan Kayan and J.C. Kraft and I have undertaken a major extension of our earlier study of the Trojan Plain (cited above) to determine the nature and extent of the estuary in Bronze Age times and also the human activity at the foot of the escarpment at the "front" of the citadel. Kayan directed the large core-drilling program. The hundreds of samples are now being analyzed in the Archaeometry Laboratory in Duluth. The results will be published in *Studia Troica*.



Marble Ionic entablature from New Ilium. The Greek inscription on the frieze concerns the dedication of the proskenion and statues in the theater.

Sigmund Freud Exhibit

"The Sigmund Freud Antiquities: Fragments from a Buried Past" will be on view at the Boston University Art Gallery, 855 Commonwealth Avenue, February 28 through April 5, 1992. The exhibit will include many of the antiquities that Sigmund Freud collected in Vienna. The opening reception for the exhibit will be on February 28 from five to seven p.m. Associated activities include a panel discussion entitled: "Excavating the Past, Freud and His Antiquities Collection," on Monday, March 2, 7:00 p.m. Professor Kathryn Bard will participate in the panel discussion and on Thursday, March 19, she will speak on "Akhenaten, Moses, and Monotheism." Other lectures and more detailed information about the exhibit will be announced at a later date.

I have made a study of the building stone of the fortress. Preliminary results indicate that all the stone for walls and foundations was local, from within a kilometer or so of the site. With Norman Herz of the University of Georgia I have begun a study of the source of the structural marble used in the monuments of New Ilium. Sourcing is done using stable isotope analysis. Collection of samples from additional Anatolian quarries will continue during the summer of 1992.

A related project with colleagues from the Archaeological Museum in Istanbul and the Max-Planck-Institute in Heidelberg, Germany will involve trace-element analysis of obsidian deposits in Anatolia to extend and refine current data on potential sources for Trojan and other prehistoric Aegean and Anatolian obsidian.

Round four should provide additional information about Bronze Age Troia, particularly periods I–V, and give us our first real look at the extensive Hellenistic and Roman cities. Keep tuned.

Faculty News

The Humanities Foundation of Boston University has awarded a two-year grant to the Center for the continuation in 1991-92 and 1992-93 of the distinguished lecture series on "Context and Human Society." The series concerns the interrelationships of human societies and their environments, both natural and manmade.

Kathryn Bard spoke to sixth grade students at the Memorial Spaulding School in Newton, Massachusetts, on Egyptian Archaeology. **Murray McClellan** and **Curtis Runnels** also took part in the visit to the school.

Kathryn Bard conducted excavations at a predynastic settlement near Nag Hammadi in upper Egypt during July and August, 1991. The field work was supported by a grant from the National Geographic Society. She lectured on these excavations on August 26 at the American Research Center in Cairo, Egypt.

Mary Beaudry, Associate Professor of Archaeology, was recently elected to her third three-year term on the Executive Board of the Council for Northeast Historical Archaeology. The Council held its annual meetings in Newark, Delaware, October 5-6, in conjunction with the Winterthur Conference.

Mary Beaudry and **Anne Yentsch** have edited a book entitled *The Art and Mystery of Historical Archaeology: Essays in Honor of James Deetz*, which will be published in 1992 by CRC Press, Inc.

Clemency Coggins, Adjunct Associate Professor in the Department

Kathryn Bard (right center) speaks to students in the sixth grade at Memorial Spaulding School in Newton, Massachusetts.



News Flash

W. M. Keck Foundation Funds New Professorship

The W. M. Keck Foundation has awarded Boston University \$200,000 as a challenge grant to create a new faculty post for a Professor of Archaeology and Remote Sensing. The announcement from the Foundation came in a letter addressed to University President John R. Silber and dated December 24, 1991, so that it arrived as a particularly welcome holiday gift!

Boston University will seek additional funds from other donors (\$1.5 million) to create a permanent endowment for the new faculty position, which will be called the W. M. Keck Foundation Professorship in Archaeology and Remote Sensing during the period that it is funded by the Foundation. A Faculty Search Committee, chaired by Professor James Wiseman, who wrote the grant proposal, has been formed to carry out a nationwide search. Nominations and applications will be accepted by the committee at the departmental address until March 1, 1992, for an appointment effective September 1, 1992. The new professor will be a member both of the Department of Archaeology and the Center for Remote Sensing.

This is the fourth grant awarded since 1985 by the W. M. Keck Foundation in support of the remote sensing programs at Boston University. The grants, which total \$1.52 million, have played a critical role in the development of the Center for Remote Sensing into an internationally respected research and instructional center. It is the only such center in the world that emphasizes archaeological applications of remote sensing technology, and the new grant recognizes this close relationship between the Center for Remote Sensing and the Department of Archaeology.

of Archaeology, has been appointed to the Editorial Board of the *International Journal of Cultural Property*, the first issue of which will appear in January 1992. The journal is published by Walter de Gruyter of Berlin and New York for the International Cultural Property Society, which is based in Amsterdam, The Netherlands.

Julie Hansen, Assistant Professor of Archaeology, received in early December an advance copy of her book entitled: *The Palaeoethnobotany of*

Franchthi Cave. The book, published by Indiana University Press, deals with the plant remains recovered from this important cave site in southern Greece which was occupied for more than twenty thousand years from at least 25,000 to 5,000 years ago.

Thomas E. Killion, Research Fellow, has been appointed for a four-year period to the Office of Repatriation at the Smithsonian Institution. The Repatriation office deals with requests by Native American groups for the return of skeletal materials and associated artifacts and sacred items of culture, currently being curated by the Smithsonian Institution.

Patricia McAnany, Assistant Professor of Archaeology, received an \$87,511 grant from the National Science Foundation for field work during the summer of 1992 at the Maya site of K'axob, Belize. Professor McAnany is on leave as a Fellow at Dumbarton Oaks in Washington, D.C., for the academic year 1991-92.

Curtis Runnels, Associate Professor of Archaeology, is a
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Center Activities: Spring and Fall 1991

The Center and the Department sponsored many lectures and special events during 1991, including the Context and Human Society Lectures by Professor Martin Biddle. This lecture series, as well as several other events, is highlighted below and on the following page. All photographs shown were taken by Michael Hamilton.

Professor Martin Biddle, Astor Senior Research Fellow in Archaeology at Hertford College, Oxford University, presented three lectures on "Archaeology Is History" in the Context and Human Society Series, March 19-21, 1991. The Humanities Foundation of Boston University and the Center for Archaeological Studies co-sponsor the prestigious annual series.

Professor Biddle founded and has for many years directed the Winchester Research Unit. He has been excavating Mediaeval and post-Mediaeval sites in Britain for almost forty years, and recently has worked also in Egypt and Jerusalem. He is internationally recognized for his contributions to excavation techniques and for his integration of archaeological and documentary data in historical interpretations.

(Upper right.) Professor Biddle shows Professors Murray McClellan and Patricia McAnany a replica of King Arthur's Round Table. (Lower right.) At the reception held in the Castle for Professor Martin Biddle, Boston University Provost Jon Westling chats with Professor Biddle's wife, Professor Birthe Kjølbye-Biddle. Professor Kjølbye-Biddle also presented a lecture on Friday, March 22, entitled: Disentangling the Deep: The Archaeology of Complex Stratified Sites.



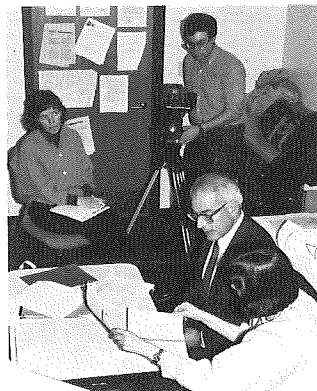
Dr. Paul Goldberg (right) of Hebrew University examines an artifact with Professor Murray McClellan. Dr. Goldberg presented a lecture on: A New Look at Archaeological Sediments in the Mediterranean.



Boston City Archaeologist, Dr. Steven Pendery (left), discusses the similarity between pottery sherds from Spencer-Pierce-Little Farm and Brook Farm with Dr. Ricardo Elia, Director of Boston University's Office of Public Archaeology. Dr. Pendery lectured in February on the Brook Farm.



Peter Kelterborn of Switzerland shows Professor Curtis Runnels one of the flint tools he used in his recent lecture to the undergraduate archaeology club.



Dr. Farouk El-Baz is videotaped by NBC television as he discusses remote sensing with graduate students.



Dr. Helaine Silverman of Brandeis University lectured in February on her work in Peru. Here she reviews maps of site with archaeology graduate students Ann-Eliza Lewis and Tom Tartaron.

More Center Activities and May Commencement



Dr. Anna Marguerite McCann chats with Professor James Wiseman before her lecture on December 5, entitled: Underwater Archaeology and the JASON Project. The lecture was co-sponsored by the Center for Archaeological Studies and the Archaeological Institute of America.

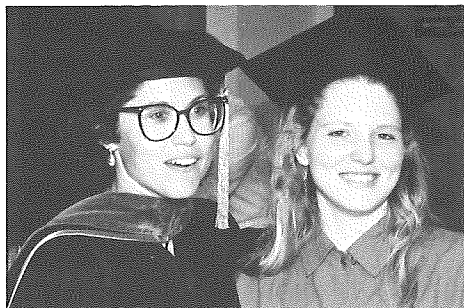
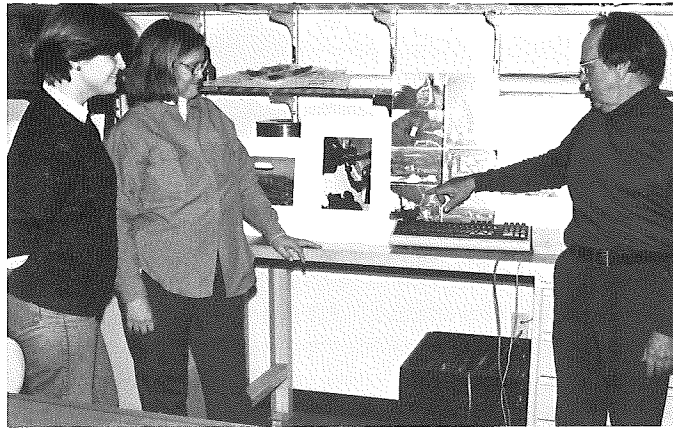
Congratulations to all May 1991 Graduates . . .

B.A.: Rebecca A. Braniff (*Cum Laude* and *Departmental Award for Distinction*), Catherine N. Camilletti, (*Cum Laude*), Ann Cox, Lorren W. Jackson, III (*Magna Cum Laude* and *College Prize for Excellence*), Lisa M. Shaul, and Jacquelyn S. White.

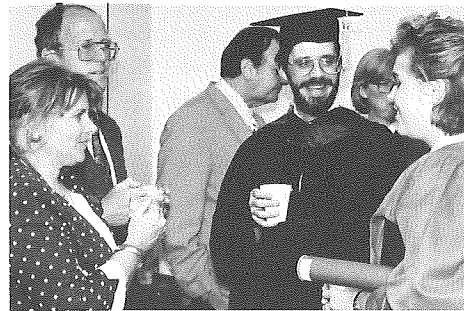
M.A.: John W. Cuozzo, David H. Dutton, Harriet Hornblower, Sally Pendleton, and Grace H. Ziesing.

Ph.D.: David B. Landon.

Two members of the Department, Research Professor J. Wilson Myers and Research Fellow Eleanor Myers, review aerial photographs with graduate student Carol Stein when they presented their lecture in February on: Balloon Archaeology: Method and Result.



Professor Patricia McAnany shares a happy moment with Lisa Shaul, who received her Bachelor of Arts degree.



Professor Murray McClellan chats with graduating senior Rebecca Braniff and her parents at the reception following the May Commencement ceremonies.

Professor Norman Hammond, Acting Chairman of the Department of Archaeology (1989-91), presents John Cuozzo with his Master of Arts degree at the Department's Commencement ceremonies in May.



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national lecturer during 1991-92 for Sigma XI, the Scientific Research Society, which is the honor society for scientists. Sigma XI has more than five hundred chapters and clubs across North America and abroad that are located at both major research universities and smaller instruction-oriented colleges.

James R. Wiseman, Director of the Center for Archaeological Studies and Chairman of the Department of Archaeology has been selected as the Charles Eliot Norton Lecturer for the Archaeological Institute of America. Professor Wiseman will present lectures at ten universities and colleges in the United States and Canada during the academic year, 1992-93.

The Luther I. Replogle Foundation has awarded **James Wiseman** a three-year grant of \$27,200 to aid in the preparation for publication of volumes in the series of final reports on the Stobi (Yugoslavia) Excavation Project. The series is being published by Princeton University Press, and two volumes are already in press: *Volume 1: The Hellenistic and Roman Pottery* by Virginia Anderson-Stojanovic, which will appear in spring, 1992, and *Volume 2: The Theater* by Elizabeth R. Gebhard. The Replogle Foundation grant will be used for subsequent volumes, including one on inscriptions from the theater (Wiseman), another on the residences (by F. P. Hemans, Carolyn Snively, and Ruth Kolarik), and an overview volume on the project.

Beyond the Kitchen Door: The 1991 Field Season at the Spencer-Pierce-Little Farm

by Mary C. Beaudry

The Spencer-Pierce-Little house (SPL) and 230 acres of land in Newbury, Massachusetts, were acquired by the Society for the Preservation of New England Antiquities (SPNEA) in 1986. Since the fall of 1986, Professor Mary Beaudry has directed Boston University students and many local volunteers in excavations in and around the main house, which was built in the late seventeenth century and is a unique example of brick-and-stone architecture in the English Artisan Mannerist style. The archaeological work is being conducted along with architectural study of the house and detailed research into the families who lived in the house over its long history; see Context 6:1-2 (1987) 8-9 and 8:1-2 (1989) 1-3. Sara Mascia assisted in the direction of the project and field school in 1991.

The scullery and the yard beyond the kitchen were the focus of research during the 1991 summer investigations at the Spencer-Pierce-Little (SPL) house in Newbury. The "Scullery," a

special room for food preparation, dish-washing, and so forth, was so-labelled on an 1812 map of the SPL property, where it was shown to the west of the kitchen ell. The ell is the "top" of the cross formed by the main house, which is cruciform in plan. Our interest in the scullery and yard lay in what they could reveal about the everyday lives of the site's inhabitants, especially diet, food preparation, waste and water management, and the wide range of women's tasks that were inexorable realities of domestic life until the early twentieth century.

A small section of the foundation of the scullery had been excavated in 1990, along with an adjacent area of cobble paving. Excavations in 1991 by students in the Boston University field school and by volunteers extended the previous work and have revealed that the cobbles formed an apron, about 1.5 meters wide, around the scullery, which had been a frame structure set upon a crude, dry-laid

stone foundation. A circular stone-lined feature discovered in the southwest corner of the scullery was probably a well, although only about a meter of the fill was excavated.

Excavation within the scullery foundation provided evidence that it may have had a wood floor supported on posts. One post hole was located and excavated, which contained the stalk and terminus of a trifid-style (tri-lobed) spoon and ceramic fragments dating to about the 1720s as well as a felsite pre-form (an unfinished projectile point, probably prehistoric, but otherwise not datable). Another feature beneath the scullery deposits may have been a sump. It likewise produced material from the 1720s, including a fragment of a gadrooned stem of a large goblet similar to one recovered from the site of Clay Bank in Gloucester County, Virginia, by Ivor Noël Hume.

Deposits above the lower levels of the fill in the scullery produced materials dating throughout the eighteenth and into the early nineteenth century; those above the foundations and atop the cobble paving dated after about 1840. Most of the interior of what had been the scullery is now occupied by a large brick cistern installed in the third quarter of the nineteenth century.

Excavation in the work yard outside the kitchen/scullery produced midden deposits containing a surprising quantity of animal bone in relatively good condition as well as ample evidence of various landscaping episodes. Directly above subsoil was a stratum of glacial sand apparently deposited on top of the original grade level during excavation of the cellar. Lying directly on the sand were several discrete "piles" of construction rubble that had been spread out before having a generous fill laid over them. Above this was a thick stratum of gravel deposited in the late eighteenth century (the most interesting artifact here was a Spanish silver trade dollar bearing the date 1778). The gravel, therefore, was probably laid down about the time Nathaniel Tracy renovated the house in the 1780s. The graveled yard surface stretched away from the cobble apron of the scullery,



Carolyn White from Oberlin College and Peter Zinc, a student from Lincoln-Sudbury High School, excavate in the SPL kitchen dooryard, behind the early nineteenth-century wood addition to the west wing of the house. Photograph by Michael Hamilton.

an as yet undetermined distance.

Our tentative interpretation is that the scullery was constructed around or sometime after 1720 and that it existed for perhaps more than a century. The area around the scullery was an active, open work yard that for a time at least consisted of both cobbled and graveled surfaces. By the early nineteenth century the rear yard of the main house was bounded by new additions to the main house: a wood addition to the west, built by the wealthy owner Offin Boardman for his wife (she refused to live in the stone house), and a large wood-frame tenant farmer's house stretching to the north. The scullery seems to have been demolished before 1840 and the foundation cavity as well as the nearby well-like feature were filled. A portion of the buried remains of the scullery was destroyed when a cistern to collect roof run-off was installed about 1850 to 1865. The cistern installation pit was backfilled and the area was grassed over (this is evident in photographs dating from the 1880s on). When the cistern was abandoned, its cast-iron downspout was simply broken off at grade level and the subterranean elements of the cistern remained untouched.

Our work in 1991 was enhanced by the volunteer efforts of China Trade expert Carl Crossman, who spent almost all of the six-week field season, as well as post-excavation time, mending the hundreds of glass and ceramic vessels recovered in late 1990 from the stone-lined privy in the East



Carolyn White, a student from Oberlin College, completes a stone-by-stone drawing of the cobble apron around the SPL scullery. Photograph by Michael Hamilton.

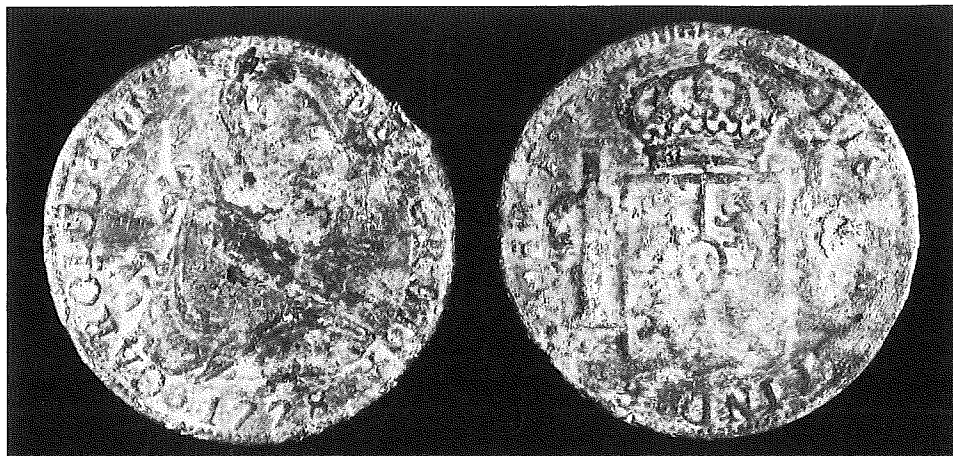
Yard. These date mainly from about 1790 to 1810, although there are a few examples of Chinese export porcelain from earlier in the eighteenth century (for example, an Imari plate and a Batavia tea bowl). Crossman's work has been an enormous contribution to the project and has drawn our attention to the important issue of the influence of the China Trade on the consumption patterns of the late eighteenth- and early nineteenth-century families who resided at the Spencer-Pierce-Little house, all of whom were from wealthy, urban, mercantile backgrounds.

The results of the 1991 season advanced the project significantly toward one of its long-term research

goals: understanding the changing use of the farm, which began as a commercial livestock venture during the early settlement of Newbury. They shed additional light on our previous research, which has shown that in the late eighteenth century the working farm became a grand country estate for a succession of Newburyport merchants who amassed their wealth through Revolutionary War privateering and the China Trade. We also know that by the middle of the nineteenth century, the property was a thriving family farm. Edward Henry Little, who purchased the farm in 1850 after working it as a tenant for nearly a decade, practiced the principles of progressive agriculture in improving the farm's productivity.

Little and his descendants respected the historical character of the property, however, and, in bequeathing the property to SPNEA, assured that it would be preserved for future generations. SPNEA hopes to open the house and grounds to the public by 1995 as a museum that interprets the social history of New England families and farms over three centuries.

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Front and back view of a 1778 Spanish silver trade dollar; such coins were the only specie Chinese merchants would accept in exchange for the goods they traded to New England merchants. Photograph by Michael Hamilton.

A Small Town in Early Christian Cyprus: The Fifth Season of the Kalavasos-Kopetra Project

by Murray McClellan

As we began our fifth season at the small, late Roman (fifth to seventh centuries A.C.) site of Kalavasos-Kopetra, my co-director, Professor Marcus Rautman of the University of Missouri-Columbia, and I were hoping that we would finally excavate some domestic structures belonging to this agricultural and mining community. As described in a previous issue of *Context* (Vol. 9:1-2), our specific interest in Kopetra has been to document the nature of this southern Cypriot settlement and to place it within a larger regional context. Our project had the exciting prospect of investigating a type of site and, indeed, a period almost totally ignored in previous archaeological work on the island. During the past four seasons of survey and excavation at the site we had outlined the extent of the settlement, hypothesized functional variations within the site based on observed differences in surface distributions of artifact types, and had exposed two small early Christian basilicas. These ecclesiastical structures, one on the southern edge of the settlement, the other, apparently part of a monastery, lying some 100 meters

to the east of the town, are important as rural examples of a basilica type well known in urban contexts and as such have much to tell us about the nature of the community which built them. Nonetheless, we needed to find some houses to round out our picture of ancient Kopetra.

The 1991 field season of the Kalavasos-Kopetra Project (hereafter the KKP) was undertaken in conjunction with an archaeological field school administered by Boston University. The fifteen undergraduates of the field school included seven archaeology majors from Boston University and eight other students from Wheaton College, Columbia University, SUNY New Paltz, the University of Pennsylvania, American University, Emory University, and Arizona State University. These students joined the regular KKP staff and, when not on tour to the major sites and museums of Cyprus, participated fully in all aspects of the dig. While the opportunity to participate in the practical applications of theoretical and methodological concepts studied in their formal courses was obviously an invaluable experience



Boston University field school students at weekly trench tours.



Gypsum plaster molded and carved relief sculpture of an eagle, from first phase of Area II basilica.

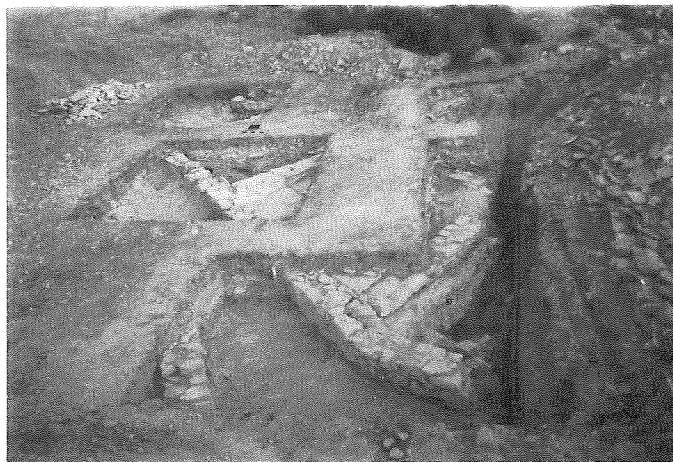
for the students, the presence of fifteen undergraduates eager to learn what archaeology is all about proved to be a great boon to the project as a whole. Discussions about our new discoveries and possible interpretations of them were carried on with great vehemence by students and staff alike, often continuing well into the wee hours of the night.

In addition to our goal of uncovering part of the settlement proper at Kopetra, the objectives of the 1991 season included the further clarification of the plan and history of the basilica in Area II. This latter task was accomplished quite successfully by exposing the entire central nave, southern aisle, and an attached southern chapel. First constructed towards the middle of the sixth century A.C., the original multi-level, three-aisled basilica and attached chapel were modified in a second phase when the internal colonnades were replaced with solid walls composed of reused material. This second-phase complex was destroyed towards the middle of the next century, perhaps as a result

of the Arab invasions of Cyprus in 648 or 652. In the third phase, two small single-room churches were constructed over the east end of the attached chapel and over the basilica's presbytery. This final phase can be dated to the second half of the seventh century on the basis of a type of hand-made pottery first identified this last season in levels associated with these later constructions. The elaborate decoration of the original Area II basilica continued to be revealed this year as more fragments of tessellated floor and wall mosaics were discovered and more molded and carved gypsum plaster relief sculpture was recovered, including two examples of standing eagles.

In the continuing search for domestic structures, three new areas of Kopetra were tested by excavation during the 1991 season. One of these, Area IV, had been partially exposed during the construction of trenches for water irrigation pipelines laid in the region in 1986. The intensive surface survey of this area had revealed a significantly high proportion of coarse-ware pottery which, together with the fragments of an oil press discovered nearby, suggested a domestic/industrial function for this quarter of the town. This supposition was confirmed by our excavations which revealed an irregularly shaped, multi-phased structure of roughly square rooms fronting a small alley. At last we had an example of the domestic architecture of Kopetra! The structure's irregular plan, very similar to houses in the modern village of Kalavassos, and the paucity of its associated artifacts present a great contrast to Kopetra's basilicas.

The second new sector, Area V, is located on the northern edge of the settlement and had been partially disrupted several years ago when an olive grove was planted in its thin, rocky soil. Alerted by the richness of the area's surface finds and by the east-west orientation of one exposed wall, we suspected that Area V contained yet another basilica and thus sank only a limited set of test trenches here. Our suspicions were quickly confirmed when, on the eastern edge of the area, the curved apse of the cen-



(Upper left.) Area IV from the south; on right, modern irrigation pipeline; at lower center, small alley. (Bottom left.) Detail of opus sectile floor in central apse of Area V basilica. (Bottom right.) General view of Area VI structure, from the north.



tral nave emerged. Nonetheless we were quite surprised to discover that this third basilica, contemporary with the other two found at the site, was by far the most richly ornamented. It had a tessellated wall mosaic, architectural decoration in both gypsum plaster and in carved sandstone and, in the bema of the central nave, an *opus sectile* floor composed in part of imported marble. This elaborate floor is identical to those laid at the grand cathedrals in the major cities of early Christian Cyprus.

The emerging picture of the relative wealth of the settlement at Kopetra was further augmented by the limited excavation undertaken in the third new sector of the 1991 season, Area VI. Here, located on a low natural rise in the center of the site, we uncovered a well-built structure of as yet undetermined function. It was

laid out on at least three separate levels, had carefully fitted gypsum paved floors and was fronted by a covered passageway equipped with a covered drain. As was the case with the other structures uncovered this last season, the Area VI building was apparently originally constructed around A.D. 550 and continued to function, albeit in a reduced and modified form, until approximately A.D. 700. The artifacts associated with the Area VI structure, including a wide variety of bronze and iron objects and large quantities of fine-ware and imported amphora fabrics, stands in marked contrast to the meager assemblage discovered in Area IV, only 100 meters to its east.

Clearly, the anonymous late Roman settlement at Kopetra had a remarkable degree of social hetero-

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On the Trail of the *Tabula Rasa* at Dzibilchaltun

by Clemency Chase Coggins and Daniel Seton Coggins

The new project at the ancient Maya site of Dzibilchaltun in Yucatan, Mexico, was directed in 1991 by Clemency Chase Coggins and sponsored by the Department of Archaeology at Boston University and the Middle American Research Institute, Tulane University. The latter Institute with the National Geographic Society had conducted survey and excavations at the site from 1956 to 1968 (see Andrews IV and Andrews V, 1980). The work in 1991 was performed with the permission of the Mexican Instituto Nacional de Antropología, and under the aegis of Alfredo Barrera Rubio, Director of the Centro Regional de Yucatan.

Early every morning in the dark we cautiously skirted the empty indoor swimming pool of the decommissioned bordello that was our quarters in Merida, and loaded the van for the twenty-minute drive to Dzibilchaltun, an ancient Maya site in Yucatan, Mexico. En route we picked up our Maya-speaking bushwhacker,

Antonio Padron Alcocer, jounced along the rocky track into the site, scrambled up the westernmost pyramid at Dzibilchaltun, and worked quickly to set up the theodolite before the sun rose. The aim of this repeated pre-dawn exercise was to determine the precise locations of sunrise on the horizon as seen from the pyramid on the days surrounding the vernal equinox. Shooting the sunrise thus was a key element in our efforts in 1991 to understand the role astronomical observations played when the ancient Maya planned the locations here of their pyramids and causeways (known as *sabes* in Maya archaeology). The work was carried out in February and March, along with site reconnaissance, as the first part of a study of the siting and function of both carved and plain stone monuments at Dzibilchaltun.

The ancient site once covered some twenty square kilometers in the flat,

dry, northwestern corner of the great limestone plain of the Yucatan Peninsula (Fig. 1). The ruins, which lie twelve kilometers north of Merida, the modern capital, and twenty-three kilometers south of the Gulf of Mexico, are largely covered with hennequen (sisal) fields and thorny bush (daunting obstructions to archaeological reconnaissance!). Although the site had been mapped some twenty years ago (published by Stuart et al., 1979), if the monuments were now to be analyzed in the manner we envisioned, we first had to relocate them in the midst of the inhospitable local ground cover.

We hoped to relocate the series of monuments, numbering 40 to 45 as recorded by the earlier project at Dzibilchaltun (Figs. 2 and 3 from Stuart et al., 1979). These monuments comprised twenty plain stelae, eight carved stelae (see photo on page 1), five plain altars, and about ten "miscellaneous sculptures" (Fig. 5). Three monuments were not relocated, but six to ten new monuments were found. The corpus now conservatively totals forty-nine monuments.

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generosity, much more so than we had initially anticipated for this small community well outside the economic and political centers of Cyprus and the early Byzantine empire. This heterogeneity and the unexpected wealth of the community represented by its three contemporary churches can in part be explained by the growing importance of Cyprus to the imperial powers at Constantinople at a time when much of the empire was being lost to eastern armies. By continuing to examine the settlement at Kopetra within its regional context, future study seasons of the KKP will help to suggest the mechanisms by which this late Roman community was able so successfully to take advantage of its historical and geographical situation.

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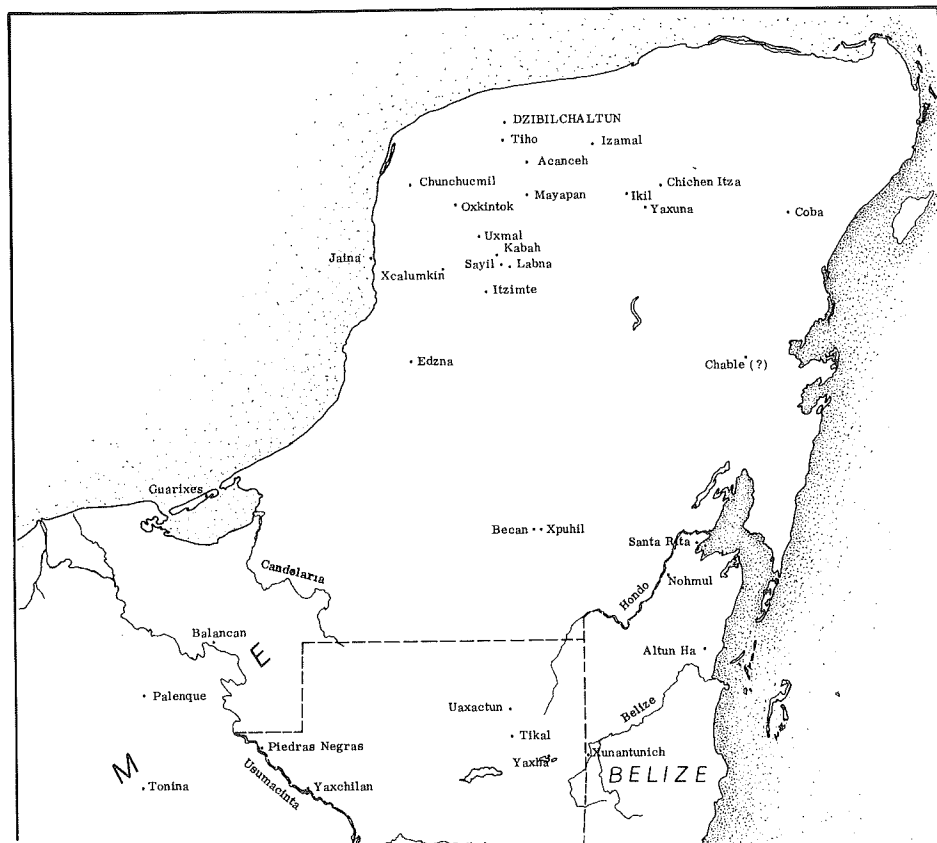


Figure 1. Map of the northern part of the Yucatan Peninsula.

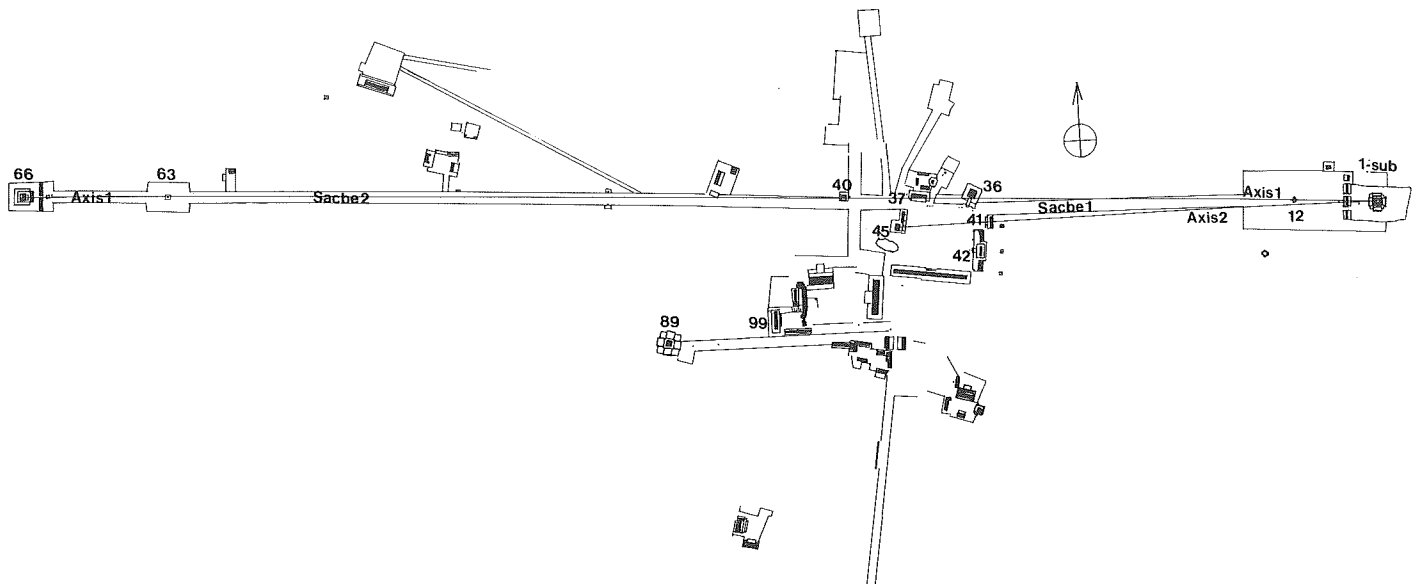


Figure 2. Plan of Dzibilchaltun, with principal east-west axis. Axis 1: 93.8 degrees. Axis 2: 90 degrees.

Of the twenty-seven stelae shown on the 1958-1965 Dzibilchaltun map, not one was standing or whole when originally found, and three carved and two plain stelae had been moved from their original locations and reused. Since nineteen of the plain stelae were apparently in or near their original locations, however, one of the aims of the project was to analyze them in their relationship to structures and other features, including carved monuments. At the same time, we took measurements to provide comparative data for a locational analysis of all the monuments at Dzibilchaltun.

This information will be valuable both for dating purposes, and for eventual comparison with monuments at other sites in order to understand the purpose or purposes of plain stelae wherever they were erected. They are found at most Maya sites, but have never been studied. It is not known, for instance, if plain stelae are sometimes, always, or never functionally interchangeable with carved ones. Nor is it known if they were usually decorated in any way. Hence they might be called *tabulae rasae*, although we do not know if they were "erased" or not.

One hypothesis to be tested concerned the date of the foundation of Dzibilchaltun; a second, related hypothesis was that Dzibilchaltun's late seventh century A.C. plan was

designed as a function of calendric ritual, and thus might provide a rationale for monument location (Coggin 1983:7; Coggin and Drucker 1988). These hypotheses proposed that the uniquely long 2.26 km east-west sacbe at the center of Dzibilchaltun was constructed as part of an unusually accurate observatory in association with equinoctial events, and that the sacbe itself was laid out to commemorate a specific date that corresponded to the formal foundation of Dzibilchaltun in the Classic period: March 16, A.C. 692, four days before the spring equinox.

The Foundation Hypothesis

In order to test the astronomical orientation hypothesis, we measured sunrise from the western pyramidal Str. 66 to the eastern horizon beyond the reconstructed Str. 1-sub located at the opposite end of the sacbe (Figs. 2, 4). Up until the equinox, sunrise was recorded thirty-two times, although on nineteen of these days the sun was not visible at the horizon because of clouds or ground fog. This cloudiness increased as the equinox approached—the eight sunrises from March 14-21 were all obscured. Since there is no city or other source of atmospheric pollutants to the east of Dzibilchaltun, these measurements suggest the eastern horizon might have been similarly invisible to the

ancient Maya 59 percent of the time in the spring. Ancient viewing might, in fact, have been even *less* successful if milpas (corn fields) were burned to the east, as is usual at this season.

The long east-west sacbe that is the spine of Dzibilchaltun comprising the eastern Sacbe 1 and the western Sacbe 2 (shown as "Axis 1" in Figs. 2, 3) is skewed 3.8 degrees south of true east. This deviation demonstrates that the Maya did not lay out this principal sacbe (Axis 1) to commemorate the equinox. The Maya are well known for their accurate astronomical observations; they had been building equinoctial observatories for a millennium, so we can assume this deviation was not an error.

The 1991 measurements showed that the sun actually rises behind Str. 1-sub, as viewed from Str. 66 at the western end of Axis 1, nine days before the equinox (Figs. 2, 4). We believe this orientation was intentional and may have been an anticipatory observation like those known from the ancient American Southwest (Zeilik 1988). These very long axial observations were deliberately constructed; they could not have been made from a variety of different places or angles because Dzibilchaltun is located on a completely flat plain and there were no natural or man-made elevations,

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except for the parts of this observatory, visible in any direction at the time of its construction.

On March 12, 1991, the huge red disc of the sun rose behind Str. 1-sub, asymmetrically silhouetting the temple within the disc, as seen from the western end of the sacbe (Figure 4). In some years the temple would be symmetrically framed because the spring equinox may be on March 20 or March 21. In 1991, the equinox occurred at 10:02 p.m. on March 20, or between the two sunrises. As a consequence, the sun was too far south on the eleventh and too far north on the twelfth to silhouette Str. 1-sub symmetrically within the solar disc at sunrise (see Fig. 4). At the equinoxes the sun moves nearly thirty minutes along the horizon per day, or almost the equivalent of its own width. The equinox occurred eight and one-half days later (March 20), and the historic March 16 date, postulated as the foundation day of Dzibilchaltun, fell halfway between the two. Because of

the seasonally unpredictable conditions for viewing the horizon, the Maya may have constructed a four- or five-day warning, or anticipatory, interval for the March 16 date along the principal Axis 1. March 11 or 12 would thus also have served as a nine-day prediction period for the equinox, March 20 or 21, as viewed along Axis 2 (which is true east-west). Accurate prediction is especially difficult at this season of the year when the sun's position advances most rapidly along the horizon.

Finding the Plain Stelae and Altars

Str. 66 is located in the middle of a hennequen field, outside the site boundaries to the west (Fig. 2). We visited it regularly at sunrise, and for the first six weeks, the remainder of each day (until the sun, thirst, and exhaustion sent us home around two) was devoted to finding the mapped plain monuments that were generally in the spiky hennequen fields or engulfed in the dry thorny bush typi-

cal of Dzibilchaltun. Easily accessible monuments at the center of the site and in the museum were recorded during the last two weeks.

When we cleared the axis of the widened sacbe immediately east of the western pyramidal Str. 66, we found an unmapped stone platform with one, possibly two, plain stelae, and a plain round altar. These, and Str. 63 with a plain stela, correspond in position to Str. 12 and its plain Stela 3 at the opposite, eastern, end of the long sacbe, just west of Str. 1-sub (Fig. 2). Like these mirroring eastern buildings and their plain monuments, and the whole Axis 1 sacbe, the entire western complex is thought to date from about A.C. 700.

One of three broken plain stelae, of unknown date, north of Sacbe 2, apparently had no platform and its relationship to adjacent buildings is peculiar. With its stony environs in the middle of the hennequen, this monument is a good example of the frequently ambiguous stela contexts found at Dzibilchaltun.

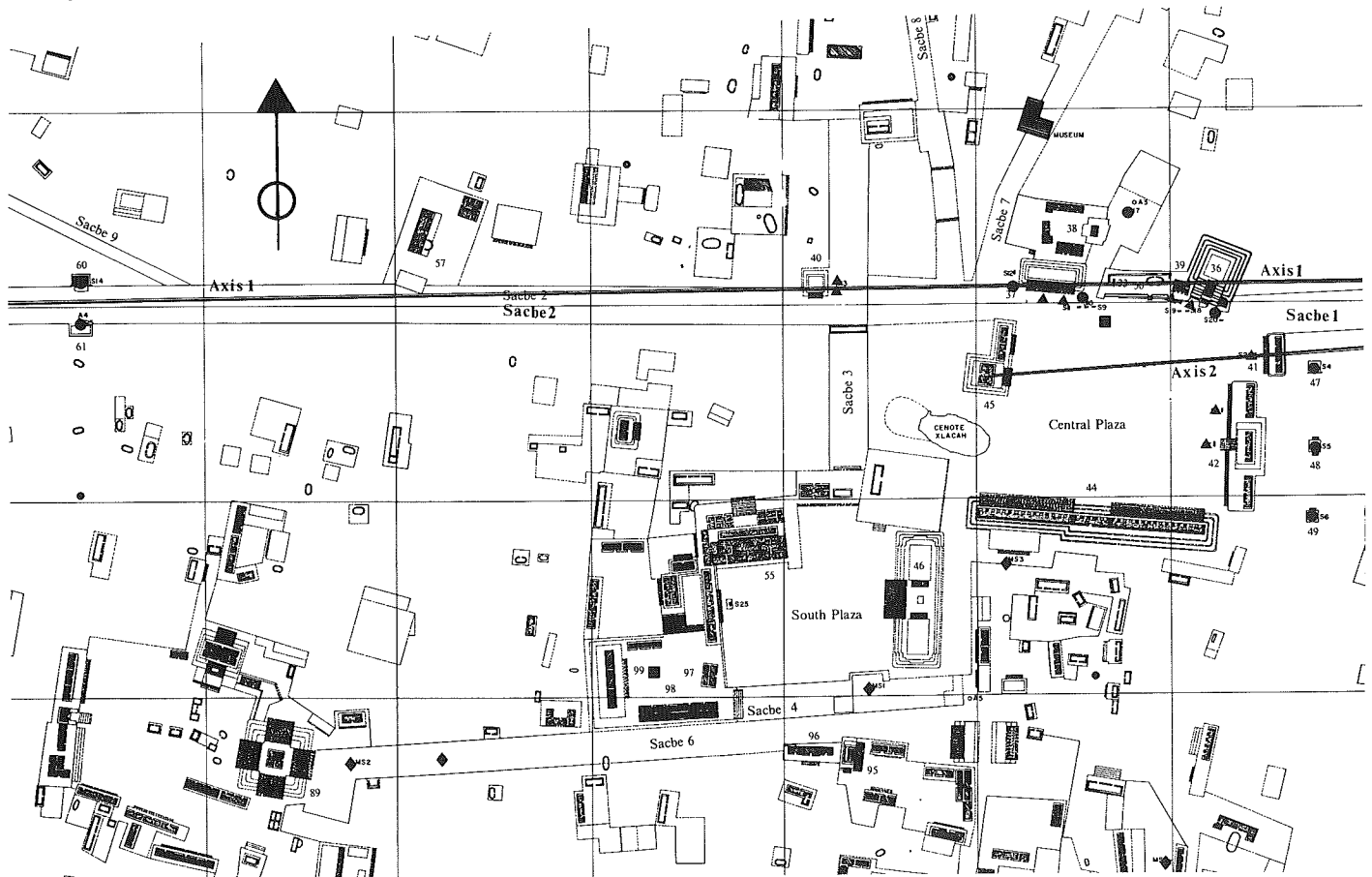


Figure 3. Center of Dzibilchaltun. ● Plain Stelae. ▲ Carved Stelae. ◆ Miscellaneous Sculpture with inscription. ■ Concentration of carved façade stones.

Aptly named, "dzibilchaltun" means "writing on slabs of stone (or bedrock)" in Yucatec Mayan. Bedrock is at the surface everywhere. There is very little soil. Platforms and walls sit on top of the bedrock and have been robbed for stone since the sixteenth century. Stone robbing is not quite so common today, since the site is legally protected, but ancient masonry has been extensively used to construct cairns and boundary and corral walls. Because of these losses, one can not be sure a broken stela lying alone on the ground was not once supported by a platform, or was not itself once bigger—any portable stones may have been taken in the last five centuries. One can, however, be confident that the butt of a stela is not invisible underground. Stelae at Dzibilchaltun were supported by cribbings in platforms, not inserted into the omnipresent bedrock, as they would have been inserted into the ground at southern lowland sites.

Carved Stelae

The carved stelae were all at the Central Plaza, whereas the "Miscellaneous Sculptures" with inscriptions were all found south of the Central Plaza on sacbes or in residential groups (Fig. 3). No monuments had the complete Maya "Long Count" dates known as "Initial Series inscriptions," but there were several abbreviated dates that referred to Long Count dates in a shorthand form characteristic of Yucatan.

Like all the plain stelae at the site, the carved ones are broken. Three carved stelae, known from photographs taken in 1941, were thought to be lost, but we refound them along the east side of the Central Plaza when we turned over several broken and heavily eroded "plain" fragments, some partly buried under piles of dirt and stones. The top of carved Stela 9, now in the museum, apparently commemorates a Maya Long Count date, "10.1.0.0.0 5 Ahau" that corresponds to November 28, 849 A.C.

Two carved stelae (nos. 18 and 19) on Axis 1 had been reused in ancient times in the southwestern face of the

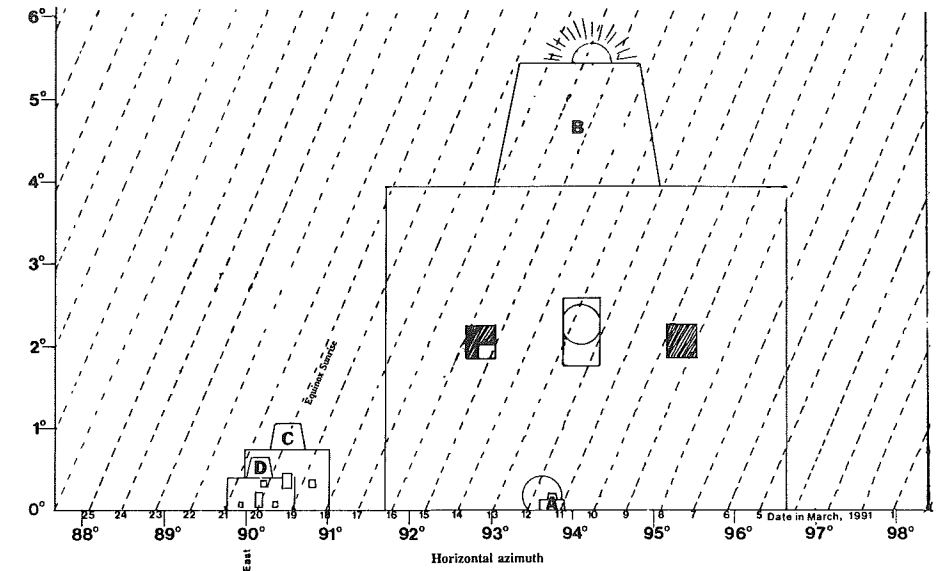


Figure 4. Trajectory of the sun rising behind Str. 1-sub from March 3-22, 1991, as viewed from Strs. 12, 66, 41, and 45. The size and location of Str. 1-sub varies in the graph according to viewpoint, while the size of the sun is constant. Dotted lines indicate the top center of the solar disc. A) Str. 1-sub from Str. 66; B) Str. 1-sub from Str. 12; C) Str. 1-sub from Str. 41; D) Str. 1-sub from Str. 45.

substructure of Str. 36 (see photo on page 1), while fragments of two to four more carved stelae were found in the Central Plaza, reused in construction of the seventeenth-century Catholic Open Chapel or later in the wall of the Colonial corral. One of these latter records what is probably the Long Count date 9.18.0.0.0 11 Ahau, October 9, 790 A.C.

One or more carved stelae were also once erected east of Str. 40, which was constructed on Axis 1 at the beginning of Sacbe 2 as it leaves the northwestern corner of the Central Plaza (Fig. 3). The other six carved monuments are "Miscellaneous Sculptures" from south of the Central Plaza (Fig. 3). Two could not be relocated, despite repeated tracking and hacking through the bush, although we did relocate one on Sacbe 4 (M.S. 1) which depicts a kneeling bound captive. On Sacbe 6, in the course of searching fruitlessly for M.S. 2, we also found an unrecorded relief with about ten glyphs and what may be another kneeling captive.

Unfortunately none of these inscriptions is legible. One fairly well-preserved relief, however, was found by the 1963 survey team on a lintel from a ninth or tenth century building in a group 600 meters southwest of the Central Plaza (Fig. 2).

Carved in a cursive style, this inscription with six remaining glyphs begins with a common Maya compound found at the beginning of southern lowland Classic inscriptions (Fig. 5).

Preliminary Conclusions

The carved monuments of Dzibilchaltun were probably all made between A.C. 700 and 900. They are concentrated in the Central Plaza, and to its south, near the finest residential groups. These monuments portray rulers and captives, and some of the inscriptions surely recorded historical events.

The plain stelae may all have been made during the same two centuries, but they were used and reused, perhaps written upon and erased, possibly for as long as eight centuries, and may, in all but three cases, have been a part of ceremony focused on the main sacbe of the site. In view of what is known about the erection of Maya stelae, one may postulate this was some kind of calendric ritual.

The stelae portraying rulers at the Central Plaza probably all originally included Maya Long Count dates and thus, like the plain stelae, would have been involved in a kind of calendric

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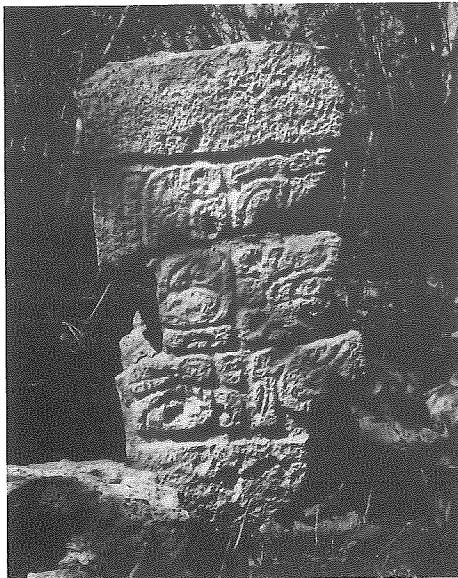


Figure 5. Carved lintel from Str. I980o558.

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ritual, although the rulers were usually associated with one specific historic date. The plain monuments, on the other hand, may have been used in the recurring cyclic celebrations of both the Maya Long Count and the solar year.

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Profiles of the Past

Our Archaeological Heritage

by Ricardo Elia

Heritage for Sale

This year marks the five hundredth anniversary of Christopher Columbus's first voyage to the New World, and the event has proved a marketer's dream. In anticipation of the quincentennial anniversary, the public has been inundated with articles, books, celebrations, and protests. Activities related to the anniversary have included everything from a major public television series on the legacy of Columbus to Danish-sponsored research projects dedicated to investigating possible pre-Columbian Norse sites in North America.

While many of the quincentennial activities are of educational value, some are strictly intended to cash in on the recent public interest in Columbus and the Age of Discovery. One of the worst offenders in the latter category is the traveling sale of artifacts recovered from the famous shipwreck, *Nuestra Señora de Atocha*, and other Spanish galleons that sank off Florida by Mel Fisher's company, Treasure Salvors Inc.

For a week last October, the respected Boston jewelers Shreve Crump & Low showcased the *Atocha* loot in their Boylston Street store. The *Atocha* sale—a slickly packaged road-show featuring Mel Fisher's son, Kim—had already been to Washington, D.C., and was moving

Southwest." In *New Directions in American Archaeoastronomy*, edited by Anthony F. Aveni. *BAR International Series* no. 454:183-198.

Clemency Chase Coggins is Adjunct Associate Professor of Archaeology at Boston University and Director of the project at Dzibilchaltun. Daniel Seton Coggins managed the project, relocated the monuments, and took measurements for survey and astronomical observation.

on to Minneapolis and other urban markets after Boston. In each city, the marketing strategy is the same, as the treasure hunters team up with an established local jeweler to present their exhibit-cum-sale.

"Own a piece of history" is the theme of the *Atocha* sale, and this message was repeated on tastefully calligraphed cards in each display case. The artifacts on sale were almost exclusively silver coins—many of them pieces of eight—that had been graded into different price categories ranging from \$695 to more than \$1200. Smaller, more worn coins could also be had for as little as \$100; these came from less glamorous wrecks than the *Atocha*.

Shoppers who were not enticed by the coins could purchase a variety of gold and silver jewelry modeled on artifacts from the *Atocha*. Accompanying each item was a certificate asserting that it had been made with a drop of actual gold or silver from the *Atocha*. That is, the salvors themselves thus attest that genuine artifacts from the wreck have been melted down and fashioned into replicas.

Ever since the early 1970s, when former chicken farmer Mel Fisher began to search for the Spanish treasure galleon that sank in the Florida Keys in 1622, the name *Atocha* has been a symbol of contradictory meanings. To treasure hunters, *Atocha* means incredible treasure in gold and silver coins and jewels, a mother lode of riches found after a long and costly search. To archaeologists, *Atocha* means an incredible loss of archaeological and historical information for the sake of profit, and the name has come to represent more than three decades of commercial plundering of shipwreck sites from the Age of Discovery and the colonial period in

the Western Hemisphere.

With all the renewed interest in Columbus and the early exploration and settlement of the New World, it is appropriate for us to take stock of what we have learned about one of the most important aspects of that period—the ships and sailors that made exploration and settlement possible. What do we know of the ships themselves: their construction technology, armament, and cargoes? And what of the sailors who lived and died in them?

Historians estimate that, between 1492 and 1520 alone, more than fifty ships of exploration were lost in the waters of the New World. If we consider the period 1492 to 1800, the number of documented shipwrecks is in the hundreds. Often single ships went down; at other times, entire Spanish treasure convoys were lost during hurricanes or severe storms. Some of the most notable disasters include four ships that went down off Padre Island, Texas, in 1554; eight ships, including *Atocha*, that sank in a hurricane in 1622; and the famous Spanish “plate fleets” of 1715 and 1733, involving dozens of ships laden with gold, silver, and other cargo, that were lost in hurricanes off Florida.

With literally hundreds of potential shipwreck sites, one might think that underwater archaeologists would have a vast and rich database to study and to use in answering important questions about the first centuries of exploration and settlement in the New World. Unfortunately, treasure hunters and divers have been systematically plundering these shipwreck sites for more than three decades, and the loss to the historical record is both immeasurable and irreplaceable. Surprisingly little archaeological information is known about these ships, especially from the earlier periods. Only a handful of sites from the Age of Discovery have been scientifically investigated by archaeologists, and most of those had previously been picked over by the treasure hunters.

Treasure hunters who are searching for gold and silver cannot be bothered with time-consuming and costly items like archaeological recording,

conservation, and scientific analysis. Their methods are anything but subtle. In *Ships and Shipwrecks of the Americas* (edited by George F. Bass, Thames and Hudson, 1988), Roger C. Smith describes some of the treasure hunters’ methods. For example, one of the ships in the 1715 plate fleet, nicknamed by the divers the “Cabin Wreck,” was treated in this way:

Dug initially with a dragline from a temporary pier built out into the water, its timbers and other debris were scooped up, dumped on the beach, and combed with a metal detector.

Other sites fared no better. According to Smith, one ship found by divers might have been the admiral’s flagship from the 1733 fleet, but the identity of the vessel could not be determined because “diagnostic cargoes have been removed, features of the site altered, and no systematic excavation records kept.” The *Chaves*, another ship lost in 1733, “was relocated in modern times by an aerial search and promptly picked apart by divers.” All too typically, the archaeology of these wrecks has now become the archaeology of looting. The *San Pedro*, a wreck from the 1733 fleet, contained silver coins and Chinese porcelain. According to Smith,

... the San Pedro was dug repeatedly over a period of years by weekend treasure-seekers; remains of her timbers and ballast today lie strewn across the seabed, mixed with modern litter and discarded digging tools.

Many ships that did not contain “treasure,” in a modern commercial sense, have also been destroyed by divers in their frantic pursuit of gold. For example, a wreck nicknamed “El Leri” was ruined by divers who “removed an anchor and several cannons as trophies, and began dismantling the large ballast mound in anticipation of finding valuable cargo, before moving on to more lucrative wrecksites.”

The last decade has seen a dramatic increase in systematic underwater treasure hunting. With today’s

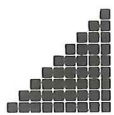
sophisticated remote-sensing technology, any chicken farmer who can raise enough money can become a treasure hunter and will find any number of scientists, historians, lawyers, promoters, jewelers, and even some unscrupulous archaeologists, who are more than happy to join in the quest for profit at the expense of the world’s cultural heritage. Kim Fisher, Mel’s son, claims that his father now has 200 divers and twenty ships in the pursuit of treasure. Many others are also involved, not only in U.S. waters but also off Bermuda, Belize, Ecuador, and in the Far East—anywhere, in fact, where there are shipwrecks and the possibility of treasure.

“Own a piece of history.” This seductive label, displayed in a respectable jeweler’s establishment, invites the public to share not only in history but in the excitement of discovering sunken treasure. The lure is an attractive one, with roots that reach deep into our cultural psyche. But the truth is not attractive; it is ugly. Shipwreck sites are among the most endangered of all species of archaeological resources. Treasure hunting—no matter how skillfully it is cloaked in an aura of respectability and promoted as history and archaeology—is the great destroyer of underwater sites, and, through its conversion of our common cultural heritage into private gain, a perverse devourer of history.

Selling coins and other artifacts obliterates the archaeological record and erases any possibility of further analysis. Melting down artifacts is perhaps the most obscene act in all this, as history is literally destroyed to make replicas. And buying coins and other artifacts from sites like the *Atocha* only helps to finance the plundering of more underwater archaeological sites.

The theme of the *Atocha* show should be “Destroy a piece of history” instead of “Own a piece of history.”

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.



CALENDAR

Spring, 1992

Context and Human Society Lecture Series. Speaker and dates will be announced later.

January-May 1992

Field Study in Archaeology: Belize. Professor Norman Hammond is director of the field school in Belize, Central America.

February 28-April 5, 1992

Sigmund Freud Exhibit at Boston University Art Gallery, 855 Commonwealth Avenue.

June 1-July 11, 1992

Nikopolis Field School. Professor James Wiseman, director (see this issue of *Context*, pages 1-4).

June 22-July 31, 1992

Spencer-Pierce-Little Farm Field School. Professor Mary Beaudry, director (see this issue of *Context*, pages 18-19).

June 1-July 12, 1992

Summer Study Abroad Program: Greece. Professor Murray McClellan, Department of Archaeology, and Professor Valerie M. Warrior, Department of Classical Studies, are co-directors of the program, which will be based at the University of Ioannina.

For additional information on the field schools and programs, write the Department of Archaeology, Boston University, 675 Commonwealth Avenue, Boston, MA 02215; Tel. (617) 353-3415.

Context is the newsletter of the Center for Archaeological Studies and is published quarterly. Institutions and individuals may subscribe separately to *Context* at a cost of \$10 per year. Membership in the Center is open to the public; annual dues are \$20 (\$10 for students); benefits include a subscription to *Context*, invitations to attend fall and spring lecture series and other events, and the use of the Center's library facilities. The Center also offers special seminars for the public during the academic year and summer field schools in the Boston area and abroad. Other categories of membership are: Contributing Member, \$50; Institutional, \$50; Patron, \$100; Benefactor, \$500; and Corporate, \$1000. These categories include a subscription to the *Journal of Field Archaeology*. Please make checks payable to the Center for Archaeological Studies and send to the

Center office at Boston University, 675 Commonwealth Avenue, Boston, MA 02215. Gifts to the Center are tax-deductible.

Editor-in-Chief: James R. Wiseman.

Managing Editor: Lucy Wiseman.

Editorial Board: Ricardo J. Elia, Creighton Gabel, Norman Hammond, Fred S. Kleiner.

Faculty and Research Appointments in the Department of Archaeology

(1991-92): Professors Creighton Gabel, Norman Hammond, Fred S. Kleiner, James R. Wiseman. Associate Professors Mary C. Beaudry, Curtis N. Runnels, Paul E. Zimansky. Assistant Professors Kathryn A. Bard, Julie Hansen, Patricia A. McAnany. Research Professors Farouk El-Baz, George (Rip) Rapp, J. Wilson Myers.

Student/Alum News

William Barnett (Ph.D. 1989) has a new position as SEM Supervisor at the Museum of Natural History in New York.

David B. Landon (Ph.D. 1991) has been appointed Assistant Professor in the Department of Sciences at Michigan Technological University in Houghton, Michigan.

Ann-Eliza Lewis (Ph.D. candidate) has been appointed Assistant Editor, *Northeast Historical Archaeology*.

Two Boston University students presented papers at the CNEHA meetings. **Julie H. Ernstein's** paper was entitled: *Community as Context: The Search for Meanings in Tidewater, Maryland*. **Sara F. Mascia** presented one on:

Excavations at the Spencer-Pierce-Little Farm: Interpretation of a Late Eighteenth-Century Renovation.

Adjunct Associate Professors Clemency C. Coggins, Ricardo J. Elia. Visiting Assistant Professor Murray McClellan. Distinguished Research Fellow Gordon Willey. Research Associate Gerald Kelso. Research Fellows William K. Barnett, Julie Benyo, Timothy G. Baugh, Helen Sorayya Carr, Tracey Cullen, John A. Gifford, Paul Goldberg, Thomas W. Killion, Georgeana Little, Priscilla Murray, Eleanor Emlen Myers, Steven Pendery, Tjeerd H. van Andel, Elizabeth C. Stone, Al B. Wesolowsky, Ann Yentsch.

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