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CONSERVATION

The GCI Newsletter



The Getty Conservation Institute Newsletter

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Front cover: The Capitoline temple at the archaeological site of Dougga, in Tunisia. One of the oldest settlements in the Tunisian interior, Dougga was a social, cultural, and religious center in Roman times. Today, this and many other archaeological sites in the Mediterranean region are tourist destinations, necessitating careful management if their remains are to be preserved. *Photo:* Marta de la Torre.

Back cover: Globe photo by Dennis Keeley.



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Among all the types of cultural heritage under threat, archaeological sites—and their wealth of information and artifacts—are in greatest jeopardy. Since time immemorial, archaeological sites have been exploited for knowledge and for treasure, looted for objects, destroyed out of idle curiosity, and plundered for material for new construction. Today, uncontrolled tourism poses its own threat. Lost sites, like extinct species, are lost forever. To prevent their loss, we need a holistic approach to site conservation.

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The mayor of Evora, Portugal, and vice-president of the Organization of World Heritage Cities describes how a long-term perspective, combined with a commitment to public participation, helped pave the way for the economic development, social reconstruction, and cultural revitalization of his city.

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The Mediterranean region contains vestiges of ancient civilizations that shaped our own societies. Unfortunately, the lack of long-term conservation plans in the region is leading to the irreversible degradation of many archaeological sites. In May 1995, the GCI and the Getty Museum hosted a conference of government officials and heritage specialists to discuss protection of Mediterranean sites. This adaptation of the introduction to the conference proceedings, now being published, explores the role that site management can play in the preservation of archaeological heritage.

17 Preserving Collections in Tropical Countries

In industrialized countries, most large museums provide stable environments for their collections by using elaborate climate-control systems. However, many museums in tropical countries lack the money to install, run, and maintain such sophisticated systems. How can safe environments be provided to ensure the long-term preservation of these museum collections? The answer lies in the use of passive environmental controls, relatively inexpensive and simple methods for creating reasonably stable museum environments by reducing extreme conditions.

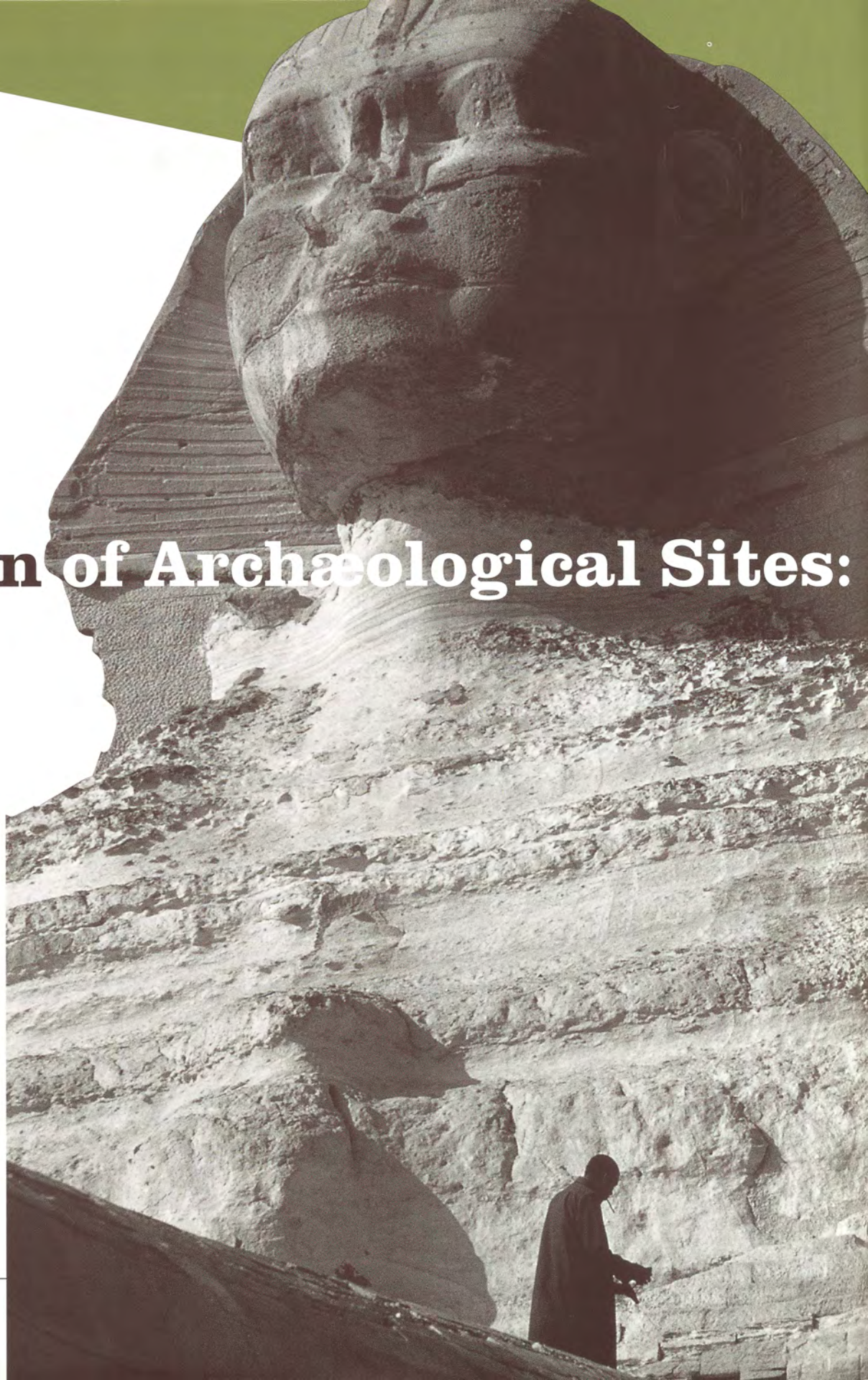
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Updates on Getty Conservation Institute projects, events, courses, publications, and staff.

Preservation of Archaeological Sites:

By Neville Agnew

The Great Sphinx at the Giza Plateau in Egypt. Despite its monumentality, this universally recognized icon of the ancient world is a fragile part of our heritage and continues to suffer deterioration from forces that are still being studied. The Sphinx and other archaeological sites, large and small, are irreplaceable and are more vulnerable than museum objects in protected environments. *Photo: Luis Monreal.*





Chetro Keti, an Anasazi settlement in Chaco Canyon, New Mexico. With miles of stone walls to maintain in Chaco Culture National Historical Park, the U.S. National Park Service (NPS) has reburied some areas to protect important archaeological elements while still allowing interpretive features to remain exposed. In an NPS-GCI project, Chetro Keti was partially reburied, in part to preserve the original support beams. The images above show the same site before and after this reburial. Photos: Guillermo Aldana, Angelyn Bass.

A Holistic Perspective

Every year around the world, millions of people visit museums, historic cities, and ancient sites to make contact with the past. This vast interest in our cultural heritage reflects the desire of people everywhere to know about and understand human origins and achievements. Designation by UNESCO of more than 500 World Heritage Sites, endorsed by the nations that own the sites, underscores the notion of heritage as a universal human legacy.

Among all the types of heritage under threat, archaeological sites—and their wealth of information and artifacts—are in greatest jeopardy. Since time immemorial, archaeological sites have been exploited for knowledge and for treasure, looted for objects, destroyed out of idle curiosity, and plundered for material for new construction. So great are the remains of the ancient civilizations of Egypt, Greece, China, and the Americas as to seem, like the resources of the oceans, inexhaustible. But even the oceans show evidence of severe depletion and pollution—and the atmosphere, our own gaseous “ocean,” is stressed by carbon dioxide and pollutants. There are many other examples of apparently endless resources being exhausted.

Is the archaeological heritage any different?

“Husbandry of resources” is the catchphrase in the areas of environmental studies and ecology. The concepts and methods used in these fields should also be applied to the preservation of the heritage left to us. Lost sites, like extinct species, are lost forever. To prevent their loss, we need a holistic approach to site conservation.

A Holistic Approach to Preservation

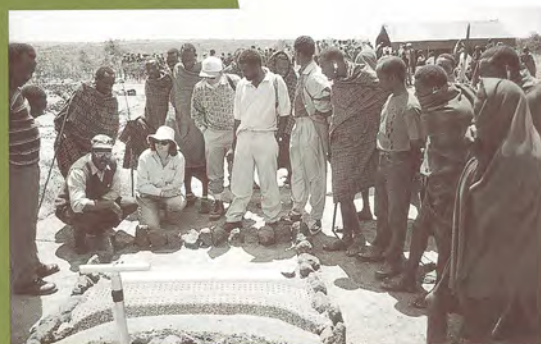
Preservation, to be effective, requires knowledge of the extent of the resource. We do not know how many and what kinds of archaeological sites are still to be discovered, and we can only estimate this by doing an inventory. Though expensive, this is a critical part of a holistic approach. Noninvasive geophysical techniques now exist for gathering information and should be used by preservationists to locate and record the extent of our archaeological wealth. Although computer databases (such as geographic information systems) are tools of immense power, even many technically advanced countries have not greatly utilized them in managing archaeological sites.

We also need to know more about how quickly or slowly sites are being damaged and/or lost. Conservation science and technology are sometimes seen as a panacea that will save for the future what we value, if only we can muster the resources needed to undertake the necessary conservation. The truth, sadly, is different. All cultural heritage deteriorates, no matter what we do. The most we can hope to do is to slow rates of loss through preventive measures, wise use, appropriate interventions and custodianship, and prioritization of our efforts.

Prioritization is particularly complicated because heritage that is important to one group may be of little or no value to another. Assessing the values of a site with the participation of interested parties is the important first step. Aesthetic, historic, scientific, religious, symbolic, educational, economic, and ecological values all need to be considered. At the same time, we need to recognize that values may not be immutable. All values, including economic ones, are diminished by the deterioration of a site. In addition, the relative importance of some values may shift over time as a society changes.



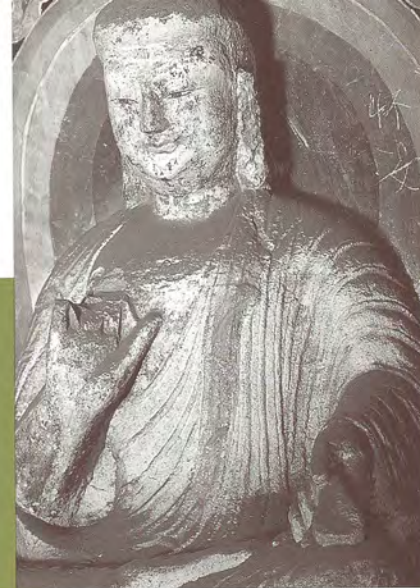
The visitors' center at Chaco Canyon. Well-presented information can help visitors appreciate the many different values of a site and can enrich the experience of visiting that site. *Photo:* Guillermo Aldana.



Archaeologist Fiona Marshall at a demonstration mound, explaining to the local Maasai the method used to rebury, for protective purposes, the hominid footprints at Laetoli, Tanzania. (The reburial was part of a joint project of the GCI and the Tanzanian Antiquities Department to record and conserve the site.) Educating a local population on the importance of a site is part of a holistic approach to conservation. *Photo:* Frank Long.



Tourists in the tomb of Queen Nefertari in Luxor, Egypt, after the completion of the conservation of the tomb's wall paintings by the GCI and the Egyptian Antiquities Organization. The derivation of economic benefit from a site must be balanced with measures that protect the site and preserve the other values it may have. *Photo:* Shin Maekawa.



A polychromed figure—coated with coal dust and dirt particles—in one of the Yungang grottoes, a series of 5th- and 6th-century Buddhist temples near the city of Datong, China. The temples are threatened by pollution from coal-mining activities in and around Yungang. A holistic approach to conservation here would have to balance the complex conflicts between preservation and industrial development. *Photo:* R. Tseng.

Often it is a site's economic value that receives the greatest attention. But when a government's tourism authority works independently of its antiquities conservation department, the revenue a site produces may not go toward its protection. In many instances, a site is enjoyed by visitors from places other than the country that owns it, is managed by an agency that is underfunded and inadequately staffed, and is of benefit to business interests with little understanding of its fragility and of the need for its conservation. Tourism and conservation should be natural partners rather than antagonists. Tourism can actually support conservation while still generating income, but quantitative economic analysis is needed for a convincing case to be made for this.

A holistic approach to the conservation of sites must also confront the fundamental conflict between excavation and preservation. That a buried resource exists today, having survived for perhaps millennia, should make it self-evident that the buried environment is a stable one. That excavation exposes the remains to deterioration should be equally self-evident. While archaeology has boomed in the latter half of the 20th century, the protection of sites has not kept pace. Conservation has never had the cachet of

archaeological discovery. Often an unwanted handmaiden of archaeology, conservation began to demand its role in site protection just at the time when funding for archaeology became more competitive. It is the first expense in fieldwork to be cut, because it is the one least likely to provide the benefits that archaeologists seek—namely, discovery and publication.

From the standpoint of conservation, the argument is not against excavation (although more limited and less invasive excavation is desirable), but rather for practices that ensure that sites are conserved and protected. Cultural-resource authorities need to mandate, through legislation, a standard code of ethical practice to compel the conservation of archaeological finds and sites. For example, it should be required that sites that will not to be opened to visitors be either maintained or reburied. If there is no funding in a field archaeologist's budget for a comprehensive conservation plan—which should include the hiring of an experienced, on-site conservator—no excavation permit should be granted.

In the past, archaeologists have dug "blind" (and dug and dug) to uncover artifacts and structures. New tools that allow for more precise, controlled excavation will,



The rock art site of El Ratón in Baja California. Rock art sites, a particularly fragile part of our heritage, can contain archaeological deposits in and around them. Walkways of the kind shown here can help protect a site while facilitating visitor access to the rock art. *Photo: Nicholas Stanley-Price.*



The Great Pyramid at the Maya site of Uxmal in Yucatán, Mexico. At jungle sites such as this, deterioration can be exacerbated by forces arising from the natural environment, including vegetation growth. But because a site's surrounding landscape is as much a part of the visitor's experience as the structural remains, holistic conservation requires consideration of the ecology and natural environment. *Photo: Guillermo Aldana.*

hopefully, limit the extent of excavation. Among the new techniques are ground-penetrating radar, resistivity and magnetometry, seismic methods, and remote methods, such as multispectral scanning from aircraft. Minimally destructive methods, such as core sampling for chemical analysis and micro-artifacts, have been used to determine ancient settlement patterns. These techniques provide archaeologists with instruments of precision that should precede and guide the use of the spade and trowel, allowing more of a site to remain undisturbed.

Conducting an inventory of archaeological resources, expanding our knowledge of site deterioration, prioritizing values, and integrating conservation into archaeology are all important elements of site preservation. Equally important is imbuing the thinking behind site preservation with a holistic philosophy. To do so means refraining from viewing the problems of archaeological sites entirely through the prism of reductionism.

Reductionism

Conservation sits astride the arts and sciences. In recent decades, the contributions of science to the preservation of cultural heritage have been significant, transform-

ing conservation from skills- or crafts-based work into a discipline. Only slowly has the realization come that science cannot provide all the answers, nor can it ensure the ultimate survival of any but a small fraction of our heritage. Science is only a tool, and a technological one at that. In the service of conservation, it must be balanced by the arts and humanities.

The methodology of science has traditionally been reductionist. Reductionism—the idea that the whole can be understood by examining each of its parts—has helped unravel the workings of the world. Lately, though, it has come under attack for being incapable of giving insight into such mysterious processes as the workings of the human mind. Reductionism as a scientific methodology tends to result in categorization. Categorization, the compulsion to organize information, to “pigeonhole” for greater insight, has increased in modern scholarship under the relentless pressure of ever-increasing amounts of information. Previously, bits of information were categorized and stored so that how they functioned as a whole could be determined later on. The analogy of the mechanical clock is apt: disassembled and categorized as gears and springs, it is worthless for telling time. When whole disciplines are treated as iso-

lated entities, impoverishment is the result.

Within the natural sciences, the traditional domains of physics, chemistry, geology, and biology have merged as a result of the recognition that their boundaries are artificial. The same may be happening in the social sciences and the arts. But between the arts and the sciences, there seems to have been little movement in the decades since C. P. Snow wrote *The Two Cultures*. Thinking is still polarized, and society relates to the arts and sciences as though the two were entirely disparate and unconnected. In fact, both are expressions of the creative impulse. Indeed, physicist Freeman Dyson has described science as being an art form, not a philosophical method. In this sense, reductionism and categorization have served us ill. As already pointed out, science is a tool in conservation. It can help us to preserve what we value, but it cannot usually tell us what we ought to value. That is the role of the humanities. We need both.

The consequences of narrow thinking are evident in the preservation of archaeological sites. It is not sufficiently appreciated that a site may fit within a cultural landscape that is also an ecological environment, and that the site is affected by weather, tourism, vandalism, and the surrounding biosphere. The archaeologist sees the archaeology, the

biologist sees the ecology, the visitor perceives the ruin. We are not well trained to comprehend the totality or to seek relationships. Why, indeed, should we look for wider connections? Because a richer appreciation and a better understanding of humankind's place in the world flows from this approach. Holism is the antithesis of categorization. The holistic conservation of heritage reflects a vision of the world that embraces the interconnectedness of things.

Sociobiologist E. O. Wilson speculates that we are genetically predisposed to think only one or two generations into the future. Whether or not this is biologically true, by looking at the big picture we can transcend the limits of a short-term perspective and the narrowness that results from categorization. These two factors limit our spiritual and intellectual enrichment, as well as our capacity to preserve the past with the care that it requires if future generations are to learn and benefit from it. Conservation is for the future. Conservation works with the past to strive for an understanding of an object or site in the present, with the objective of saving it for the future. Looking forward is as important as looking back.

Management

Management of resources is a basic part of today's world. Implicit in the idea of management is a holistic perspective. Good management is holistic.

Underlying management, like science, is the reductionist process. This process is powerful because it allows us to understand how things work—just as it does in scientific investigation. As applied to site management, reductionist analysis enables us to determine the values of a site; examine the site's significance to various groups (including future generations); determine the causes and rates of deterioration, wherever possible, and derive a prognosis; develop a conservation strategy that may include development (for display or education) or reburial; consider the constraints, side effects, and threats of proposed interventions; communicate the written plan for evaluation to those who have a stake in the site and to those who are competent to critique the plan on a technical basis; and, finally, implement the program with appropriate documentation,

management, monitoring, and maintenance.

While each of these elements requires particular expertise, the preservation of sites demands, in the end, a vision that is encompassing and holistic. (Various charters have sought to promote this, with the Burra Charter of Australia being one of the most effective.) The reductionist process is only the beginning of good management. To preserve the past, it must be followed by a holistic synthesis.

Has heritage management become too formulaic and mechanistic? There does seem to be a trend in that direction, and if it continues the dangers are grave. The word "management" itself is unfelicitous: borrowed from the realm of commerce, it is ill suited to the values (other than economic) of heritage. The gospel of heritage resource management, unless tempered by a holistic philosophy, risks reducing "heritage" to just "resource." This way of thinking has resulted in a convenient shortsightedness in some developing countries where the need for economic growth is urgent and where archaeological and cultural sites are considered a ripe "resource." The fragility and the non-renewability of heritage are overlooked or forgotten in the rush to develop.

For centuries, the archaeological wealth of the world has been exploited for information and for loot. Added to these today is the tourist dollar. There is, of course, a natural life span to all things produced by humankind. That is a reality. Everything has its life, and that life will come to an end, whether through catastrophe or through the inexorable processes of decay. Seeking to slow this loss, conservation is a futuristic activity—it is for the future and future generations, though it is of the past. Those of us in the field of conservation need to disseminate more widely a philosophy of holistic thinking, and to ally ourselves with the environmental and ecology movements to create a vision of preservation that connects the cultural and natural worlds. In this way we may one day succeed in preserving not just pieces of our heritage, but our heritage as a whole.

Neville Agnew is associate director for programs at the GCI.

The Culture of Civic Participation

A Conversation with Abilio Dias Fernandes



Courtesy the City of Evora

Abilio Dias Fernandes is mayor of Evora, Portugal, and vice-president of the Organization of World Heritage Cities (OWHC). Dr. Dias Fernandes, who was born in Mozambique when it was a Portuguese colony, earned a degree in finance from the Lisbon Higher Institute of Economics and Finance. He became mayor of Evora in 1977. Nine years later, Evora was designated a World Heritage City by UNESCO.

During his tenure as mayor, Dr. Dias Fernandes has worked to encourage civic involvement and bring economic development to Evora in a way that preserves the city's cultural heritage.

Because of its achievements in urban socioeconomic development, the Municipal Council of Evora has been commissioned by the European Union to head a team of cities that will set guidelines for the strategic planning and development of medium-size cities in the region.

Dr. Dias Fernandes spoke with Mario Bravo, a communications consultant who is working with the GCI as it assists in organizing the 4th International Symposium of the Organization of World Heritage Cities, to be held in Evora in September.

■ *Mario Bravo: Could you give some historical and cultural background on the city of Evora and the Portuguese region of Alentejo?*

■ **Abilio Dias Fernandes:** The cultural wealth of Evora transcends the quantity and quality of the monuments that one first sees. On the plains surrounding the city are Paleolithic remains mixed with megalithic monuments that date back to 4,000 to 6,000 B.C.E. The four kilometers of city walls enclose such remains as the impressive forum and the hot baths, evidence of the importance of this city to the Romans. Added to the archaeological wealth is the influence of Latin on the Portuguese language.

Between the 8th and 13th centuries, the Arabs dominated an important part of the coast and the southern area of the country, leaving their imprint on monuments, traditions, and popular customs, including language and cuisine. The same had happened with the Visigoths between the end of the Roman Empire and the beginning of the Arab era.

As time went by, the Portuguese royalty moved the seat of their power to the city of Evora, bringing with them courtiers, artists, philosophers, humanists, and poets, who fashioned the golden era of Portuguese culture. It was

during the 16th century that great buildings, universities, and convents were built, which time, wars, and earthquakes have been unable to destroy. As the centuries passed and other cities changed due to industrial development, Evora maintained its architectural splendor and agricultural character. It was able to do so because members of the ruling class, who owned large pieces of land, prevented industrial development and the rapid-fire changes ushered in by the 20th century from dulling the artistic creativity of the city.

In the last few decades the region has suffered severe economic problems. Did the poverty of the population affect the development of the region's cultural heritage?

Before the revolution of April 25, 1974, we were immersed in fascism, dictatorship, and a lack of freedom. For half a century, cultural development had been available only to the elite and to landowners. The people did not have these privileges. Once a democratic way of life was established, the city's culture was slowly restored. The songs of the people who till the soil could once again be heard in the fields and streets. Other signs of artistic expression also began to flourish.

Did the recovery of cultural vitality and of the awareness of cultural heritage take place naturally or as a result of a political process?

The reappearance of cultural vitality was not orchestrated, but it was stimulated. The mayor's office supported spontaneous popular initiatives. If a group of people showed interest in reviving the music that had been played in churches and cathedrals during the 16th century, these people were given instruments, venues, techniques, and training to assist them in salvaging this forgotten form of cultural expression.

The public's interest in preserving and caring for their culture is immediately apparent. However, this consciousness could not be the result of an isolated initiative. There is evidently some strategy and planning behind it.

The strategy followed by the mayor's office was to propose a vision of integrated development, ensuring an immediate impact on the people's well-being. In Portugal, all municipalities have within their mandates urban administration. Taking advantage of this, we met with the public and designed the first municipal master plan ever formulated in the country. This plan made clear the priorities for intervention. The first step was to provide services to, and control the growth of, the outlying slum communities that had mushroomed over the last few decades.

The proposals for urban intervention were discussed with the people who, together with technicians and authorities, decided where to make improvements, build roads, and restore gardens and churches. Infrastructure investments were supervised by cultural commissions that had been created by the community to defend neighborhood interests. Urban intervention has thus always had the support and participation of the community, whose members have defined the priorities and collaborated on the physical execution of the work. Along with the recovery of the city, a culture of civic participation took root and grew, thanks to the benefits that were immediately experienced by the population.

How did you motivate people to use the city's limited economic resources not only for improvements to housing in the outlying areas, but also for the conservation of the historic city center?

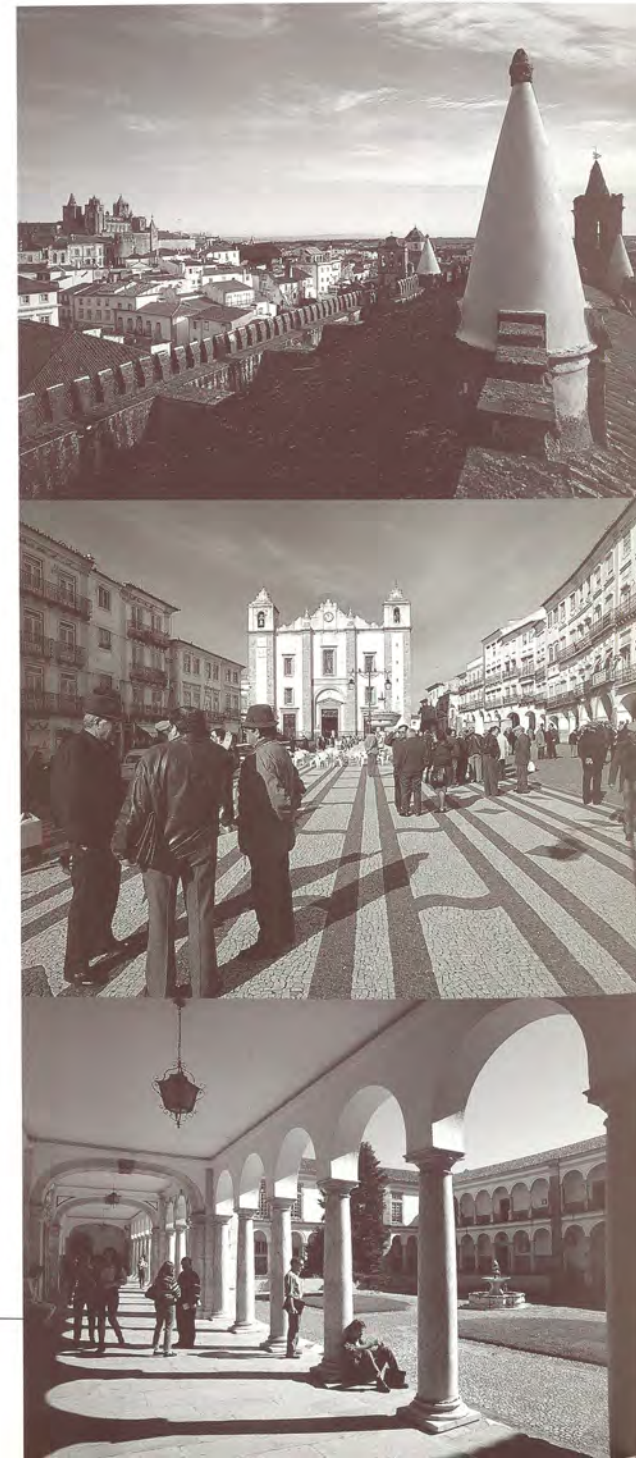
During the first ten years of the process of social reconstruction in Evora, no conservation work was carried out in the historic center. This was in keeping with the people's desire that minimal conditions of sanitation and housing for the majority of the population be met before archaeological work was considered. People were not interested in a museum-city at that time, but rather in appropriate housing. As the program advanced, housing rehabilitation took place within the historic center. Slowly but surely, the mayor's office began to propose more ambitious interventions. We began buying run-down houses in order to restore them and resell them to interested parties.

During this period of architectural and urban activity, cultural life flourished, as did recreational activities. Likewise, agricultural, commercial, and industrial activities revived. The return of the University of Evora, which had disappeared after the exodus of the Jesuits in the mid-18th century, was of great importance to the conservation of monuments. Schools of music and drama opened, as well as institutions of higher education. These tangible benefits to the population served as the initial spark for interventions in the cultural heritage.

The deliberately delayed intervention in the historic center gave us the opportunity to study, research, and reflect on the best way to conserve the historic monuments. The first step consisted of a detailed inventory of artwork, sites, and monuments. We asked international organizations for the documentation and experience of other European historic cities so that we could learn the methods used.

The decision process was long and controversial. It took the public over two years to discuss the options presented in the municipal master plan, but a consensus was finally reached. The governing document is still in force and has been followed scrupulously.

Top: A view of Evora, with the city's cathedral in the background. **Middle:** The central plaza of Evora. **Bottom:** The University of Evora. **Photos:** Courtesy the City of Evora.



During the deliberations you undoubtedly felt pressure to pay attention to economic interests, which are not always compatible with the interests of historic cities.

In Portugal, economic development depends on the national government, not on the municipalities. Thus, our plan for municipal development touched only on complementary economic activities. The development of tourism in the city is not the result of an economic policy but a consequence of the value, care, and consideration given to cultural resources. In 1986, when Evora received the title of World Heritage City, tourism increased. The first social and infrastructure impacts were felt, and the municipality took an active role in controlling the tourism flow.

How did you manage to balance the growth of tourism with the social gains achieved by the public and the authorities?

Tourist activity has grown at an orderly pace, never increasing as the result of large-scale projects or investments. This gradual growth in the number of visitors has allowed both the city's population and its resources to adapt to the new economy, without the need to change our long-term goals. The environment and ambiance of Evora are certainly those of a cultural city focused on targeted, rather than mass, tourism. The process of discussion and participation created a public consciousness regarding the importance of life, both that of the city and of the individual. Tourists obviously liked this ambiance and were attracted to various forms of cultural expression, traditions, and customs in Evora, the cuisine, and the leisure activities, all of which provide a framework for enjoying the monuments.

Such a complicated process can work only when one takes a long-term perspective rather than simply responding to political exigencies. What possibilities do other historic cities have of incorporating such long-range plans?

What any city or medium-size town needs to do is establish what the strongest interests of the community are. The values that the population considers important will be the ones that sustain the dynamics of development. Such values provide the only basis for resolving any differences that may arise.

In Evora, we had strong partisan differences, tremendously strong ones. Anyone would think that after a revolution, conditions would not allow the different parties—the landowners, the church, and the communists—to get along. However, by investing the time to find out what people want and by following an agreed-upon development program, we have been able to resolve the issues that had previously divided us.

Leadership obviously plays a role in this whole process.

One of the functions of the leader is to create the environment and determine the common values that keep the community together. We have worked around the basic needs of the individual, an approach that no one can be against.

The problem of family housing is one example. Over 65 percent of the families in Evora now own their own homes. This was achieved through complex joint ventures involving landowners, labor unions, and the municipality. Each group came to the table with goodwill while still pursuing its own interests. Similarly, a growing sense of self-confidence has broadened the horizon of understanding, participation, and collaboration. This has permitted the population to enjoy the rewards of a society in which people get along.

With basic needs met, and with an educated and participating population, what new goals have you set?

Between 1993 and 1995, we drew up the "Strategic Plan for the Development of the City of Evora," going beyond the problems of urbanism and municipal services. This plan incorporated general guidelines for the future development of the city, as agreed on by the population.

It all began with this question: What kind of city do we want for ourselves and for our children in the near future? The majority answered: We want a cultural city integrated into Europe, with the infrastructure of a city that can host conventions and that has environmental protection, social stability, and widespread and equitable economic development. The industries to be established must be of a cultural nature, environmentally safe, technologically advanced, and research oriented, so that they do not alter the quality of life that has been achieved but rather improve further upon it.

We are exploring these new avenues.



Tourism and World Heritage Cities ● From September 17 to 20, the Municipal Council of Evora, along with the Getty Conservation Institute and the Organization of World Heritage Cities, will be hosting the 4th International Symposium of the Organization of World Heritage Cities. ● The theme of the symposium is "Tourism and World Heritage Cities: Challenges and Opportunities." Approximately 130 mayors, along with representatives of international financial institutions, the tourism industry, and the cultural conservation community, are expected to attend. Keynote speakers at the gathering will address long-range integrated planning for heritage cities, the conservation of culture in a constantly changing environment, and the consolidation of the tourism industry and its importance to the global economy. An important part of the event will be a presentation by the World Bank on the issue of investing in cultural heritage.

THE ARCHÆOLOGICAL HERITAGE IN THE MEDITERRANEAN REGION

By Marta de la Torre and Margaret Mac Lean

In May 1995, the Getty Conservation Institute and the J. Paul Getty Museum hosted a meeting of senior government officials and other specialists in the areas of culture, archaeology, and tourism from 17 nations located near the Mediterranean Sea. The purpose of the meeting was to promote the protection of archaeological heritage through coordinated management of its appropriate uses—research, education, and tourism.

The conference was designed to foster a broad international and interdisciplinary exchange of information, ideas, and viewpoints about the protection and management of archaeological sites. Invitations were extended to individuals with commitment, experience, and policy-making authority from government ministries and related agencies, and to representatives of foreign schools of archaeology and other international organizations. The 80 individuals who attended represented the various groups interested in sites. For many, it was the first opportunity to discuss their concerns with others from different disciplines, industries, and countries.

The GCI is publishing a book entitled *The Conservation of Archaeological Sites in the Mediterranean Region*, which reports on the proceedings of the conference (see “GCI News,” p. 22). The book includes chapters on three sites—Piazza Armerina, Sicily; Knossos, Crete; and Ephesus, Turkey—that illuminate the challenges of management and conservation faced at sites the world over. Additional chapters discuss such topics as the management of cultural sites, the reconstruction of ancient buildings, and ways of presenting and interpreting sites for today’s visitors.

The following article was adapted from the book’s introduction.

As we build what will one day become the remains of our society, we destroy what has come down to us from earlier times. The surviving remains of the past are finite and vulnerable. The Mediterranean region contains the vestiges of the ancient civilizations that shaped our own societies. If these are destroyed by overuse, neglect, or failed intervention, tangible evidence of the past will be erased. The only way to ensure the survival of these heritage sites is to find ways of caring for them that do not deplete them. These sites must be managed and used carefully as unique, nonrenewable resources. The lack of long-term conservation plans in the Mediterranean region is leading to the irreversible degradation of the physical fabric and cultural value of many archeological sites.

The factors that threaten the survival of the Mediterranean archaeological heritage are complex and varied. Often, archaeological remains foster growth by attracting visitors and, along with them, people who come to pursue the economic opportunities created by the demand for services and infrastructure catering to the tourist trade. Population growth and its accompanying infrastructure can encroach upon a site and damage it permanently.

The enormous rise in archaeological tourism in the region has put services for visitors in conflict with the care of the sites. Such conflicts can often be mitigated through collaborative management and maintenance schemes that involve those who have a stake in the survival of these resources, including cultural officials, scholarly institutions, and commercial tourism organizations.



THE IMPORTANCE OF SITES

Cultural heritage sites can have aesthetic, historic, social, scientific, religious, economic, educational, and other values. How these values are prioritized by various segments of society depends on the benefits each group derives from a certain value. Thus, opinions about what is significant in a site can vary and sometimes pose conflicts. Those who are responsible for the archaeological heritage must ensure that these places are used by society in ways that do not sacrifice the values that make the sites significant. This is one of the most difficult challenges facing stewards of the heritage.

To care effectively for a place, one must understand and articulate its values. Value can be equated with *usefulness*, if a site can be utilized for productive purposes (such as the education of citizens), or it can be equated with *significance*, if the site stands for something that transcends the physical remains. The benefits derived from a site can be understood to be the positive effects on the community, culture, national image, and so forth.

Sites can also have potential benefits, such as the knowledge that can be obtained through further scientific investigation, or educational opportunities that can be created through the presentation and interpretation of the site to visitors. Both current and potential benefits should be taken into consideration in the care of a site.

Educational value is the common ground among most constituencies. A site can provide lessons in history, cultural expression, art, architecture, societal development, and conflict. However, throughout most of the world, the interpretation and presentation of archaeological sites to the public are woefully underdeveloped in both theory and practice. Sites that lack information for visitors are not easily understood by nonspecialists.

Interpretation and presentation must be accepted as obligations to the visitor, not just as a means of attracting more tourists. In recent years, some countries in the Mediterranean region have begun to use funds derived from tourism for the study, conservation, and presentation of heritage sites. Cost-effective approaches, innovative methods, and planning techniques are being tested and evaluated. The dissemination of the results of such experiments would be an important contribution to everyone in the field.

Both natural and cultural sites have become important economic resources in many parts of the world, with their economic potential almost always realized through tourism. While the degradation of both natural and cultural resources in the presence of large numbers of visitors is inevitable if a situation is unmanaged, there is a greater awareness of the dangers that affect the natural habitat than of those that imperil archaeological sites.

The site of Ephesus in Turkey. During the Roman Imperial period, Ephesus was the capital of the province of Asia and one of the wealthiest cities of Asia Minor. Ephesus had magnificent public buildings, including the Temple of Artemis, which was one of the seven wonders of the ancient world. Today, the site retains its integrity as an ancient landscape and as an example of Hellenistic and Roman architecture and urban planning. Photo: Martha Demas.



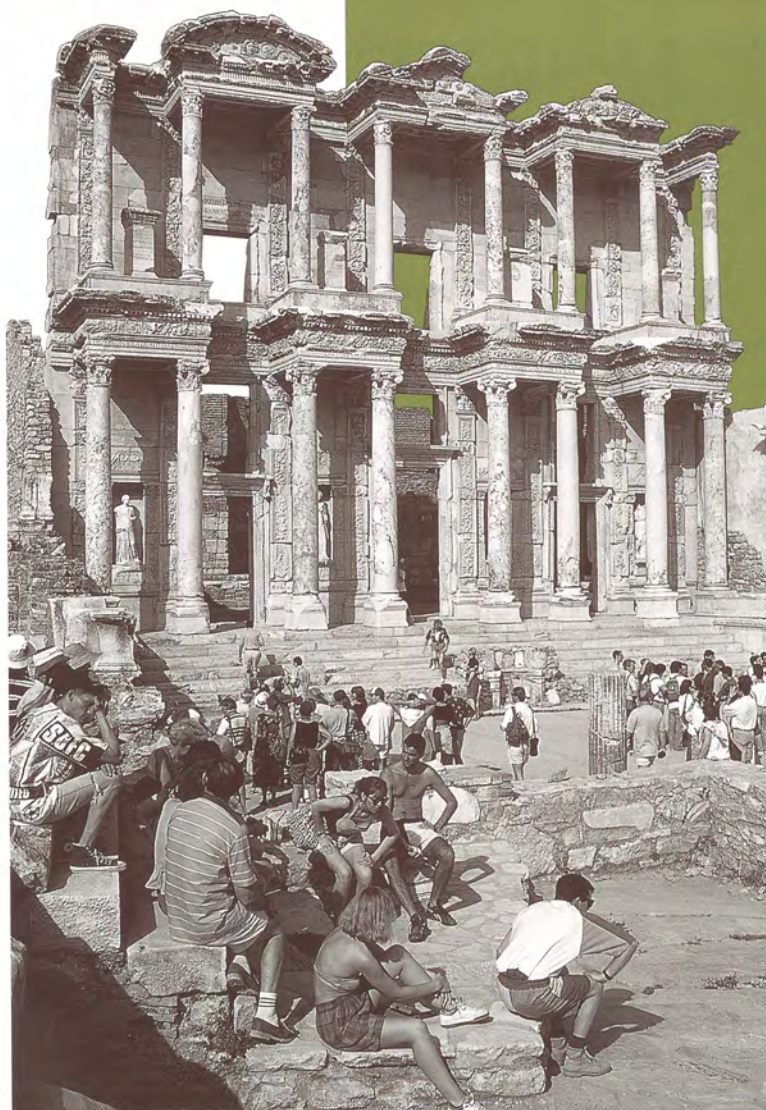
The conservation of the values of such natural sites as beaches, forests, and landscapes is known to be closely tied to their long-term economic value. That this phenomenon does not seem to be acknowledged in the case of archaeological sites is perhaps due to critical differences in visitors' perceptions of value. While everyone prefers beaches with uncluttered space, clean sand, and clear water, it does not seem that crowds, lack of maintenance, and erroneous reconstructions in any way diminish the attraction that archaeological sites have for many tourists. The appeal of archaeological sites is so strong that even those that are poorly kept and virtually unexplained attract large numbers of visitors.

BALANCING PROTECTION AND TOURISM

If a site attracts crowds, it becomes a must-see for all tour organizers, creating an even greater influx of tourists. (This has the odd effect of flooding a few sites and leaving other, nearby sites almost deserted.) In many countries, the separate national agencies responsible for tourism and for the cultural heritage pursue their objectives independently. This disjunction often creates serious conflicts. Cultural heritage professionals have begun to advocate a more coordinated and thoughtful approach to archaeological resource management. However, attempts to impose limits on the number of people allowed at a site at a given time often elicit immediate negative reactions from other interest groups.

Archaeologists continue to excavate without providing for the presentation and interpretation of sites to the public. National authorities promote sites without consulting local populations. Tourism operators show sites without considering the physical impact of large numbers of visitors. Dams are built without any study of their effects on archaeological sites. Hotels spring up around sites, and disposal of their water and waste contaminates and erodes the archaeological remains. The list is long, but little is learned from tragic examples.

Very few studies have been done of site management and the economics of conservation—whether on the



A Mediterranean Site EPHESUS

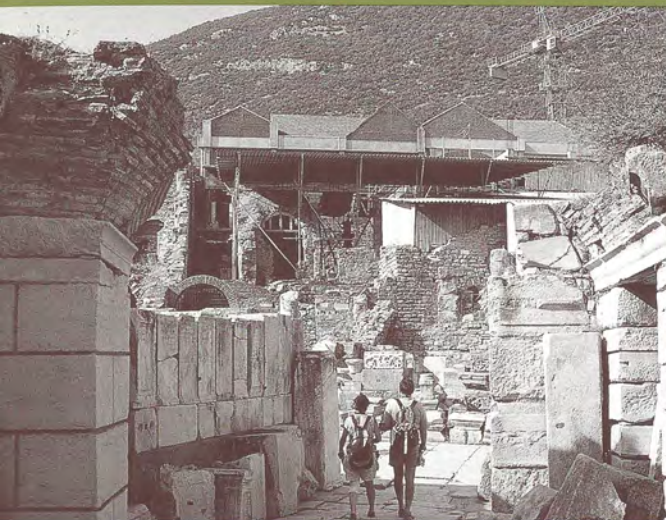
*Prepared by Martha Demas,
GCI Special Projects*

The Celsus Library. Most visitors have difficulty imagining the magnificence of a city like Ephesus from the scattered stones that remain. Attempts to interpret the Ephesus site have included restorations of monuments. Restoration of the Celsus Library was premised on the assumption that visitors would prefer to see the monument as it looked in ancient times rather than as a romantic ruin. *Photo: Guillermo Aldana.*

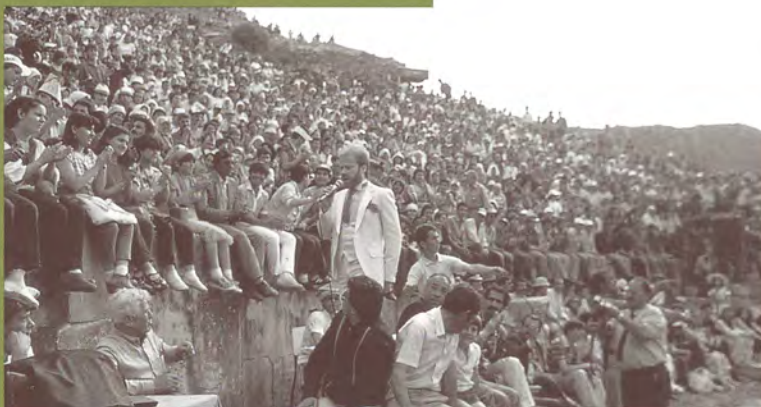


The monument to Gaius Memmius. In the monument's 1963 restoration, the intent was not to present a harmonious whole, but rather to convey the fragmented nature of monuments and their history of abandonment and collapse. The deliberate use of concrete creates a contrast between its rough finish and the smooth marble remains. Since many of the original parts were missing, the placement of extant pieces only alludes to the monument's original form. *Photo: Guillermo Aldana.*

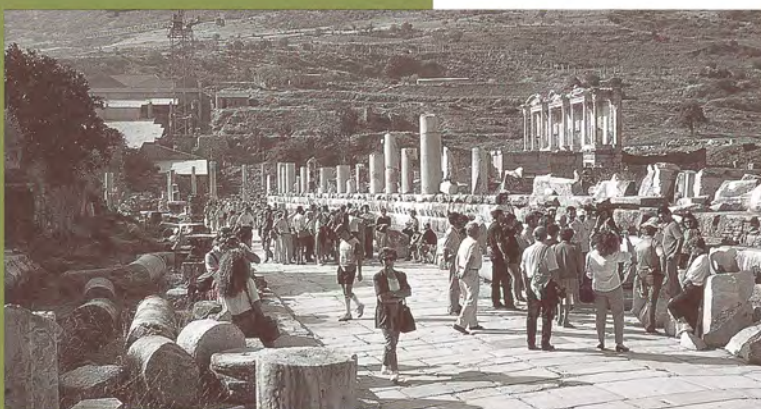
Exterior and interior views of the terrace houses. These urban apartments, still containing wall paintings and mosaic floors in situ, provide a vivid picture of the life of wealthy Ephesians. Shortly after excavation, the houses were covered with temporary roofing. In 1979 a permanent shelter was started, but due to controversy regarding its scale and intrusiveness, it was completed over only two of the upper apartments. The shelter typifies the trend at sites toward massive, costly interventions aimed primarily at interpreting monuments to visitors. *Photos: Marta de la Torre, and courtesy the Ephesus Museum.*



A concert crowd at the Ephesus theater. For years the theater was regularly filled to its 20,000-person capacity for the International Izmir Festival, thus making it again part of the civic fabric of a community. Though restored, the theater was never well stabilized for modern use, which created concern about safety and the conservation of the monument. The theater is now closed periodically, pending decisions about how it should be conserved and used. *Photo: Courtesy the Ephesus Museum.*



Tourists in Ephesus. The site has seen a steady increase of visitors; from 1960 to the late 1980s, the number of visitors rose from 276,000 to nearly 1.7 million. A site can be transformed by large numbers of visitors, and their presence can cause serious deterioration of the fragile remains if these are not properly protected. The development of Ephesus as a tourist attraction has brought a measure of prosperity to the region, but as in many other places, the authorities responsible for the site's protection derive little direct economic support from this bounty. *Photo: Guillermo Aidana.*



subject of the relationship of visitors and deterioration, the impact of a deteriorated site on visitor interest, or the appropriate allocations in national budgets for various archaeological sites. Nevertheless, there is an increased awareness of the need to conserve the “goose that lays the golden egg.” This awareness must be accompanied by research and study to further our understanding of the dynamics of managing these irreplaceable resources.

THE PROMISE OF PLANNING

While not all conflicts can be solved to everyone's satisfaction, much could be advanced by a coherent planning process involving broad consultation of concerned groups. No single management solution is applicable to all situations. Conditions vary from site to site and from country to country, as do values, administrative environments, threats to sites, conditions of remains, numbers of visitors, and available resources. Specific solutions must be found for each site.

Many countries and international organizations have developed management approaches to cultural heritage. Successful cultural management generally starts with a planning process that results in a management plan to guide major policy decisions as well as day-to-day operations. A management plan will not provide answers to every question that might emerge. Rather, its usefulness lies in its articulation of policies for different areas of activities—for example, excavation, conservation, visitor management, interpretation, and maintenance—that are in accordance with the significance of the site and with the values to be conserved. These policies provide the framework for all decisions that must be made, in both the present and the future, in each of these areas.

Experiences in some parts of the world have shown that the responsibilities of site management can be effectively assumed by individuals with a range of professional backgrounds, including archaeology, architecture, and conservation. Site managers should have both an interest in management and the skills necessary for managing. Possessing these qualifications is more important than having a background in a particular profession.

New managerial positions will need to be created, and in almost all cases the individuals hired to fill these positions will need to be trained in new skills. In the future, such management skills will become part of the education of professionals who are likely to be responsible for heritage sites. Until then, managers could be trained through specially designed short courses organized at either the national or regional level.

Site management constitutes a new approach to the care of sites in the Mediterranean region. If it is to be adopted successfully, the decision-making process must be evaluated. Successful implementation of this approach will require coordinated management at the level of the national authorities, as well as the education of the various groups with vested interests in the region's archaeological heritage.

Open, negotiated management is new to many places and is often rejected a priori as impracticable or as not being feasible for certain cultures. The shift toward a participatory process of systematic decision making is never a simple step. In most cases, agencies or interest groups need to relinquish a degree of authority to which they have been accustomed or entitled. The implementation of inclusive management approaches can take place only if policy makers see potential advantages in such a change and if resources are allocated to put them in place.

The archaeological heritage of the Mediterranean enriches not only our view of the past, but also our vision of the future. The physical remains of the ancient world still have much to reveal about the human experience. Every effort should be made to ensure that as we move toward the future, the monumental legacy left to us is protected and passed on for the generations to come.



CONFERENCE CONCLUSIONS

The intrinsic importance and finite nature of archaeological resources have been recognized in various international charters. The participants in this conference support these charters and urge their implementation. In recent years, various forces have increased the threat to these sites: among others, rapidly increasing urbanization, environmental degradation, natural disasters, violent conflicts, and, in many countries, a lack of resources for their maintenance. The extraordinary growth of mass tourism in the last few years has brought about a change in the way archaeological sites are used. Archaeological sites are nonrenewable resources, however, and, as such, must be managed and maintained.

There is now a need to define more fully the values that archaeological sites hold for all humanity, present and future, and to develop processes to manage and present these sites. The conservation of a site's cultural values is the paramount aim of these processes. In the realization that archaeological sites are important economic resources and in view of increasing public interest, an organized approach to decision making would assure the conservation and preservation of the various values of the archaeological sites, including their educational and economic potential.

The participants of the conference on the Conservation of Archaeological Sites in the Mediterranean Region in their discussions came to the following conclusions:

- ① Archaeological sites hold values for a variety of groups (archaeologists, tourists, students, national and local communities, and others). These groups value the sites in different ways, and their values have a direct effect on the ultimate fate of the sites.
- ② Since decisions taken regarding the different uses of a site affect its values, a systematic and comprehensive approach should be adopted in the process of making decisions about sites.
- ③ An interdisciplinary group representing the various constituencies of the site should participate directly in the decision-making process. The management process must begin with thorough research and consultation with all those concerned, leading to a statement of

significance of the values of the site, followed by the setting of management policy and strategies for its implementation.

④ This management process should be led by specially designated individuals. Their role and responsibility must be defined according to the needs of each site, as well as to the structures and laws that govern each site.

⑤ Additional training should be provided for the preparation of specialists (archaeologists, architects, art historians, and others) who might become responsible for the management of sites. Such training should be extended to those already responsible for archaeological sites by means of courses developed by the appropriate international and national organizations acting in concert.

⑥ The uses of a cultural site often evolve in the course of time. Therefore, the requirements for its management may change accordingly.

⑦ The director of a proposed excavation should guarantee from the beginning of research the presence of various specialists required for an interdisciplinary approach, and acknowledge in the plan the fair representation of the interests of different constituencies. The granting of permits for excavation should depend on compliance with this requirement as well as with national laws.

⑧ It is recognized that many archaeological sites can be important economic resources. Mass tourism offers an opportunity to utilize these sites for economic benefit, but at the same time it increases the risk of decay and destruction. The management process should take this into account.

⑨ Archaeological sites can also be educational resources. Plans for the presentation of such sites should respond to this potential and involve appropriately qualified professionals. Continuing evaluation should be an integral part of these plans.

⑩ The participants recommend that governments and other national and international agencies recognize and support this new concept of sites and their management.

Athens, May 12, 1995

Preserving Collections in Tropical Countries

By Colin Pearson



Exterior and interior views of the Kiribati Cultural Centre, which houses the National Museum of Kiribati, a Pacific Island State in Micronesia. The building's design permits air movement without mechanical ventilation. The louvered windows at ground level enable breezes from the sea—just 50 meters away—to pass through the building. The vents at the top of the building promote air movement through the stack effect (i.e., hot air rising).
Photos: Colin Pearson.

For museum collections, the best environment is a stable one. Among other things, that means an environment where there are only moderate changes in temperature and relative humidity. Extreme fluctuations of either can cause significant stress in objects, and the results can be destructive. Paint can crack on a canvas or pop off a painted object, wooden veneers can peel away, glued joints on wooden furniture can fail, and wooden objects can be permanently deformed.

In industrialized countries, most large museums provide stable environments for their collections by using elaborate air-conditioning systems that operate 24 hours a day. However, at the many more small museums—particularly those in tropical countries—there is not the money to install, run, and maintain sophisticated climate-control systems. Because of a lack of understanding of climate control for museums, some at these institutions believe that unless they can match the environments of air-conditioned museums, their collections will rapidly disintegrate.

In fact, air-conditioning systems themselves can create problems. If a system is designed primarily for human comfort and controls temperature alone, or if it is inefficient or improperly maintained, it can actually cause more damage to the collections than if there were no air-conditioning at all. For example, museum buildings that are designed to be air-conditioned often provide little climate control for the collections when the air-conditioning breaks down. The shutting off of a system (either when it is turned off at night to save money or when it breaks down) can cause significant temperature and humidity fluctuations.

For instance, a museum in Thailand has two of its galleries air-conditioned, but for only seven hours each day; on weekends and public holidays, the air-conditioning is switched off. These galleries experience greater fluctuations in temperature and relative humidity than do the museum's non-air-conditioned galleries, with the end result being that the collections in the former galleries will deteriorate faster. (Similar fluctuations are created by switching spotlights on and off, or by allowing direct sunlight to fall on artwork.) The optimal environment for museum collections is one that is not only cool, but also stable.

The hotter the temperature and the higher the humidity, the faster the deterioration of materials. Collections do best when the level of relative humidity is between about 40 and 70 percent. Below 40 percent, many materials dry out; above 70 percent, mold and bacteria can grow. For museums in dry or humid tropical countries, these conditions are difficult to meet. The temperatures are rarely below 20°C and are often around 40°C, and the relative humidity is often either up to 95 percent or down to 10 percent.

How can safe environments be provided to ensure the long-term preservation of museum collections in tropical countries? The answer lies in the use of passive environmental controls, relatively inexpensive and simple methods for creating reasonably stable museum environments by reducing extreme conditions. This is the approach being promoted by the Getty Conservation Institute (GCI) and the University of Canberra, Australia. With this approach, air-conditioning is not even considered, apart from such basic features as a portable dehumidifier if the relative humidity



Exterior and interior views of the Museum of History in Hanoi, Vietnam. This is an example of a traditional colonial building whose design promotes a reasonably stable environment. The open doors and windows allow good cross ventilation, while high ceilings and the use of fans help control mold growth through air movement when the building is closed. Photos: Colin Pearson.

is very high, along with air-circulating fans to help prevent mold growth.

A current project is a review of the literature on environmental management for cultural institutions in tropical countries. The literature review is being developed in part as the result of a workshop on the subject held at the GCI in 1992. At the workshop, the level of current knowledge was discussed, with gaps identified by experts in related fields. The information that exists is focused primarily on human comfort and is therefore not completely applicable to museum collections. Human beings are far more adaptable to environmental changes than are museum objects. In hot, dry climates, people stay inside buildings during the day and sleep outside on roofs at night. If they get too hot, they can remove clothes; if they get too cold, they can put clothes on. People can also tolerate fluctuations in relative humidity. Objects in museum collections lack this flexibility and cannot simply be moved around or covered up as environmental conditions change.

There is a need to raise awareness of the damage that can be caused to museum collections by adverse conditions and to suggest simple approaches for creating a stable and safe environment. For example, inside one museum in Vietnam the relative humidity was measured at 90 percent—higher than the level of 80 percent outside. The reason for this was that the floors were mopped twice a day. Reducing the relative humidity inside the building involved the simple step of altering this long-standing custom.

In another museum in Vietnam, all the furnishings and display cases were covered with condensation. The reason? The museum was tightly closed, and the air-circulation fans were not in operation. The prescription for

providing a stable environment in this museum included switching on the fans and opening the doors and windows when the external environment was at an acceptable level. When it was not, the museum could be sealed as tightly as possible, with the fans operated to circulate air. At the same museum, incandescent spotlights were located inside a display case just a few centimeters away from an organic object, causing heat and light damage. In addition, there were rapid changes in relative humidity when the lights were switched on and off. The simple solution was to move the spotlight out of the case and install it at a safe distance from the object.

The use of natural and forced ventilation to provide a more stable environment for museums in hot, humid climates is common practice. However, this approach can mean that air pollutants are brought into the building. Many urban centers in newly industrializing countries have serious pollution problems. The challenge for museums is to find a cheap and efficient method of removing air pollutants from the atmosphere. Display cases and storage units constructed with special materials can provide some level of pollution control, but more research in this field is required.

The literature review mentioned earlier, which is being prepared by this author with support from the GCI, will discuss the problems of temperature, relative humidity, light, air pollution, and pests in tropical countries, and the traditional methods of controlling these. In addition, this author is developing a manual that will detail recommended environmental standards and propose passive techniques. It will cover the museum building site, building location and orientation, landscaping, building design and construction

materials, and control of the climate, air pollution, and pests in the museum buildings, display cases, and store-rooms. Advice will also be provided on how to determine the major threats facing a museum and its collections.

The GCI is also investigating the environmental problems associated with collections in hot and humid environments. The objective of its project is to identify practical strategies for reducing environmentally caused deterioration of museum objects. Strategies for managing the museum environment—from the building itself to display cases within the building—will be studied. In pursuing this project, the Institute will be working with this author and other individuals and organizations with extensive experience in dealing with the environmental problems of collections in hot, humid climates. The GCI will be sharing the information it acquires and disseminating the results of its work.

An important portion of the world's cultural heritage resides in tropical countries where both the human and financial resources for preserving museum collections are limited. However, it is already clear that there are steps cultural institutions in these countries can take to provide a more stable environment for their collections. It is hoped that the information now being developed will offer even more tools to these institutions to aid them in preserving the objects in their keeping.

Colin Pearson is the director of the National Centre for Cultural Heritage Science Studies and a professor on the Faculty of Applied Science at the University of Canberra, Australia.

Nefertari on Tour and on the Net

The exhibition *Nefertari: Light of Egypt*, organized by the Getty Conservation Institute and the Fondazione Memmo, continues to travel in Italy. During the spring of 1997 the exhibition was on view in the southern Italian city of Bari, where it was seen by more than 200,000 people.

Intended to raise public awareness of

conservation, the exhibit uses a variety of media, integrating history and objects with a presentation of the conservation process. It commemorates the unearthing of the 3,200-year-old tomb of Queen Nefertari in the Valley of the Queens by Italian archaeologist Ernesto Schiaparelli in 1904, as well as the conservation of the tomb's wall paintings by the GCI and the Egyptian Antiquities Organization, conducted between 1986 and 1992.

Nefertari: Light of Egypt originally opened in the fall of 1994, at the Palazzo Ruspoli, in Rome. From there it moved to the Promotrice delle Belle Arti, in Turin. In all, approximately one million people have seen the exhibition, which includes a virtual-reality tour of Nefertari's tomb.

Using a joystick, visitors can travel anywhere within the tomb (both as it is today and as it appeared at the time of its discovery), stopping to look at conservation problems and treatment methods or to listen to recitations of the hieroglyphic inscriptions that appear in the wall paintings.

In December 1996, the Nefertari virtual-reality tour was installed at Innoventions in Disneyworld's Epcot Center, in Florida. Since then, nearly 10 million visitors have taken the reality tour. Developed for the GCI by the Italian multimedia firm Infobyte, the virtual-reality tour can be visited at the Infobyte Web site (<http://www.infobyte.it/pages/vr/nefertari.html>).

Exhibition at the Octagon Museum

In conjunction with the Getty Conservation Institute and the St. Petersburg International Center for Preservation, the Octagon Museum in Washington, D.C., presented an exhibition of architectural drawings of the New Hermitage.

Watercolors on the Neva: Original Drawings for the New Hermitage was on display at the Octagon—the museum of the American Architectural Foundation—from May 13 through July 13, 1997. All of the 21 drawings in the exhibition were done by Leo von Klenze, the German architect,

planner, painter, and engineer who was hired by Czar Nicholas I to plan and build the New Hermitage. Constructed between 1839 and 1852, the New Hermitage was the first building in Russia designed to be a museum as that term is understood today. Until now, the watercolors by von Klenze (detail shown below) had been seen only by visitors to the vaults of the Russian State Historical Archives in St. Petersburg, Russia. The exhibit marked the first time the works had been publicly displayed.

The St. Petersburg International Center for Preservation and the GCI arranged to bring these drawings to the United States to promote an awareness of the richness of the cultural heritage of St. Petersburg and the need for its preservation. The GCI began working in Russia in 1989 with the Library of the Russian Academy of Sciences and subsequently helped establish the International Center for Preservation.

The Center's founding chair, Esther Coopersmith, said that it was "a symbol of goodwill and mutual interests that we were able to organize this exhibition of works from the Russian State Historical Archives." The exhibition curator, art historian M. Kirby Talley, Jr., observed that "these drawings are but a small sampling of the wealth of material that awaits the world in the numerous museums, libraries, and archives of St. Petersburg."

Octagon director Eryl Platzer called the exhibit "a first for the Octagon. . . . We are pleased to be able to show these drawings in our gallery and to offer public programs on Russian art and cultural history."



GCI Video on Abomey Awarded First Prize

In April 1997, the Getty Conservation Institute's documentary on the bas-reliefs of the Royal Palaces of Abomey won the Gold Award for documentaries at the 30th Worldfest-Houston, the Houston International Film Festival. *History Told on Walls* was selected as the best production in the arts and culture category. Approximately 150 documentaries were in competition at the festival.

Written, produced, and directed by Pedro Pablo Celedón, who has worked on a number of GCI video projects, *History Told on Walls* presents the story of the royal bas-reliefs and the culture that created them. It was produced as part of a major project of the Institute, which collaborated with the government of Benin on the conservation of the oldest remaining royal bas-reliefs in Abomey. The video production interweaves a depiction of the conservation work with the history of the Kingdom of Dahomey and the continuing cultural traditions of the Benin people.

Worldfest-Houston, one of the oldest film festivals in the United States, emphasizes independent filmmaking.

History Told on Walls can be purchased through Getty Trust Publications (see this section, p. 22).

Recent
Projects

Emergency Response and Salvage Wheel

On June 11, 1997, the National Task Force on Emergency Response announced an important development in the care and treatment of damaged collections at the nation's cultural institutions. At a press conference in Washington, D.C., the task force—a joint initiative of the Federal Emergency Management Agency (FEMA), the Getty Conservation Institute, and the National Institute for the Conservation of Cultural Property (NIC)—presented its Emergency Response and Salvage Wheel. The salvage wheel is designed to provide staff at cultural institutions with immediate access to essential information on protecting and salvaging collections during the first 48 hours of an emergency. The wheel contains information developed and

reviewed by preservation and conservation professionals, and endorsed by FEMA and seven other federal agencies and national organizations.

"Disasters can strike anywhere and destroy indiscriminately," noted FEMA director James Lee Witt. "We must do all we can to protect our nation's heritage for future generations. The salvage wheel is a terrific example of what we can accomplish with working partnerships like the National Task Force on Emergency Response."

Funding for the wheel was made possible through a public-private partnership, with major public funding provided by the National Endowment for the Humanities (NEH) and private funding supplied by the St. Paul Companies and an anonymous private nonprofit foundation. "America's museums, libraries, and archives are the guardians of the nation's cultural heritage," said Sheldon Hackney, chairman of the NEH. "If significant portions of their holdings are lost to posterity through natural disasters, we as a nation lose parts of the American experience. The arrival of

the salvage wheel meets a huge need for information that can minimize or, in some cases, even prevent any such loss."

The National Task Force on Emergency Response is a partnership of 29 government agencies and national service organizations committed to providing expert assistance to cultural institutions and the public in times of disaster. "We helped to establish the National Task Force in 1994 to mobilize our best resources to protect our nation's cultural heritage," said Miguel Angel Corzo, director of the GCI. "The wheel demonstrates what a successful public-private partnership can produce when the cultural community and emergency professionals activate collective resources for the common good."

NIC president Lawrence Reger said that "the Emergency Response and Salvage Wheel addresses one of the most significant goals of the Task Force: providing accurate and easily accessible information about preserving objects damaged by natural disaster."

The wheel will be distributed to 45,000 libraries, museums, archives, and historical organizations and sites. After the initial distribution to cultural institutions, the wheel will be available for purchase at a cost of \$9.95 each (or at a nonprofit rate of \$5.95 each), with the price including postage and handling. Reduced rates are available for orders of 10 or more. For order forms or information, call the toll-free number 1-888-979-2233, or write to the National Task Force on Emergency Response, 3299 K Street, NW, Washington, D.C. 20007.

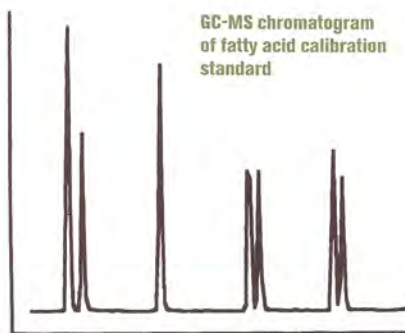


Analysis of Organic Materials by Gas Chromatography–Mass Spectrometry

For centuries, artists and craftspeople have used natural organic materials in the creation of works of art and artifacts. Proteins, oils, waxes, resins, and plant gums have a long history of use as coatings, varnishes, adhesives, and paint-binding media.

Identification of these materials aids in the planning of appropriate conservation treatments, provides information on an artist's methods, and sheds light on the processes of deterioration.

One of the most powerful analytical tools for studying organic substances is gas chromatography–mass spectrometry (GC–MS), a technique designed to identify the components of complex mixtures. Since the early 1990s, a team of GCI scientists led by Dusan Stulik and Michael Schilling has been committed to advancing the state of the art in GC–MS analysis of organic materials. The team's work, which incorporates new technological developments, extensive use of quantitative analysis, and improved data-interpretation techniques, has led to a number of exciting findings that are described in more than 10 publications.



For example, a new procedure developed to analyze amino acids in proteinaceous binding media (such as animal glues and egg tempera) permits the identification of protein mixtures in paint. Luiz A. C. Souza, a former Scientific Program intern who worked on the team, used the procedure for studying painted altarpieces from Ouro Preto, located in Minas Gerais, Brazil. Dr. Souza found that the gesso layers of the altarpieces were prepared with animal glue, and that some of the colors were done in egg tempera.

Recently, the team reconsidered a procedure developed 30 years ago for the analysis of fatty acids and glycerol in food oils, and modified it for use in analyzing paint. The updated procedure is remarkably effective for assessing the extent of degradation of oil-paint media, as demonstrated in a collaborative study with Susan Lake of the Hirschhorn Museum of paintings by Willem de Kooning. The tests confirmed anecdotal accounts that de Kooning employed slow-drying oils in his paints in order to prolong their workability, a practice that has led to increased hydrolytic breakdown of his paints.

An especially promising procedure currently being evaluated by the team allows the analysis and identification of proteins, oils, waxes, and resins that are present in a single paint sample. The procedure, dubbed “POWR” (for protein, oil, wax, and resin), accomplishes in one method what previously required four separate tests, thus eliminating the need for multiple sampling from a work of art. Tests of *Dead Christ Supported by Mourning Angels*, a late-15th-century *tüchlein* painting from the Bonnefanten Museum in Maastricht, The Netherlands, confirmed the presence of plant gum in the medium instead of the more commonly encountered animal glue. GC–MS team member Herant Khanjian and Hélène Dubois, a former intern in the J. Paul Getty Museum paintings conservation department, presented a poster that described this work (which happened to be the first recorded occurrence of the use of this medium in an easel painting) at the 1995 Leiden Conference on historic painting techniques.

Other recent applications of GC–MS include: (1) the detection of blood as a binding medium in pigment cakes from the Chumash Indians of central California; (2) the identification of meat as a ritual meal from a 2,000-year-old Chinese Zhou dynasty lacquer earcup; (3) the discovery that plant gums contain characteristic levels of amino acids that can be used for their identification, and the use of that discovery to confirm that the paint used in the wall paintings in the tomb of Nefertari in Luxor, Egypt was applied with a gum-arabic medium; and (4) detection of free fatty acids in “ghost images” (the white, hazy deposits on the glass inside picture frames).

At present, the team is developing a procedure for identifying plant gums which will complement the POWR procedure results. Traditional gum-analysis procedures, pyrolysis-GC, and direct insertion probe MS techniques are all under consideration by Mr. Schilling and David Carson, the newest team member.

Broad dissemination of the research results is a high priority for the team. Although the GC–MS publications reach a wide audience, hands-on training in the new procedures provides unique opportunities for collaborating with other institutions and for studying unique collections of art objects. The first example of the team's efforts to reach other museum professionals was the “Analytical Techniques in Conservation” course held at the Winterthur Museum, Delaware, in 1996. The team is now negotiating with potential partners from other major institutions to study significant collections using the new procedures.

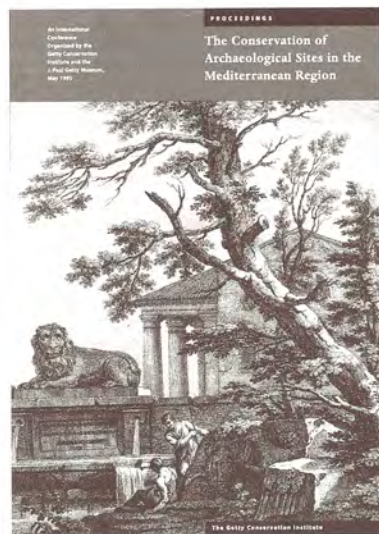
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The Conservation of Archaeological Sites in the Mediterranean Region

A Report on an International Conference Organized by the Getty Conservation Institute and the J. Paul Getty Museum, 6–12 May 1995

Marta de la Torre, Editor

One of the greatest challenges faced today by those responsible for ancient cultural sites is that of maintaining the delicate balance between conserving these fragile resources and making them available to increasing numbers of visitors. Tourism, unchecked development, and changing environmental conditions threaten significant historical sites throughout the world.



These issues are among the topics dealt with in this book, which reports on the proceedings of an international conference on the conservation of classical sites in the Mediterranean region, organized by the Getty Conservation Institute and the J. Paul Getty Museum. The book includes chapters discussing management issues at three sites: Piazza Armerina, Sicily; Knossos, Crete; and Ephesus, Turkey. While visiting these sites, conference participants examined how issues raised at these locales can illuminate the challenges of management and conservation faced by complex heritage sites the world over. Additional chapters discuss such topics as the management of cultural sites, the reconstruction of ancient buildings, and ways of presenting and interpreting sites for today's visitors. (A portion of the book's introduction appears in this issue of the newsletter; see p. 12.)

Marta de la Torre is director of the training program at the Getty Conservation Institute.

176 pages, 8 5/16 x 11 1/16 inches

13 color and 114 b/w illustrations

ISBN 0-89236-486-6, paper, \$50.00

History Told on Walls

This award-winning documentary is the story of the successful collaboration between the Republic of Benin and the Getty Conservation Institute to preserve the heavily damaged bas-reliefs that once adorned the Salle des Bijoux, or "Hall of Jewels," part of the official palace of King Glélé in Abomey.

The royal bas-reliefs of Abomey are like pages in a history book, recalling landmark events in the life of the Fon people and their rulers. They connect the modern Beninois to their ancestors in the powerful Kingdom of Dahomey, which was at its peak in the 18th and 19th centuries. With a visual vocabulary rooted in voodoo imagery, the bas-reliefs are a source of pride and cultural identity, a living tradition, and a repository of information about the past for this West African nation of five million people.

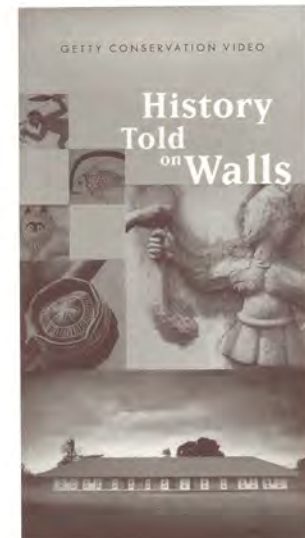
History Told on Walls chronicles the efforts to conserve an important part of the past in order to help build a stronger future.

43 minutes, VHS format, color,

\$19.95

ISBN 0-89236-473-4 English

ISBN 0-89236-474-2 French



Sheri Saperstein



Dennis Kealey

Assistant Coordinator, Training

Sheri Saperstein was born in Memphis, Tennessee, and grew up in Los Angeles. After high school she went east, to Massachusetts, to attend Wellesley College. At Wellesley she majored in medieval and Renaissance studies, and also served as a programmer at the college radio station. During college she spent a winter term at the University of York, England, and enjoyed it so much that after graduation she moved to London. There, she found a job assisting the decorative arts editor of *The Dictionary of Art*, a 34-volume reference work produced by the Macmillan publishing house. On weekends, she volunteered for the Friends of the Tate Gallery.

After a year in England, she returned to California and soon began work at the Los Angeles County Museum of Art (LACMA) as a registrarial assistant, participating in the general management of the collections and the processing of deaccessions. A year and a half later she was promoted to assistant registrar and given responsibility for the registration of traveling exhibitions, including *Degenerate Art: The Fate of the Avant-Garde in Nazi Germany*; *A Primal Spirit: Ten Contemporary Japanese Sculptors*; and *Masterpieces of Impressionism and Post-Impressionism: The Annenberg Collection*.

It was at LACMA that she became interested in conservation, thinking about works of art as objects requiring special handling and treatment. She first heard about the work of the GCI when she attended a lecture series on conservation, and she was pleased to learn of an opening in the Training Program. Since joining the Institute in June 1991, she has worked on the organization and coordination of a number of courses and conferences. She has particularly enjoyed her work on the 1993 Institute open house, the GCI publication *Readings in Conservation*, the 1995 symposium on panel paintings co-organized with the Getty Museum, and the 6th Conference of the International Committee for the Conservation of Mosaics, held in 1996.

She was the GCI's representative in the Getty Trust's Adopt-A-School Program when it began its partnership at a Los Angeles elementary school, and she continues to be a great believer in volunteering. For several years she has been a volunteer with the L.A. Opera League, helping with membership development and artist hospitality, and she will soon begin her second year as secretary of the Wellesley College Club of Los Angeles.

Eric Doehne



Dennis Kealey

Associate Scientist, Scientific

Eric Doehne was born in Chapel Hill, North Carolina, where his father taught at the University of North Carolina medical school. When he was seven, his family moved to Woodland, California, near Sacramento. In high school he pursued a number of interests, including the trombone, theater, and student government, but he was particularly taken with an aerial geography class, taught by a former air force pilot who flew his students around the state on Saturdays.

Eric attended Haverford, a small Quaker college in suburban Philadelphia, and there studied geology, along with history and political science. He returned west to do graduate work in sedimentary geology and geochemistry at the University of California, Davis. There, he learned to use electron microscopes to identify traces of fallout from the asteroid impact that may have triggered the demise of the dinosaurs. He had originally intended to either work for an oil company or teach, but when his faculty advisor told him in 1988 of a position at the GCI, he applied. Though he had been offered a four-year scholarship at the University of California, Santa Cruz, to complete his Ph.D. studies, he decided to take the GCI job.

Hired primarily to operate the Institute's electron microprobe, he was soon working on a variety of other projects as well. His first major project involved the Getty Kouros, work that was related to his Ph.D. dissertation on the weathering rates of marble from ancient Greek quarries. In the years since, he has contributed research to a number of Institute projects, including the conservation of the hominid footprints at Laetoli, in Tanzania, and the Maya site of Xunantunich, in Belize.

He enjoys conservation because it has so many interesting—and unsolved—problems. Particularly intrigued by the problems of deterioration, especially damage to stone caused by salts, he has used a variety of technologies (including time-lapse video) to examine the microdynamics of salt crystallization. He has long had an interest in digital imaging and enjoys incorporating imaging techniques into his work, which still involves operating the Institute's electron microprobe and its environmental scanning electron microscope. He is also working on new GCI projects, including one involving the conservation of earthen architecture and another that is focused on the exploration of the philosophical basis of conservation and the bringing of new ideas to the field.

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