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CONSERVATION

The GCI Newsletter



BUDDHIST GROTTOS ON THE SILK ROAD

The Getty Conservation Institute Newsletter

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Front cover: Dancers depicted in a wall painting in Cave 275 of China's Mogao Grottoes. The painting dates from the Northern Liang Kingdom period (397-439). Photo: © Dunhuang Arts Photograph Company. Back cover: Globe photo by Dennis Keeley.

VOLUME IX NUMBER I



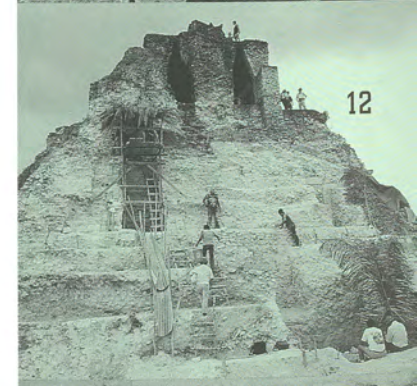
4



8



10



12



16

[contents]

FEATURE

4 BUDDHIST GROTTOS ON THE SILK ROAD

For over a thousand years, China was connected to the West by trade routes known now as the Silk Road. Today the Buddhist grotto temples established along the Silk Road not only inspire us with their spirituality and artistic mastery but also provide a wealth of information regarding the age that produced them. Since 1988, the Getty Conservation Institute has assisted in the conservation of the Mogao Grottoes, the largest single collection of Buddhist mural art in China. Last year, experts from around the world gathered near the site to share research on the preservation of temple grottoes spread throughout Asia and to learn more about the site conservation of Mogao.

PROFILE

8 A CONVERSATION WITH DEV MEHTA

The Commissioner of the Bombay Metropolitan Region Development Authority talks about the multifaceted development plans for two of India's most precious cultural sites: the ancient Ellora and Ajanta caves.

NEWS IN CONSERVATION

10 CULTURAL HERITAGE CONFERENCE IN COLOMBO

The Asia-Pacific region encompasses a cultural heritage as diverse as its geography. Yet the nations of the region confront many of the same problems in preserving that heritage. As part of the search for preservation solutions, a group of cultural heritage professionals from the area gathered in Colombo, Sri Lanka, in July 1993 for a meeting organized by the Getty Conservation Institute.

12 XUNANTUNICH: CONSERVATION IN A TROPICAL ENVIRONMENT

The evocative sight of temple and palace ruins engulfed by dense tropical jungle has long attracted the imagination of poets, the interest of archaeologists, the avaricious eye of the tomb robber, and the curiosity of the general public. Preserving such sites for the future is an enormous challenge. As part of an effort to research site conservation in tropical environments, the Getty Conservation Institute is working with archaeologists and government authorities in Belize to address problems of conservation at Xunantunich, an ancient Maya city.

GCI NEWS

16 COURSES, EVENTS, AND PUBLICATIONS

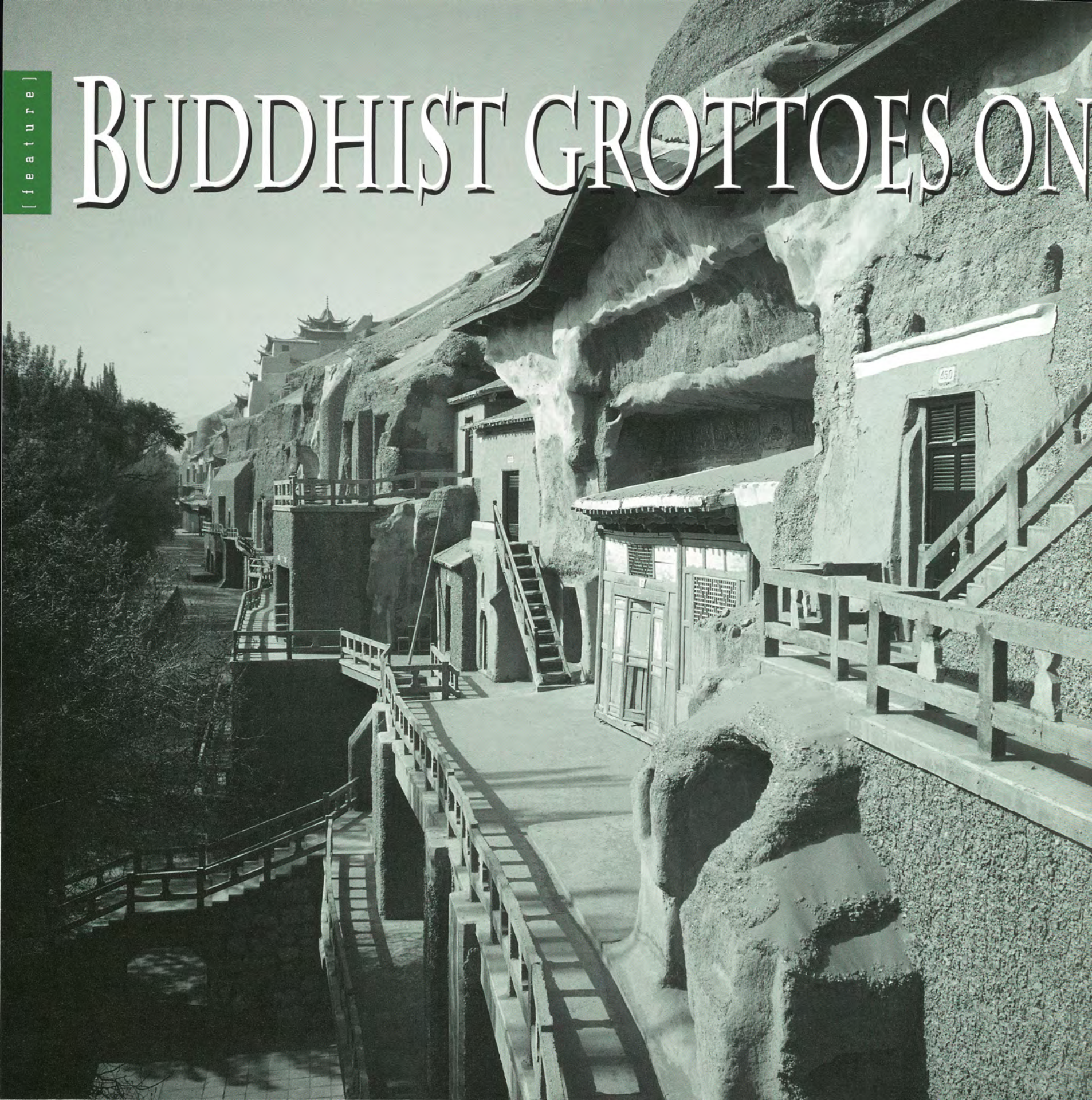
Updates on Getty Conservation Institute projects, events, courses, publications, and staff.

VOLUME IX, NUMBER I

GETTY
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INSTITUTE
JOURNAL

[feature]

BUDDHIST GROTTOS ON



THE SILK ROAD

by Jeffrey Levin

For well over a thousand years, China, Central Asia, and the lands to the west were connected by trade routes collectively known today as the Silk Road. Beginning with the rule of the Han emperors (207 B.C.E.–220 C.E.), caravans following the route brought silk and other commodities such as ceramics, furs, iron, and cinnamon all the way from China to places as far west as Rome. Going east on this ancient track were goods from the West favored in the East — among them woolen and linen textiles, amber, ivory, glass, and gold.

The Silk Road also served as a highway for religious thought, for along its great stretches traveled not only merchants but missionaries and pilgrims, carrying with them the creed of Buddhism which first flowered in India. It was via the Silk Road that Buddhism reached the Chinese, powerfully influencing their art and culture.

By the close of the fifteenth century the great caravans of East-West trade were no more. The drying up of oases along the route and the geopolitical changes in Central Asia resulting from the rise of Islam contributed to the road's slow abandonment. China closed herself off from the West, and European traders sought to reach her markets by sea.

But long after the caravans had vanished, a record of the life that flourished in China in the days of the Silk Road remained in the art of the Buddhist grotto temples established along the route. Today the value of these sites resides not only in their inspiring spirituality and artistic mastery but also in the wealth of information they provide regarding the culture of the age that produced them.

Preserving these sites and others like them is a complex task. To aid in this pursuit, experts from around the world gathered in China in October 1993 for a conference organized by the Dunhuang Academy, the Getty Conservation Institute, and the Chinese National Institute of Cultural Property. Meeting at the Dunhuang Academy's facility near the spectacular Mogao Grottoes, participants shared research results on the preservation of temple grottoes that are spread throughout Asia.



“The numbers are quite stunning,” observed Senake Bandaranayake, a speaker at the conference and Director of the Postgraduate Institute of Archaeology in Sri Lanka. “India has 1,200 known sites. China reports 250. In Sri Lanka there are 260 to 270.” According to Dr. Bandaranayake, the evolution and typology of these rock temples — 80 percent of them Buddhist in origin — have been little studied in a comparative way.

Conservation of grotto sites from across Asia was discussed in the nearly sixty papers presented to the conference's participants. The site that received the most attention was the one a short walk from the conference itself.

THE MOGAO GROTTOS

A World Heritage site, the Mogao Grottoes are 1,770 kilometers (1,100 miles) west of Beijing near the city of Dunhuang, an oasis at the edge of the Gobi Desert in Gansu Province. In the age of the Silk Road, Dunhuang was a major crossroads for the caravan routes that skirted along the northern and southern edges of the desolate and feared Takla Makan Desert to the west.

Situated in a landscape of barren rock mountains and vast sand dunes, the rock temples of Mogao were begun in the middle of the 4th century by a monk who, it is said, had a vision of a thousand Buddhas. Over the next ten centuries, Chinese Buddhists carved an extensive series of grottoes along the site's 1.6 kilometers (1 mile) of cliff face. Today there remain more than 490 temples containing wall paintings covering 45,000 square meters (484,200 square feet), making Mogao the site of the largest single collection of Buddhist mural art in China. The walls of the grottoes depict a remarkable array of legends, portraits, ornamental designs, historical anecdotes with Buddhist themes, and scenes of social and commercial life. According to Duan Wenjie, the present director of the Dunhuang Academy who has served on the academy's staff since its founding fifty years ago, the mural art at Mogao “has added inestimably to our under-

Facing page: The Mogao Grottoes. The cliff face was reinforced and concrete walkways and stairways added in the 1960s.

Photo: Dusan Stulik.

Above: The nine-story pagoda at Mogao that houses a sculpture of the Buddha over 32.8 meters (108 feet) high.

Photo: Guillermo Aldana.

Right: The Great Buddha from Cave 130, created during the Tang dynasty (618–906). Photo: Guillermo Aldana.

Left: Flying apsaras, painted in Cave 327 during the Western Xia dynasty (1035–1227). Photo: © Beijing Slides Publishing Company.



standing of medieval life in China." The grottoes also contain more than 2,000 brightly painted clay sculptures of Buddha and other figures, the largest over 32.8 meters (108 feet) in height.

Contributing to the grottoes' survival through the centuries are Mogao's remoteness and arid climate. Still, serious problems confront the site. Mogao is on the edge of an earthquake zone, and although no caves have collapsed in six decades, certain areas of the cliff face are structurally unstable and threaten to topple. Behind the cliff is a plateau of high sand dunes extending several kilometers to the west. Sand, stones, and fine dust continually cascade down the face of the cliffs in rivulets, and every year approximately 2,000 cubic meters (70,600 cubic feet) of sand — the equivalent of seven hundred truckloads — must be manually removed.

Damage at the site extends inside to the wall paintings and sculpture. Parts of sculptures have been broken or lost, while base supports for some sculptures are sagging. Wall paintings have suffered physical abrasion, paint detachment and peeling, and color changes. The penetration of rain and snow in the thin-roofed upper caves, the presence of sand and dust throughout the grottoes, and now the likelihood of humidity and temperature stress produced by burgeoning tourism at the site all contribute to deterioration of the grottoes' artistic treasures.

Some treasures from Mogao — in particular, sculpture, paintings, and scrolls — were removed from the site early in this century by explorers and archaeologists from the West and Japan. Sir Aurel Stein, a Hungarian-born British citizen, was the first of these to reach Dunhuang, and he left the site with hundreds of thousand-year-old manuscripts in his possession. He was followed by others who acquired more manuscripts and other relics as well. Most of these items are now held by institutions in the West.

CONSERVING THE SITE

In 1988, the Getty Conservation Institute began collaborating with the People's Republic of China (PRC) in developing a conservation program for the grottoes at Mogao and for those at Yungang, near Datong in eastern China. As the Institute's Director, Miguel Angel Corzo, told the Dunhuang conference, "at both places we have taken a broad approach based on the most severe threats to the sites." As described to the conference by Neville Agnew, the Institute's Special Projects Director, those threats at Mogao include "the wind-driven sand, the structural cracks in the rock, the very soft conglomerate rock found here, the deterioration of the roofs of the grottoes that require stabilization, and the need for enhancement of training in technical and scientific methods and materials."

Working closely with the PRC's State Bureau of Cultural Relics (SBCR), the Conservation Institute conducted an analysis of Mogao's problems, then concentrated on measures to enhance the site's survival as a whole, adhering in its activities to the principle of limited intervention. Analysis began with a program of site monitoring. Environmental data — including temperature, humidity, wind speed and direction, sunlight, and rainfall — continue being recorded by a solar-powered monitoring station installed on the cliff above the grottoes (the station was designed by Shin Maekawa, Head of Environmental Science at the Institute). Microclimate data are also being gathered by similar monitoring systems installed in two caves — one open to the public, the other closed — to assess whether the increases in humidity and carbon dioxide caused by visitors are damaging the grottoes' wall paintings and sculpture. The Institute is

training Chinese scientists to analyze the data to make informed decisions on managing the numbers of visitors and their time spent within the grottoes.

To better understand the grottoes' structural cracking, a program of crack monitoring was initiated in 1991. Here, too, Chinese team members were trained in several monitoring techniques, and monitoring is ongoing. Members of the Dunhuang Academy staff were also instructed in use of color monitoring equipment. Measurement of the colors in selected wall paintings was performed, and this record will provide team members with a basis for evaluating color changes of pigments over time.

To reduce sand at the Mogao site, a 3.7-kilometer (2.3-mile) windbreak composed of synthetic textiles was erected on the cliff above the caves in the fall of 1991. The fence reduced wind speed by about 50 percent, and measurements taken during the year following its installation indicated that the

windbreak cut sand accumulation at the foot of the caves by over 60 percent. With the intent of establishing a natural windbreak to supplement and ultimately replace the fence, desert-adapted trees and shrubs were planted on an experimental basis in May 1992, irrigated by a drip-feed system.

To restrict the amount of sand and dust infiltrating the grottoes, the project team installed filters in doorways of selected caves. Monitoring of caves both with and without the filters indicates that the filters reduce the dust in the air by approximately 50 percent.

Conservation Institute and SBCR staff are experimenting with several techniques to prevent further damage to the thin-roofed caves in the upper levels of the cliff. The erosion is so great that some caves are now exposed to the elements. Using geosynthetic materials, the team created a prototype for reinforcing roofs and halting water leakage. In addition, several chemical consolidants are being tested for possible use to prevent erosion of the soft rock of the cliff slope.

From the Chinese standpoint, the benefits of these efforts extend beyond the site itself. "Through our cooperation with the Getty Conservation Institute, our scientific



Above left: Shin Maekawa of the Institute installing the environmental monitoring station at the Mogao Grottoes, assisted by Chinese project team members. Photo: R. Tseng.



Above right: Li Tie Chao, a Chinese member of the project team, performs color monitoring in one of the grottoes. Photo: R. Tseng.

and research personnel have greatly improved the quality of their day-to-day work," remarked Huang Kezhong, Deputy Director of the Chinese National Institute of Cultural Property, at the close of the first day of the conference. "Such cooperation has helped introduce advanced equipment and technology from abroad and has opened up our vision."

THE DUNHUANG CONFERENCE

Much of what has been learned from the Mogao and the Yungang projects was shared with the participants at the Dunhuang conference. But conference speakers provided a perspective on the conservation of grotto sites that encompassed more than the specific problems of these two sites, emphasizing among other things the importance of careful site management.

"Physical conservation goes hand in hand with good management," stated Sharon Sullivan, Director of the Australian Heritage Commission, in one of the conference's four keynote addresses. "The establishment of a viable ongoing management framework and management plan to achieve certain specified ends is in fact an essential prerequisite to any significant decisions about physical conservation which involve intervention in the fabric."

Rapidly increasing tourism is a major challenge for site managers in Asia. "We are at overload levels at many of our most important sites," Robertson Collins of the ICOMOS Committee on Cultural Tourism told conference participants. "The number of visitors to the Buddhist sites, both religious and secular, has grown far beyond the carrying capacity envisioned by the original builders — and frequently way beyond the budgets of the conservation departments that now manage those sites." He noted with some irony that the stage has been reached where "we need tourists to get the money to protect our sites from tourism." Site managers, he observed, typically have regarded those in tourism development with alarm. With better communication between both sides, he suggested, tourism could become an ally of site conservation by fostering more political support for those responsible for site custodianship.

Mogao itself offered an example of the significance of tourist revenue in supporting economic development. Ma Wenzhi, head of Gansu Province's Cultural Department, remarked that "because of the tourist attraction of [the Mogao Grottoes,] the economy in this area has been developing the fastest of all the areas within Gansu Province, and people here enjoy the highest salaries."



Above left: Dunhuang conference participants visiting a spot above the grottoes where chemical consolidants are being tested for use in erosion protection. Photo: Neville Agnew.

Above right: A portion of the synthetic textile fence erected on the cliff above the caves, designed to reduce sand accumulation at the site. Photo: Guillermo Aldana.

Below right: Sculpture of a bodhisattva in Cave 45 dating from the Tang dynasty (618-906). Photo: © Dunhuang Arts Photograph Company.



As several at the conference emphasized, consideration of the economic potential of a site must be tempered with a recognition of a site's preservation needs. The temptation to exploit a site can ultimately lead to site damage if public access is provided without carefully considered safeguards.

"Don't be seduced by the economic benefits of tourism by allowing access too soon," cautioned Jeffrey Cody of Cornell University's Department of City and Regional Planning in his address to the conference. "Careful planning can save money and better protect a site for the future."

Another of the keynote speakers addressed the problem of communication within an increasingly diverse profession. Sharon Cather of the Conservation of Wall Paintings Department at London's Courtauld Institute of Art observed that "in doing preventative conservation we start cutting across other professional expertise. . . . I think that's very clear from the range of contributions that we have at this conference — we have people in geotechnical studies, we have chemists, art historians, and site managers." A conference like the one at Dunhuang is important, she said, because "one of the ways we can learn to communicate better is if we have at least some basic understanding of what our colleagues are doing in other fields of expertise."

"Perhaps the main value in this conference is to see that people everywhere have the same kinds of problems," remarked Senake Bandaranayake of Sri Lanka during one of the conference breaks. It also, he said, helps propagate "emerging philosophical trends in conservation that jog one into rethinking the conscious or unconscious philosophy behind one's work."

The Buddhist grottoes of China, particularly those of the Silk Road, are the physical remains of an ancient time when an abundance of goods regularly passed back and forth between East and West. But as the grottoes themselves eloquently declare with their art, the Silk Road was more than a commercial link. The rock temples at Mogao and elsewhere are a testament to the power of the spiritual beliefs that also traveled the Silk Road and produced the remarkable Buddhist murals and sculpture that adorn the spaces of these historic sites. It therefore seems utterly fitting that conservation professionals from East and West gathered at Dunhuang, a Silk Road crossroads, to trade ideas on how best to preserve the heritage left to us from that earlier and culturally rich era of exchange. ←

Jeffrey Levin is the Editor of Conservation, The GCI Newsletter.





A CONVERSATION WITH DEV MEHTA

Born in Bombay, Dev Mehta has worked for the Indian Civil Service for the last thirty years or so. He holds a master's degree in business administration from the University of Connecticut and also a master's degree in economics from the London School of Economics. He studied law and commerce at the University of Bombay. Throughout his career, he has held distinguished positions in social planning and development. He initiated the Ajanta-Ellora Development Plan when he was head of the Tourism Organisation. He has been the Bombay Metropolitan Region Development Authority Commissioner since 1993.

Jane Slate Siena spoke with Mr. Mehta at the Dunhuang Academy in China during the October 1993 GCI-sponsored international conference "Conservation of Ancient Sites on the Silk Road." Mr. Mehta's paper on the development plans for the Ellora and Ajanta caves will be published as part of the conference proceedings.

Above: One of the rock-cut temples of India's Ellora Caves, created between the 6th and 8th century. Photo: Guillermo Aldana.

Jane Slate Siena: In your State of Maharashtra, you have authority over two of the world's greatest and most precious cultural sites: India's ancient Ellora and Ajanta caves.

Dev Mehta: Yes, they are two of our country's greatest treasures. The Ajanta Caves, located 110 kilometers from Aurangabad, are an ensemble of thirty caves that were carved and elaborately decorated over a period of seven hundred years — from the 2nd century B.C.E. to the 5th century C.E. These caves are famous for their beautiful paintings and sculpture. Because they predate the spread of Buddhism into China and Afghanistan, they are unequalled in their significance as historical records of their times.

The quality of the wall paintings at Ajanta is really astounding because they have been relatively undisturbed through the centuries. The monumental Sleeping Buddha sculpture — a regular feature of Buddhist cave art throughout Asia — is probably the best of its kind anywhere. Likewise, Ajanta's Preaching Buddha is among the most outstanding in the world.

The Ellora caves are 25 kilometers north of Aurangabad and were carved over a period of 350 years, from the sixth century onward; they include Buddhist monuments (cave nos. 1–12), Hindu monuments (cave nos. 13–29), and Jain monuments (caves nos. 30–34). Cave No. 16, known as Kailasa Temple, is an architectural feat, delicately carved from top to bottom, hewn out of a single rock. Perhaps this is the only monument of this kind in the world. With only one wrong hammer blow, the whole concept could have been ruined. The Kailasa Temple represents the climax of rock-cut caves in India.

The Buddhist group of caves has variations on the vihara scheme, and they contain exquisite sculptures. The Jain group of caves is distinguished by intricate carvings.

Since 1988, you have made a personal commitment to bring these remarkable sites to national and international attention. Why had this not been done before?

Though the sites have been appreciated for centuries in India, in the region, and of course among specialists from all over the world, no one had actually succeeded in developing their full potential as destinations for visitors and as symbols for the local communities. They were, perhaps, taken for granted. I wanted to change this.

Some say you are changing this by putting together a management plan that is the most radical and far-reaching yet to be developed anywhere.

Actually, I prefer to say development plan, because the plan incorporates all elements that are needed to truly develop the sites' full potential. Our plan is multifaceted; it includes restoration, management operations, tourism, infrastructure development, on-site educational programs, and intense interaction with the surrounding communities. We do not wish to build islands of museums around these monuments. Quite the contrary, we want to live and breathe with our neighbors.

Is there a precedent of this scale among the many master plans developed recently for cultural sites?

I do not think so. You see, we are including every aspect of life to use the monuments as development resources for the whole region. We cannot isolate this effort only for tourism, or for preservation, or for any other single concern. It's certainly a first for India, and perhaps for the world.

What is the overall objective of the development plan?

To bring a sense of dignity to the sites and to those visiting the sites — to help people feel connected to the sites — and to use the inherent power of great monuments as a development tool that respects the local communities.

Please describe your vision of the sites once the development plan is implemented.

At Ajanta, there will be a site museum, a scientific laboratory, a center for the study of rock art, and a wide range of services for visitors. On-site orientation programs will also be fully developed at the Ellora Temple. We believe it is very important to provide visitors with information; otherwise people wander aimlessly around sites with no understanding of what they are seeing, which unfortunately is the situation at most cultural sites the world over. This has to change, and I hope that our experience will stimulate an international movement in this direction.

Your site management objectives are of interest to preservationists everywhere.

We are observing all proper elements of site management. For example, visitors will abandon all cameras, cigarettes, food, and drink before embarking on their respective journeys of discovery. At Ajanta, we are moving the parking lot and all vendors a full four kilometers away from the caves. At Ellora, vendors will be allowed to remain close

to the caves because their activities are not disturbing the site's preservation or presentation. Proper orientations will allow visitors to experience the sites within the context of the local landscape, vegetation, history, and cultures. Visitor management procedures will direct the flow of traffic so that people will know how to enter, where to go, and how to depart the sites.

I must ask the inevitable. How are you paying for all of this?

This is the big question. In 1988 and 1989, we foresaw an opportunity to attract a consortium of important interests that combine foreign assistance, help from a variety of our ministries, and the private sector. We went to our government and said this is the time. And unlike the Taj Mahal, Ajanta and Ellora have been relatively free of previous developments. We needed to take advantage of the situation and move now.

After achieving consensus fairly rapidly, we put together a development project and, among other things, negotiated low-interest loans from Japan's Overseas Economic

Corporation Fund, immediately purchased four thousand acres surrounding the monuments, obtained planning assistance from the U.S. National Park Service, secured funds from the Indian government, and began discussions with hotels and other private industries. We expect to generate fifteen thousand new jobs, revitalize the regional economy, enrich the surrounding communities, and guarantee the survival and preservation of two of our most outstanding cultural sites.

The project is not a charity. Its economic development aspect will ensure the sites' long-term future. Preservation doesn't come cheap. We must learn how to generate funds from sites so that a funding base and a degree of independence can be developed.

You began implementing this ambitious plan in 1993. What are some of your biggest challenges?

First, managing a multidisciplinary project where so many government and private agencies are involved and, second, balancing these many interests so that the project stays on track. Each participating agency, whether public or private, foreign or local, has its own problems, time frames, and financial realities. We have to merge these many priorities into one project.

How are you doing this?

We have set up an independent, international group of specialists to monitor the project's development, guide its direction, and provide the technical and professional oversight necessary to satisfy our national and foreign partners.

What is your projected year of completion, and when can our readers expect to experience firsthand the results of your extraordinary efforts?

The project execution period is five years, and we expect it to be completed by 1998. Some additional period may be required for carrying out afforestation work. By 1996 we may have pollution-free electric vehicles in the "no-development zones" around the caves and may have completed most of the conservation work. ■



*Above: A Buddhist temple at the Ajanta Caves, a series of some thirty caves carved out of granite cliffs between the 2nd century B.C.E. and the 5th century C.E.
Photo: Guillermo Aldana.*

CULTURAL HERITAGE CONFERENCE IN COLOMBO

by *Marta de la Torre*



The Asia-Pacific region encompasses a cultural heritage as diverse as its geography. Yet the nations of the region confront many of the same problems in preserving that heritage. As part of the search for preservation solutions, a group of cultural heritage professionals from the area gathered in Colombo, Sri Lanka, in July 1993 for a meeting organized by the Getty Conservation Institute.

The meeting was a follow-up to a conference in Hawaii organized two years earlier by the Institute, the United States Information Agency (USIA), and the United States National Committee of ICOMOS. During the Colombo gathering, representatives from Australia, India, Japan, Nepal, New Zealand, Pakistan, Papua New Guinea, the Philippines, Sri

Lanka, UNESCO, US/ICOMOS, and USIA spent two days discussing issues that ranged from legal protection of cultural heritage and the impact of tourism, to public education and training.

Of grave concern to many working to preserve the region's rich heritage is the continuing international commerce in illicitly exported cultural objects. At present, such commerce is enjoined by the 1970 UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import, Export, and Transfer of Ownership of Cultural Property. Participants in the Colombo meeting noted that until more of the principal art-importing countries in Europe and Asia become signatories to the Convention, its effectiveness would remain limited. They urged UNESCO to increase its efforts to obtain ratification. At the same time, it was acknowledged that nations losing their heritage through pillage and illicit traffic must increase efforts to solve the problem at their end. Many at the meeting felt that the answer rests partly in national efforts to educate people on the value of their heritage.

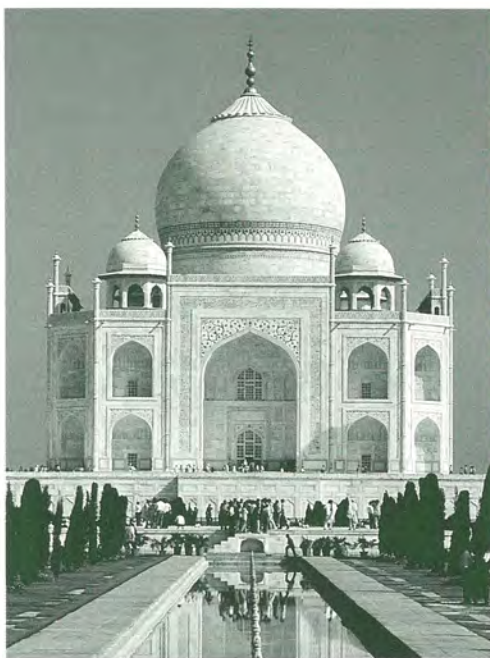
Also helpful would be improving access to the international network for the recovery of illicitly exported or stolen objects. Local channels for contacting international organizations such as Interpol are often inefficient and transmit information only after long delays. Cultural preservation officials need up-to-date information on ways to reach these organizations in a timely way.

Another concern of conservation professionals in Asia and the Pacific is increasing tourism and its impact on the preservation of cultural heritage. Carefully considered site management is essential to control the negative impact of visitors. However, the effects of tourism can go beyond the deterioration of buildings and sites. At the Colombo meeting, Graham Park, Director of the Auckland Institute and



Stone reliefs at the Buddhist monument of Borobudur in central Java. Constructed between 778 and 850, Borobudur is one of Indonesia's best-known sites.

Photo: Luis Monreal.



The Taj Mahal mausoleum outside Agra, India, built in the 17th century by the Mughal emperor Shah Jahan in memory of his wife. It is reportedly visited by 40 percent of India's annual 1.8 million visitors. Photo: Guillermo Aldana.

Museum, offered the example of the Maori, the indigenous people of New Zealand. The Maori currently are struggling with the changes that tourism imposes on their cultural values. Because they believe that their culture should be shared only for spiritual reasons, never for material gain, many Maori feel that by participating in tourism development they compromise their deepest beliefs.

A conflict exists in many developing nations between the desire for income generated by the tourism industry and the concern over the damage that uncontrolled and unplanned tourism can cause. Some local and national authorities value cultural resources primarily for their potential to attract foreign visitors and fail to provide the funds necessary for conservation and maintenance.

Miguel Angel Corzo, Director of the Getty Conservation Institute, asked the Colombo group to consider the role that cultural organizations could play in shaping the development of tourism. He pointed out that tourism is often promoted and financed by foreign tour operators, who will almost never limit the number of visitors out of concern for conservation and will only do so if it is dictated by local authorities.

Giora Solar, Head of Conservation for the Israeli Antiquities Authority, observed that cultural organizations frequently have difficulty influencing national tourism policy. He suggested that cultural administrators try to apply some of the nature reserve concepts to cultural sites, such as limiting the number of visitors. He also stated that the concept of "sacrificial" cultural sites will have to be discussed seriously in the future.

Many participants of the Colombo meeting felt that countries relying heavily on income from tourists should establish a tourism council at the ministerial level of government, where all interests can be represented. This mechanism could help to develop coherent national policies that would avoid the contradictions of one government agency inviting tourists to "come pot hunting with us," while another one asks them to "help us preserve our cultural heritage."

Dev Mehta, chairman of India's Maharashtra Tourism Development Corporation, presented the development plans for the Ajanta-Ellora caves in India, where the needs of both conservation and the visitor are considered. The plans include locating visitor facilities a distance from the caves and special itineraries on the site. However, as Mr. Mehta himself reminded the gathering, even a plan as advanced as the one for Ajanta-Ellora is only a temporary solution, and in the twenty-first century, as visitor numbers increase, difficult decisions will have to be made.

The importance of educating and enlisting the public in efforts to protect cultural heritage is widely recognized. Methods of increasing public awareness can take many forms. Russell Keune, US/ICOMOS Vice-President for Programs, outlined the advantages of establishing an independent, nongovernmental agency that can undertake public education with help from local groups. National private groups have successfully created local branches that work to develop local educational materials.

Karna Sakya, President of the Nepal Heritage Society, discussed his country's National Center for Conservation Education, which promotes awareness and care of the natural and cultural heritage. Although the center's work currently focuses mainly on ecological issues, many of its activities can be extended to cultural heritage. Dr. Sakya described an educational project for Lamaist monks who are brought to Katmandu and given information and training on the conservation of their heritage. This project has great potential for impact since the lamas are figures of authority in their communities and can easily influence the population's respect for its heritage. The Center is also developing a curriculum on conservation for primary and secondary schools that will be the first in Asia.

Discussions in Colombo touched on the problems of training abroad. Ahmad Nabi Khan, Pakistan's Director General of Archaeology and Museums, expressed a view held by some that upon returning to their countries, many trainees face difficulty adapting their newly acquired knowledge to local conditions. He and others believe it is better to bring specialists into a country where they can work with local professionals to develop practical solutions. Some important training initiatives already occurring in the Indian subcontinent include those of the National Research Laboratory for Conservation in Lucknow, India, the Cultural Triangle Project in Sri Lanka, and the new Pakistan Institute of Archaeological Training and Research.

As nations throughout Asia and the Pacific grapple with the problems of preserving their cultural treasures, meetings such as the ones in Hawaii and Sri Lanka can strengthen the region's heritage networks and provide encouragement to professionals and others working to save their cultural heritage. In support of their efforts, the Getty Conservation Institute will continue to act as a clearinghouse and disseminator of information of developments in the region. ●

Marta de la Torre is Director of the GCI's Training Program.



XUNANTUNICH: CONSERVATION IN A TROPICAL ENVIRONMENT

by Martha Demas

The evocative sight of temple and palace ruins engulfed by dense jungle has long attracted the imagination of poets, the interest of archaeologists, the avaricious eye of the tomb robber, and the curiosity of the general public.

Such scenes abound in parts of Asia and Central America. These geographically and culturally distinct regions have in common long-abandoned ancient settlements and humid tropical environments. The fate of these settlements is predictable as the tropical forest — kept at bay by human effort — rapidly returns to overwhelm the structures when the site is abandoned.

The initial damage to structures caused by the return of the jungle is exacerbated when ruins are excavated. Liberating buildings from their jungle cover exposes fragile materials and weakened structures to further deterioration from the erosive effects of wind and rain, microfloral growth, and changes in humidity and temperature. Large numbers of tourists visiting an excavated site can accelerate the process of destruction already at work.

Preserving these tropical sites for the future presents an enormous challenge. The ancient Maya cities of Central America and Mexico exemplify the problems faced by archaeologists, conservators, and site managers. While many Maya sites remain virtually inaccessible because of their remoteness and jungle cover, others have long been subject to excavation and, more recently, to high levels of visitation.

In 1992, the Getty Conservation Institute began a collaborative effort with archaeologists and government authorities in the Central American country of Belize to

The Castillo, the largest structure at the Xunantunich site. Soaring above the canopy of the jungle, the upper half of the monument has been largely liberated from its cover of vegetation. Only continuous maintenance prevents the jungle from returning to claim it. Photo: Guillermo Aldana.

address some of the problems of conserving archaeological sites in humid tropical zones. The venue for project activities is Xunantunich, an ancient Maya city of the Late Classic and Terminal Classic periods (700–1000). Here archaeologists from the University of California, Los Angeles (UCLA), directed by Dr. Richard M. Leventhal, are undertaking a long-term research and excavation project, which includes development of the site for tourism. The site was selected by the Institute in part because conservation efforts could be fully integrated with excavation activities — something that rarely occurs during most archaeological work.

Located near the Guatemalan border, Xunantunich has been Belize's national symbol of its Maya past. The site is dominated by a 40-meter (130-foot) high pyramid, the "Castillo." Still the tallest building in Belize, the Castillo was probably the primary ritual building for the site and once displayed a 3-meter (10-foot) high stucco frieze on all four sides. The last unexcavated segment of the frieze, which features a three-dimensional figure of a Maya ruler, is currently being excavated by the UCLA team. Surrounding the central area are numerous outlying settlements that remain largely uninvestigated, still covered by the verdant tropical forest.



Above: The west side of the Castillo, where excavation provides an opportunity to investigate its structural stability. The temporary scaffolding and covering on the structure are protecting an exposed stucco frieze. Photo: Guillermo Aldana.

Left: Conservator Haydée Orea applies lime water to the newly exposed frieze on the Castillo. After treatment and documentation, the frieze will be reburied to ensure its long-term preservation. Photo: Guillermo Aldana.



Primary goals of the Conservation Institute's Xunantunich project are to understand more fully processes of deterioration in humid tropical environments and to develop methods for conservation of architectural and decorative stone, stucco, and mortar. Most architectural elements

in tropical areas experience weathering degradation that differs significantly from such processes in colder, drier, or more temperate regions. Foremost among these differences is the growth of lichens, algae, fungi, and mosses on the almost continuously damp surface of exposed structures. Microflora penetrate stone, loosening grains and thereby decreasing the stone's cohesive strength. Even in the absence of biodeterioration, the degradation of mortar, plaster, and stone in tropical environments can be severe, as high relative humidity and frequent rainfall result in the gradual dissolution of soluble components in these materials.

With these problems in mind, the Institute is researching the use of chemical consolidants for strengthening limestone and the use of biocides for controlling microfloral growth. Parallel with laboratory work at the Institute, experiments began at Xunantunich to test the ability of selected water-based consolidants to penetrate limestone and cure in a high-humidity atmosphere, thereby increasing the stone's resistance to temperature and humidity fluctuations. Field testing consists of treating limestone samples with consolidants and exposing them to the weather. Environmental monitoring stations, equipped with battery-powered systems recharged by solar panels, have been installed at the test locations to record weather data, which will be used to define test conditions for artificial aging tests in the laboratory and to evaluate the testing in the field.

To control the microfloral growth that weakens masonry, the testing program will identify biocides that are effective, long lasting, and inexpensive and have negligible adverse impact on the environment. Selected biocides are currently being field-tested at Xunantunich. Field testing of consolidants and the biocides will continue for at least another two years.

The structural damage to Maya monuments caused by the intrusion of roots of shrubs and trees into the building fabric is a consequence not only of the tropical environment but also of the building techniques employed by the Maya. The Maya built

their pyramids in stages, each stage constituting a separate structural unit. During their period of use, the structural equilibrium of these buildings was assured by the application and continuous maintenance of an impermeable stucco facing on a structure's exterior. Once a building was abandoned, its stuccoed floors and walls cracked, and vegetation and water invaded, causing weakness and the potential for collapse. Ironically, although vegetation was the initial source of damage, in time it became the agent of stability by literally binding together, through root penetration, the collapsing structure. Removal of the vegetation in order to excavate the structure disrupts once again the equilibrium and exposes the structure to a fresh cycle of deterioration.

Conservation of excavated structures often necessitates intrusive interventions, such as dismantling and rebuilding walls and adding new materials. Developing methods for structural consolidation and stabilization that conform to conservation principles — including minimal intervention — while providing visitors with an understanding of the original appearance and construction is a challenging goal of conserving Maya monuments. All too frequently, the necessity for intrusive intervention has led to a too-heavy-handed approach, involving total reconstruction and a liberal interpretation of the original structure's appearance.

At Xunantunich, excavation is now exposing two of the pyramidal structures in the central plaza — the monumental Castillo and a smaller pyramid. As excavation proceeds, the Conservation Institute is providing expertise and on-site training in architectural and stucco conservation to the UCLA archaeological team and the Belizean authorities, to create a model for conservation of other structures. Architectural conservator Rudy Larios, with over twenty years of experience in conserving Maya structures in Guatemala and Honduras, together with experienced stucco conservators



Pyramidal Structure A1 in the central plaza of Xunantunich before and during excavation. Excavation transforms the appearance of a pyramid by removing its verdant covering and disrupts its equilibrium by exposing it to weather. Photos: Guillermo Aldana.

from the Instituto Nacional de Antropología e Historia in Mexico, provide this professional expertise. Their work has the additional benefit of helping to strengthen the network of practitioners in the region.

Although archaeological documentation during excavation is a well-developed practice, the same cannot always be said of documentation for conservation purposes. Institute staff and consultants, working

with members of the archaeological team, developed guidelines for conservation documentation, including a format for recording the condition of structures prior to intervention and photographic protocols for capturing the transformation of jungle-covered mounds into consolidated structures.

In keeping with the Getty Conservation Institute's larger goals of promoting appropriate conservation and management of archaeological sites, the Institute's Training Program is organizing workshops and short courses at the local and regional level. Two recent activities in support of conservation needs were a three-day seminar on management policy with members of the Belize Department of Archaeology, and a collections management workshop for staff members of the Belize departments of Archaeology and Museums. ☼

Martha Demas is a Fellow with GCI's Special Projects.



G C I NEWS

RECENT ACTIVITIES

LOAN FUND FOR EARTHQUAKE-DAMAGED HISTORIC BUILDINGS



BILL GIBNELL

The National Trust for Historic Preservation and First Interstate Bank of California have established an emergency loan fund to assist historic properties damaged in the January 17, 1994, Northridge earthquake. The Getty Conservation Institute and the Los Angeles Conservancy are providing the professional conservation expertise to develop and implement this emergency program.

All historic buildings damaged by the quake—including commercial, residential, institutional, and religious—are eligible for the low-interest loans. Owners of historic properties can borrow up to \$20,000. The funds can be used for architectural and engineering services and the cost of materials and labor necessary to stabilize the building. In order to obtain the loans (which will have an interest rate of no higher than 4 percent for the first year), the borrower must agree not to tear down the building for one year unless ordered to do so because of imminent public-safety

concerns of the local government. Notification prior to demolition must be provided to the National Trust.

For further information on the program, contact the Western Regional Office of the National Trust at (415) 956-0610, First Interstate Bank at (213) 614-2206, or the Los Angeles Conservancy at (213) 623-2489.

MEETING OF THE CONSERVATION IMAGING CONSORTIUM

The fourth meeting of the Conservation Imaging Consortium convened on February 24 and 25, 1994, at Harvard University in Cambridge, Massachusetts. Hosted by Henry Lie, Director of the Straus Center for Conservation, Harvard University Art Museums, forty individuals representing conservation laboratories, museums, academic departments, and industry gathered to present work, share ideas, and discuss future directions for the group. The meeting included formal presentations and discussions on electronic infrared reflectography (IRR), arguably the most mature application of electronic imaging in conservation to date. Topics addressed included the electronic archiving of digital images, methods of their capture and processing, techniques for assembling — electronically — partial images together, and comparative analyses of equipment and standardized procedures.

The Conservation Imaging Consortium, an initiative of the Getty Conservation Institute, gives members an opportunity to discuss their imaging activities and other conservation imaging projects and to learn about technical developments from experts working in industry and academic organizations. Recognizing that many institutions face budgetary restrictions, the Consortium members seek to maximize combined resources by working on compatible systems, sharing technical information and experiences, and coordinating research and development.

CORRECTION: The Imaging Technology Workshop reported on in Volume VIII, Number II, of *Conservation* was incorrectly described. The workshop, held on May 26, 1993, at Dalhousie University in Halifax, Nova Scotia, was actually the second day of a three-day event entitled "Computer Technology for Conservators—The 2nd Wave." As a result of almost two years of planning, Rob Stevenson staged this successful event in conjunction with the International Institute for Conservation — Canadian Group's 19th annual conference. Mr. Stevenson will edit the publication of the proceedings, planned for late May 1994. These proceedings will be available through ICC-CG Publications, P. O. Box/CT 9195, Ottawa, Ontario, K1G3T9, Canada.

RECENT COURSES

THIN-LAYER CHROMATOGRAPHY

This workshop, held February 28–March 4, 1994 at the Institute, was designed to familiarize conservators and conservation scientists with thin-layer chromatography (TLC) as a method to analyze and identify binding media. It is the second workshop in a series entitled "Methods in Scientific Examination of Works of Art."

The course aimed to provide participants with a low-cost, simple, and effective method of analyzing a range of binding media materials including proteins, carbohydrates, waxes, and resins. On the final day of the course, participants had the opportunity to test their proficiency with techniques presented by applying them to samples brought from their own institutions.

Those attending the course included conservation professionals from Australia, Denmark, Germany, Mexico, New Zealand, Slovenia, the United Kingdom, and the United States. The principal instructor for the course was Dr. Mary Striegel of the Conservation Institute's staff. Dr. David Nurok, an associate professor at Indiana University–Purdue University, was a guest lecturer.

NEW PROJECTS

THE ROYAL PALACES OF ABOMEY

The bas-reliefs of the Royal Palaces of Abomey, one of the most famous and historically significant sites in the West African Republic of Benin, will undergo scientific study and conservation treatment by the Benin government and the Getty Conservation Institute, it was announced in February by Institute Director Miguel Angel Corzo. The project is being launched to halt the deterioration of forty-nine polychrome earthen bas-relief panels that once adorned a palace building known as the *Salle des Bijoux* ("Hall of Jewels").

The approximately three-foot-square bas-reliefs depicting human and animal figures in allegorical scenes are thought to be the oldest surviving elements of the Royal Palaces of Abomey, a group of earthen structures built by the Fon people between the mid-seventeenth and late nineteenth centuries. The restored ruins of these palaces, now the Historical Museum of Abomey, are inscribed on UNESCO's World Heritage List.

Exposure to weather and termite and insect attacks caused serious erosion and deterioration of the bas-reliefs while they were on the facade of the *Salle des Bijoux*. In 1988, they were removed from the building's walls and framed in heavy cement casings. The *Salle des Bijoux* itself has since been torn down and is currently being rebuilt.

The project to conserve the bas-reliefs, which is expected to last four years with field campaigns each spring and fall, will follow the basic approach developed by the

GUILLERMO ALDANA



Conservation Institute in its other field projects around the world. After a thorough review of existing documentation on the bas-reliefs' history and condition and after scientific analysis of their constituent materials and causes of deterioration, the joint project team will develop and implement a conservation treatment plan. The final phase of the project will involve the planning of a site protection and monitoring program to ensure the long-term survival of the bas-reliefs. On-site training of Benin Ministry of Culture staff in the conservation, care, and maintenance of the bas-reliefs will be an important component of the project.

The West African kingdom of Abomey (formerly Dahomey), founded in 1625 by the Fon people, was an exceptionally powerful and wealthy center of trade and culture. The first royal palace of Abomey was constructed in 1645. Thereafter, each king had his palace built near that of his predecessor, the last being built for King Glèlé (1858–89). Earthen bas-reliefs were used as an integral decorative feature of the palaces. Their function was to represent the significant events marking the evolution of the Fon and their dominion over a vast territory. Although most of Abomey was burned in 1892 as the French prepared to occupy the city, the *Salle des Bijoux* is thought to have been one of the few structures to survive, making its bas-reliefs of particular importance as a historic record of the Fon's rich culture, complex mythology, customs, and rituals.

UPCOMING EVENTS

SYMPOSIUM ON THE STRUCTURAL CONSERVATION OF PANEL PAINTING

This international symposium, organized by the Getty Conservation Institute and the J. Paul Getty Museum, will provide a forum for conservators, restorers, conservation scientists, curators, and art historians to consider the historical, scientific, and practical aspects of the structural conservation of panel paintings. It will be held April 24–28, 1995, at the J. Paul Getty Museum in Malibu.

Since the conservation of wooden substrates in paintings has not been dealt with in an international conference in over fifteen years, this symposium will be an important opportunity to hear about recent advances in technical research. Participants will also

consider the history of panel manufacture and of techniques for stabilization. A particular aim of the symposium is to encourage an exchange of ideas and experiences on the practical aspects of structural conservation in order to better understand the rationale behind various approaches to stabilization.

There are a limited number of places available for the symposium, and early registration is encouraged. Registration prior to August 31, 1994, is \$250; it is \$300 after this date. For additional information, please contact Kathleen Dardes, Symposium Coordinator, Getty Conservation Institute, 4503 Glencoe Avenue, Marina del Rey, CA 90292-6537. The telephone number is 310-822-2299.

RECENT EVENTS

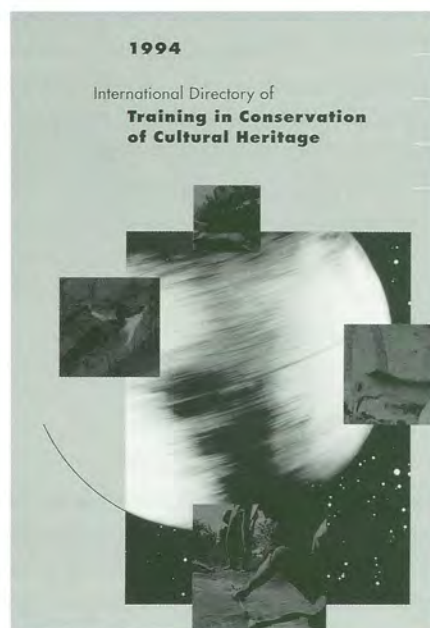
INSTITUTE HOSTS NATIONAL TRUST

On March 10, 1994, the Getty Conservation Institute hosted a reception for Richard Moe, President, and the Western Regional Advisors of the National Trust for Historic Preservation. The site of the event was El Pueblo de Los Angeles Historic Monument, the historic birthplace of the City of Los Angeles. Guests had the opportunity to view *América Tropical*, the only surviving public mural in the United States by Mexican artist David Alfaro Siqueiros, painted in 1932 and now the focus of a joint conservation project of the Institute and El Pueblo. Those attending also toured two historic buildings, the Italian Hall (on whose exterior wall the mural is painted) and the Sepulveda House, guided by Jean Bruce Poole, Director of El Pueblo's Historic Museum.

Over one hundred people attended the event, including members of the board of directors of the Los Angeles Conservancy, representatives of the mayor's office and the city council, and staff of the Getty Grant Program and the Conservation Institute. The evening included a media presentation on the Siqueiros mural's history and significance given by Luis Garza, who has been coordinating the mural's preservation efforts for the Institute.



Left to right: GCI's Jane Slate Siena, National Trust Western Regional Director Kathy Burns, National Trust President Richard Moe, GCI Director Miguel Angel Corzo, Siqueiros mural conservators Agustín and Cecilia Espinosa, and GCI consultant Rosalia Navarro on site at El Pueblo de Los Angeles Historic Monument.



PUBLICATIONS

THE INTERNATIONAL DIRECTORY OF TRAINING IN CONSERVATION OF CULTURAL PROPERTY

Reflecting the increased interest in training in conservation throughout the world, the 1994 *International Directory of Training in Conservation of Cultural Property* lists 30 percent more programs than the previous edition. This fifth edition of the directory also contains an easy-to-read international coding system and a complete subject index for easier use.

Compiled, updated, and printed as a joint venture of the International Centre for the Study of Preservation and Restoration of Cultural Property (ICCR) and the Getty Conservation Institute, the directory is designed to provide information on a wide variety of training opportunities at different levels and in various fields of conservation and restoration worldwide. The different types of programs include specialized multiyear courses leading to a degree, short-term courses for specialists, as well as conservation courses offered within programs leading to degrees in other fields. Entries are arranged alphabetically by country and, within each country, by city.

The directory is expected to be available late this spring. To order or for further information, contact Getty Trust Publications at P.O. Box 2112, Santa Monica, California 90407-2112, or telephone 310-453-5352 or (in the United States or Canada) 800-223-3431.

STAFF PROFILES

MITCHELL HEARNS BISHOP

Research Coordinator, Documentation Program

Born in Hawaii before statehood, Mitchell Bishop moved with his family to the San Fernando Valley, part of Los Angeles, when he was a small child. Interested in biology, he intended to become a doctor, but after seeing an exhibition on the California Arts and Crafts movement, he enrolled at California State University, Northridge (CSUN), to study painting, printmaking, and photography. This was not as radical a departure as it seems. His grandfather was a draughtsman and mapmaker as well as a frustrated artist, and his parents had lifelong interests in art and music.

Within CSUN's excellent studio art department, Mr. Bishop studied with some of Southern California's best working artists. In addition, he worked in the university library's reference department, where he discovered an aptitude for bibliographic and visual research. An ethnobotany class sparked an enduring interest in the uses of plants by the various cultures of the world.

In 1979, he became an assistant preparator at the Getty Museum. Later he was briefly in charge of the Museum's historical archive. His position and the archive were subsequently absorbed into the newly formed Getty Center for the History of Art and the Humanities. Several years later, prompted by a growing interest in conservation, he joined the Conservation Institute as a research assistant for *Art and Archaeology Technical Abstracts (AATA)*.

Now that he is one of two research coordinators for the Research and Applications section of the Documentation Program, Mr. Bishop's duties involve managing bibliographic and visual research, as well as playing an active role in field projects. Currently he is assisting in the digital documentation of a David Alfaro Siqueiros mural that the Institute is working to preserve. He has published on bibliographic research methods for conservators and on other topics, and has coauthored several articles and a forthcoming supplement to *AATA* on the conservation of painted ethnographic objects.



DENNIS KEELEY

MARTA DE LA TORRE

Director, Training Program

It was art and museums that led Marta de la Torre to conservation. She was born in Havana, Cuba, where she spent her first fourteen years before moving with her family to the United States. Art was an early interest, and she majored in design and art history at George Washington University in Washington, D.C. Following graduate work in art history, she completed the Ecole du Louvre, the French National Museum's curatorial school, and earned a master's degree in arts management from American University in Washington, D.C.

In 1981 she became the first director of special projects of the International Council of Museums (ICOM) in Paris. There she worked on a number of projects, including the renovation of the Egyptian Museum in Cairo, the creation of the Nubia Museum in Aswan, the training development of curatorial staff of the Egyptian Antiquities Organization, and the evaluation of UNESCO's regional training centers in Africa. Her involvement with ICOM continues—she is currently its Treasurer and a member of the Executive Council.

In 1985, she joined the Getty Conservation Institute to become the first director of its training program. With her international experience and management background, she sought to develop a program that integrated a managerial component in conservation and addressed pressing needs in the field. Preventive conservation, then only starting to be emphasized, was an early focus. She believes that the courses she has helped develop, together with others created in archaeological conservation, have helped enlarge the Institute's vision of conservation — that it is not only science and treatment but also planning and prevention. As a complement to the Institute's work, she would like to see the GCI join an American university to create the first master's degree program in archaeological and ethnographic conservation in the United States.

She takes pride in the work done by the Training Program and in the commitment and dedication of the Training Program staff.



DENNIS KEELEY

IN ACCORDANCE WITH THE GCI'S CONCERN FOR THE ENVIRONMENT THIS NEWSLETTER IS PRINTED ON RECYCLED PAPER



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