

The Management of Ancient Chinese Cave Temples

A Site-Management Training Course at the Yungang Grottoes

Sharon Sullivan

IN 1988, THE AUTHOR was invited by the Getty Conservation Institute to contribute to the development of an on-site training course in rock art site management. The course demonstrated that the combination of a good planning framework and simple, cost-effective management techniques had much to contribute to the preservation of sites.

The planning framework for the course was based on the Burra Charter (an Australian adaptation of the Venice Charter), with some change in emphasis to suit the particular needs of the participants. The Burra Charter established a methodology and sequence for the management and conservation of cultural heritage sites. Figure 1 illustrates this framework, consisting of the planning process, its sequence, and the steps carried out by the participants in the course of the training period.

In 1991, two representatives of the State Bureau of Cultural Relics of the People's Republic of China, Huang Kezhong and Sheng Wei Wei, participated in one of the training courses. By that time, the GCI had been involved for several years in conservation work at the ancient cave temples, or grottoes, of the Silk Road. Following the attendance of the Chinese participants, it was decided that a course could be adapted to suit the need for grotto conservation and site management in China. Therefore, a training course was set up by the GCI to be held in conjunction with the Yungang Grottoes Historic Relics Research Institute near Datong. A capital of China during the Northern Wei dynasty, Datong is located northwest of Beijing in Shanxi Province, near the border with Inner Mongolia, and is the site of cave temples dating from the fifth century C.E.

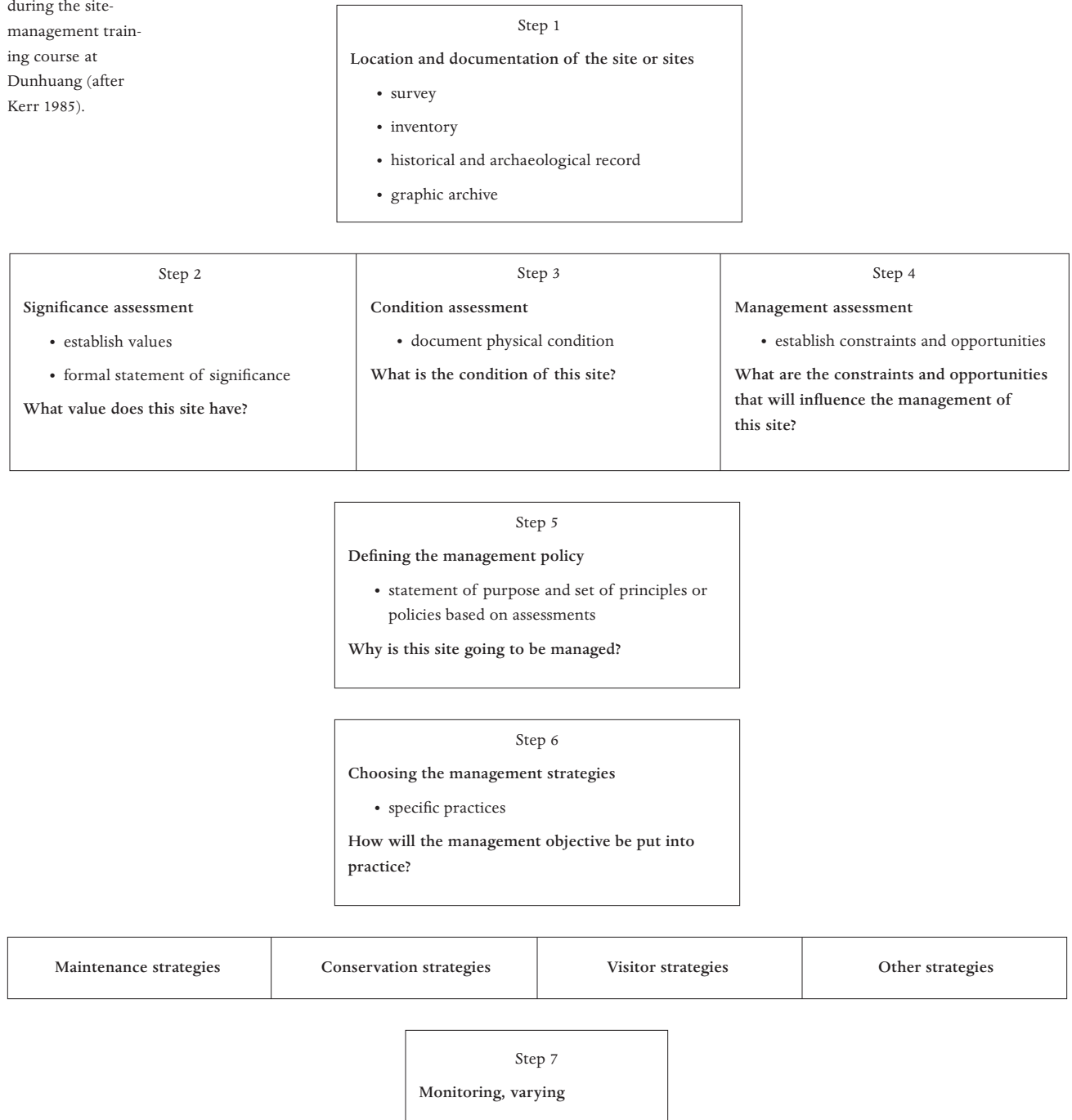
In April 1992, a preparatory trip was undertaken to visit a range of cultural sites in China. This established the framework for the course, which was held in October of that year and attracted site managers, specialists, and administrators from various areas in China. Participants and staff were housed at the Yungang grottoes, which was also used as a major case study.

The course consisted of lectures, illustrated by examples from different parts of the world; group discussions and exercises; and the preparation and presentation by the participants of the various aspects of a

Figure 1

The step-by-step process followed during the site-management training course at Dunhuang (after Kerr 1985).

Planning Process for the Conservation of Archaeological Sites



management plan, culminating in a completed plan by the end of the course. Field exercises included the preparation of documentary drawings, comparison of 1930s photographs of the site with the site today, and assessment of the site’s significance and its management environment. The latter was evaluated using a SWOT technique—an analysis of strengths and weaknesses, opportunities, and threats—followed by the development of

management objectives and strategies. Visitor surveys and visitor observations, designed and run by the participants, as well as condition surveys, provided valuable data to feed into management planning.

The nexus between management and conservation

In the field of conservation, the terms *management* and *conservation* are sometimes used interchangeably to mean all or some of those actions that are taken to ensure the long-term conservation and appropriate use of a cultural site. This may include such steps as documentation policy, significance assessment, physical research and intervention, and visitor management.

In this article, the term *management planning* is used to mean the overarching framework by which one establishes a series of appropriate steps to preserve a site, including physical conservation. The term *physical conservation* is used to mean those interventions carried out on the fabric of the site or its environment aimed at lengthening the life of that fabric. The term *preservation* is used to refer to the desired outcome of the management—the best, most efficient, and most appropriate way of achieving the long-term existence of the site and its cultural value.

The Step-by-Step Approach to Management Planning

Figure 1 shows the steps in a management planning exercise, as carried out in sequence by the participants of the conservation management training course. These are, in brief:

1. Location, identification, and documentation of the archaeological site or sites
2. Assessment of the value or significance of the site to the community or particular sections of the community, bearing in mind that “community” can apply to groups from the international to the local level
3. Assessment of the physical condition of the site
4. Weighing the values of the site with a range of management opportunities and constraints, including its physical condition, available management powers, resources, and experts
5. Arriving at a management policy or management objectives for the future of the site
6. Implementation of appropriate management strategies (including ongoing maintenance) in accordance with the management policy
7. Supervising and checking the proposed strategies and adjusting and altering them as required

In running the course, a number of concepts needed to be conveyed: First, the series of steps is a process with its own logical order; and getting the process right, complete, and in sequence is the real secret of management success. Second, the framework is empty until it is filled by

the managers themselves. That is, there is no magic recipe for management or preservation; rather, it must arise out of the adaptation of the process to local conditions and traditions, including the social, economic, political, and physical environment.

The grotto sites in China are beautiful, ancient, and of great cultural value. They also represent a great variation of fabric condition and management issues. They are often very large. Some of the elaborately carved and/or painted surfaces are still in good condition and are covered by wooden temple facades or other more modern structures. Some are completely exposed; and wind, sand, and water damage have accrued over a long period. Almost two millennia of conservation, restoration, and adaptation make a complex and technically daunting mix of interpretation and conservation problems. Pollution is also a major problem. The sites are often well staffed, but an increasing flow of visitors is causing a range of problems and is forcing the authorities to consider increasingly interventionist site-management techniques. In some areas, traditional religious use is still evident and is growing again. This brings its own set of dilemmas and management issues, especially delicate in the modern secular state.

The value of these sites, and the apparent gravity of many of their problems, seems to call for instant action—a drainage treatment here, a visitor center there, a newly invented scientific technique somewhere else. Yet, unless conservation managers analyze the whole site, and the whole problem, and systematically plan management in a logical way, they can do more harm than good.

In China, as in Australia and the United States, the managers (the participants, in this case) showed an initial tendency to leap to solutions rather than to diagnose and plan—to treat obvious symptoms without first properly analyzing the site and the management situation. There was a feeling that the value of the sites and their problems were well known, and that what was needed from the conservation professional was the latest, most scientific, and preferably the most high-tech solutions. As the training course showed, the initial assumptions of the teaching staff, and those of the participants, were just that; and also that simple, time-honored methods are often as useful, and more relevant, than imported solutions.

The secret of successful management is to develop a plan that suits the long-term needs and abilities of local management and that responds to the multiple values a site may have. Perhaps the best way of illustrating this in the case of the grotto sites is to run through some of the elements of the process, as we worked through it at Datong, and to explain some of the conclusions and outcomes that the participants developed and presented as their application of the management-planning process to local conditions.

Documentation and condition assessment

The first step taken was the documentation of the history of the site. This, along with step 3 (condition assessment), is discussed by Stephen Rickerby

elsewhere in this volume. Suffice it to say here that participants were able to use the previous documentation of the site to assess its condition and to deduce sequences of events as a prerequisite for analyzing the causes of physical problems. The documentation phase was also essential in identifying and analyzing all the elements of the site's value. This initial work assisted everyone in correcting some previous assumptions about the site and its significance.

Significance assessment

Following the documentation phase, the next step was to assess the value of the site; that is, to systematically list and analyze all the elements that contributed to the site having cultural value to the Chinese people and to humanity in general. Initially, participants seemed skeptical of the need to assess significance, since the value of these sites appeared to be abundantly clear, but analysis of this range of issues demonstrated (as always) that the concept of significance assessment is a very powerful tool for analyzing a site's management needs. The site's historic, scientific, aesthetic, social, and other values were considered.

Where does significance reside?

There was much discussion about the significance of different elements of the site, especially about the question of previous restoration and reconstruction. Was this part of the site's significance, or should it be removed? Was the Ming dynasty fort on top of the older site important? Where did the question of religious use today fit in? Was this a legitimate value for the site? How would it effect its management? Did participants agree with a 1970s article, which—after an excellent description of the site and survey of all these elements—stated that the outstanding significance of the site was that “each work here steeped in the blood and sweat of the artisans serves as evidence of the crimes perpetrated by the ruling clans of old” (Yungang Grottoes Custody Committee 1977:15)?

A fascinating and much-argued issue focused on previous “traditional” conservation and restoration methods. Over two millennia, devoted monks, patrons, and, in some cases, rulers had sporadically conserved, restored, and adapted the sites. Re-carving, supporting stone carvings with iron spikes, replacing decayed stonework with painted clay moldings, and rebuilding shelters has ensured that the sites have reached the late twentieth century in a relatively intact state and has also provided a myriad of technical problems and interpretive puzzles. Is this previous work significant? Can it even be called conservation? How will sites be managed now that their ongoing traditional care has ceased with the twentieth-century disappearance of their traditional guardians and has been replaced with an equally devoted but very different set of managers with a different set of aims?

The analysis of such issues led to lively discussion and disagreement between and among the work groups, and also amply demonstrated the necessity of assessing significance prior to carrying out management

strategies, including physical conservation. For instance, if it were decided that the major significance of the site was to teach about the crimes of the ancient clans, the presentation of the site to the public would be very different than if it were decided that its artistic and religious values were of prime importance. Similarly, the participants decided that change, adaptation, and conservation of the site over sixteen hundred years was as significant as the original, or oldest, paintings and carvings. Hence, the management policy decided on was to conserve all elements and periods of the site's fabric and not, for example, to interfere with one in order to find an earlier one.

Arriving at consensus

Despite their different views, the participants were able to produce a succinct statement of significance summarizing the values of the site. Some key elements proposed in the process of significance assessment included the following:

- A range of expertise and thorough investigation of differing views are needed to enable full investigation of all the elements of significance.
- The significance of a site is usually multifaceted, and any management strategy must consider all the elements and resolve potential conflicts between major ones.
- Significance of a site can change dramatically over time, and from culture to culture, and will require periodic reassessment and reanalysis.
- The role of site managers in assessing values is very important; they must ensure that the correct expertise is brought to bear and must, because of their special and holistic knowledge, take a leading role in the assessment.

One issue that emerged during the course was the immense amount of documentary and other evidence available about Chinese grotto sites; this is in contrast to most Western sites of the same period, and certainly to Australian Aboriginal sites. This "embarrassment of riches" needed editing to ensure that key points could be distilled from it.

Weighing significance and constraints

Following the assessment of significance, it was necessary to assess both the physical condition of the site (step 3) and the management condition or environment (step 4). Many technically brilliant and meticulously researched plans for physical conservation or ongoing management are never implemented. One important reason is that they are totally inappropriate for the management environment in which they are supposed to operate. Expensive machinery that cannot be maintained, or complex monitoring procedures that rely on a consistently high budget and a training commitment that is not feasible, are useless and do more harm than good.

The only plan that will work is one that suits local circumstances and, equally important, one that has been devised—or at least enthusiastically accepted—by local management. That was why the course was designed around the participants themselves preparing and presenting “a plan”—to ensure that it respected local conditions and that they “owned” it. A crucial step in this process was for the participants, with generous and frank information from local staff, to carry out a SWOT analysis of the site and its management. Thus, the participants looked in some detail at budgets and staffing, visitor numbers and physical problems, local political support and government policy in order to establish, in a realistic way, the management situation and plans that would be reasonable and useful to apply in this situation.

Arising out of this, the participants were able to look at significant threats (e.g., local levels of pollution) and opportunities (e.g., the possibility of a changed pricing policy for visitors). The participants engaged enthusiastically in this exercise and made great use of local staff, who, in turn, were challenged to consider questions and ideas they had not previously examined in such detail. In this exercise, and throughout the course, the participants acted as management consultants to the local staff, carrying out an assessment of present management and bringing a new perspective and a fresh outside view to a familiar situation and familiar problems—a very helpful step in the creation of a management plan.

Formulating a management policy

With all this information—on significance, on condition, and on the management environment—participants and teachers turned their attention to formulating a management policy for the site. A management policy determines how the cultural significance of the site, identified by the statement of significance, may best be conserved in the short and long terms, taking into account the particular constraints, problems, opportunities, and circumstances that relate to the site. It should cover, in general terms, policy for use, interpretation, management structure, physical intervention, investigation, future activities, mitigation, and salvage (if appropriate), and provisions for monitoring and review. The policy should clearly state the options available and the way in which the implementation of the management policy will “change the place, including its setting, affect its significance, affect the locality and its amenity, affect the client owner and user, affect others involved” (Australia ICOMOS 1988:10).

While it is easy to describe the requirements for a management or conservation policy, achieving a successful and workable policy that will effectively maximize the conservation opportunities for a site is often a complex and multifaceted task, requiring technical expertise, sound judgment, practical common sense, lateral thinking, and adaptability. These are the skills the site manager needs. The policy cannot be achieved by a recipe, or simply by hiring an appropriate expert. It requires the attention and management skill of the manager and the commitment of the organization or authority responsible for the management of the site.

The participants were specifically requested to design a policy that

- articulated the implications of the statement of significance;
- was acceptable to the owner/authority who controlled the site;
- paid due attention to the needs and desires of the community, especially to those with a special interest in the site;
- was financially feasible and economically viable;
- was technically feasible and appropriate;
- provided a long-term management framework; and
- was sufficiently flexible to allow review, improvement, or alteration.

In the course of this exercise, a number of issues crucial to the future of the site emerged. Participants and staff found themselves considering a range of issues and making decisions about questions such as:

- whether the protection of the carvings by the erection of an intrusive structure is more in keeping with the stated significance and management context than leaving them exposed, or whether it is more appropriate to protect them less completely and keep the setting and aesthetic feeling of the site more intact;
- whether to allow access to a particular part of the site that is very significant to visitors—perhaps to people practicing religious rites—or to prevent this type of activity because it may damage the site;
- how best to interpret the site—with signs, brochures, a visitor center, guided tours, or a combination of these;
- whether the natural vegetation should be left, removed, or restored, depending on its importance and its effect on other significant elements of the site;
- whether research will be allowed on the site, and if so by whom, and in what circumstances; and
- what the best makeup of the staff might be, including the roles and priority of guides, guards, scientists, and managers.

Implementation strategies

The next stage of the training course (and the plan) was step 6, the management strategies—those actual, on-site steps through which the management policy would be put into action. Once again it was important to understand the holistic nature of the exercise. Provision for a range of strategies was necessary to ensure the ongoing preservation of the site.

A range of strategies was explored and suggested by participants. These included elements such as

- ongoing documentation, assessment and research;
- maintenance and updating of records;

- physical protection of site boundaries;
- controlling impinging development and local atmospheric and other environmental problems;
- regeneration and creation of a wider buffer zone;
- regulation, control, and direction of research;
- salvage procedures, and methods for ensuring that work on the site did not affect the significant site fabric;
- curating movable artifacts; and
- arranging for ongoing consultation with and involvement of particular key people and groups.

The course placed special emphasis on maintenance, conservation, and visitor-management strategies as being the most fundamental and useful. The physical conservation strategies suggested were the subject of intense debate. A key question here (as elsewhere) was the extent of intervention required or desirable, the necessity for research to establish the nature of the problem, and the potential results of intervention.

The development of maintenance and visitor-management strategies perhaps most dramatically demonstrated the effect that site managers could have on site preservation through relatively simple practices. Simple maintenance measures—such as keeping doors and windows of protective structures maintained and shut, keeping dust levels down, removing vegetation where appropriate, and closely supervising outside workers on-site—all emerged as equally, if not more, important in terms of preservation as some of the more elaborate and costly proposals for physical conservation.

Figure 2
The observation strategy used by course participants.

Yungang Grottoes Visitor Observation
<p>Observers</p> <hr/> <p>In groups of three:</p> <ul style="list-style-type: none"> • one person recording information • one person giving information • one person walking around observing <p>At Caves 5 and 6, during a specific time period.</p>
<p>Observations</p> <hr/> <ul style="list-style-type: none"> • Are people smoking near or inside the building? If so, how many? • Are people touching the structure? If so, how many? In what places? • How long does the visitor stay inside the structure (and cave)? • Do people go into both Caves 5 and 6, or do they tend to go into just one? • Note the length of time of your observation. • Keep a count of the number of visitors you observe.

Figure 3

The script employed for surveying visitors to the grottoes.

Yungang Grottoes Visitor Survey

Hello! (Wear your name tag and introduce yourself.)

We are doing a survey of our visitors. Could we ask you a few questions? This will take only a few minutes, and your answers will help us in managing this site.

1. Where do you come from?
2. What kind of work do you do?
3. We are interested to know why you are visiting Yungang:
 - family holiday
 - business/ conference
 - group visit/work unit
 - other
4. How did you first learn about the Yungang grottoes?

• school	• friend
• travel agency	• local knowledge
• tourist guidebook/map	• other
5. Have you visited other grotto sites? If so, which ones?
6. Is this your first visit here? If no, how many times have you been here?
7. Which part of the site interested you most?
Which part was least interesting? Why?
Which caves do you think are most important?
8. Did you know that there is a Ming-dynasty fortress above the grottoes?
9. Are you satisfied with the facilities for the visitors (e.g., restrooms, souvenirs, etc.)?
10. Would you like to have learned more from your visit? What?
11. In your opinion, was the cost of your ticket appropriate?
Would you be willing to pay more for a ticket?
12. In your opinion, is the site well cared for?
Do you have any suggestions for improvement?
13. May I ask you what age group you fit into?
 - 15–25
 - 26–40
 - 41–55
 - 55+

Thank you very much for your time. The information you have given us will be very valuable to our work.

The visitor observation and survey exercise

The value of simple techniques was made even more dramatically clear through the work the participants did in the area of visitor management. On the first Sunday of the course (Sunday being the busiest day at the site for visitors), they designed and carried out a visitor observation and survey exercise. A group of participants observed visitors at certain grottoes and made notes about their behavior in accordance with instructions previously formulated with the lecturers (Fig. 2).

At the same time, other participants conducted their first-ever visitor survey (Fig. 3), interviewing some ninety visitors on-site, with the help of interpreters, as needed. There was some concern about whether the visitors would receive such questioning with equanimity. As it turned out,

however, both participants and visitors enjoyed the experience greatly. According to student reports, the visitors appeared to appreciate the fact that the site managers were interested in their opinions and in improving management. The visitor studies were based on the work of Fay Gale at Australian Aboriginal art sites for the Australian Heritage Commission (Gale and Jacobs 1987). The results of the work are too numerous to detail here; however, a number of key points emerged that are very relevant to principles of management generally, as follows:

When considering the general problems of site management, participants were overwhelmed by the immense problems of gradual and relentless physical deterioration, due to natural causes, which the managers of the sites have been battling from the beginning. These problems are grave and inevitable; and they deserve attention. However, as Stephen Rickerby points out elsewhere in this volume, the deterioration is often much more gradual than it would at first appear.

In contrast, the effect of poorly behaved visitors can be catastrophic in a short time. The participants found this from their unobtrusive observations of visitors on-site. In particular, a group of young boys spent the afternoon roaming through the site, and when they thought they were unobserved, climbed up on the large painted statues, sat in their laps, and scratched them with their feet. This seemed to be a regular occupation, as the boys were searching for money left as offerings. The clearly observable fact was that the boys, in one afternoon, were able to do more damage to these figures than ten or perhaps a hundred years of natural weathering.

This and other visitor-management problems were not the result of neglect or negligence. They simply required systematic observation on the part of managers and the consequent application of suitable management measures. The participants readily suggested solutions that were relatively simple, inexpensive, and low-tech, yet impressive in terms of the long-term preservation of the site. Similarly, observation of visitor-flow patterns resulted in a greatly enhanced design for a system of visitor management.

In the same way, by means of the visitor survey, the participants gained extensive information about the origins, expectations, and views of visitors, who were not at all reluctant about voicing their opinions and making suggestions for improvements. The survey assisted immensely in designing a visitor and interpretative strategy. Had the participants attempted to design these without such a survey, they would certainly have made some significant mistakes. For example, visitors showed a strong desire for on-site information and interpretation, for more guided tours, and for better facilities. Equally important, they stated that they would be willing to pay more for these services.

The management plan

The course concluded with the presentation of a management plan by each group to a jury and to fellow participants, who did not hesitate to

rigorously question the logic of proposed solutions and lobby for their own proposals. All the plans had key similar elements: all proposed practical, and sometimes very imaginative, solutions to management problems; and all demonstrated that the expertise necessary for the successful on-going management of the sites was locally available among the participants themselves. Perhaps most important, all groups used the planning framework in a logical way, and they clearly demonstrated their understanding of the process and its benefits.

Conclusions

A number of conclusions with general application can be drawn from the experience of participants and teachers in this management experiment. First, the simplicity and logic of the process itself was self-evident by the end of the course. Its real contribution—and the reason it was so easily adaptable—was that it pulled together, strengthened, and added to present local planning principles and practices. It is a fundamental principle of site management that such a process be used as a discipline.

Second, its use and adaptation by the participants to local outlooks, philosophy, and management environment was crucial. The lecturers and the plan outline provided only the framework for the participants' input. They had the relevant background, information, and expertise to actually produce the finished plans. To be successful, a management plan cannot depend on complex Western technology or high-tech solutions. It must be designed by the key decision makers at a number of levels; it must be acceptable to the local community; and it must be able to be implemented in the local political, social, and technical environment.

It follows, therefore, that a "perfect" plan, which instantly identifies and solves all the major problems of the site, is unrealistic and unobtainable. Westerners often take, or are given, the role of "fixers," usually by way of complex new methods and the input of major resources. Yet management planning, to be successful, needs to move in small, discernible steps from the known to the new, from the present situation to incremental change for the better. Management-strategy development is iterative and gradual. Because of this, physical conservation measures need to be an integral part of management planning and will not succeed if they get too far ahead of this process in terms of available technical or logistical support and follow-through.

Effective management planning can identify basic, low-cost measures for conservation. The establishment of a viable, ongoing management framework and a management plan to achieve certain specified ends are, in fact, essential prerequisites to any significant decisions about physical conservation that involve intervention in the fabric.

In the process of developing the plans during the course, it was also necessary to understand and come to terms with philosophical differences between the Eastern and Western approaches to material conservation. Perhaps the most animated discussions in the entire course focused on the question of an appropriate strategy for physical conservation, one that flowed from the statement of significance and

the management climate. The discussion took place toward the end of the course, when the elements of the plan were falling into place and when participants and staff had established a degree of empathy difficult to achieve quickly, especially through language interpretation. Discussion came at last to focus on the significance of the site and on the nature of the Chinese “sense of place” and its implications for management. Many participants argued strongly for the validity of a more interventionist approach to conservation than is usual in current Western methodology, including a greater emphasis on reconstruction (Wei and Aass 1989:3–8). The discussion and its outcomes demonstrated the robustness of the planning framework and the necessity for local managers to “fill out” any such framework in accordance with the cultural traditions of their own society.

Teaching the course was a great experience. The enthusiasm and intelligence of the participants, the beauty and complexity of the site, and the challenging and fascinating differences between the Western and Eastern cultures, which the course forced us all to confront, made the experience most exciting and rewarding. It gave the participants great insights into the question that brings us all together: “What, then, shall we do?”

Acknowledgments

The author extends warm gratitude to the participants of the conservation management training course at Yungang grottoes, the Getty Conservation Institute, and the State Bureau of Cultural Relics, the People’s Republic of China, for the opportunity to develop and offer this course; to Stephen Rickerby, Margaret Mac Lean, and Po-Ming Lin for their indispensable contributions; to Mike Pearson and Australia ICOMOS for ideas, inspiration, and the Burra Charter methodology.

References

- Australia International Council of Monuments and Sites (Australia ICOMOS)
 1988 *The Australia International Council of Monuments and Sites (ICOMOS) Charter for the Conservation of Places of Cultural Significance (The Illustrated Burra Charter)*. 2d ed. Sydney: Australia ICOMOS.
- Gale, F., and J. M. Jacobs
 1987 *Tourists and the National Estate: Procedures to protect Australia’s heritage*. Special Australian Heritage Publication Series 6. Canberra: Australian Government Publishing Service.
- Kerr, J.
 1985 *The Conservation Plan*. New South Wales: National Trust of Australia.
- Wei, C., and A. Aass
 1989 Heritage conservation East and West. *ICOMOS Information* 3:3–8.
- Yungang Grottoes Custody Committee
 1977 *The Yungang Caves*. Beijing: Wenwu Chubanshe (Cultural Relics Publishing House).

Management of Tourism at Buddhist Sites

Robertson E. Collins

FOR CENTURIES the Silk Road was a vibrant trade route. It was also an important travel route for people and ideas. In general, exotic goods moved from the East to the West; merchants, missionaries, ideas, and money moved from the West to the East. Buddhism was the first religion to travel west, and then east, along the Silk Road.

Around 200 B.C.E., Buddhism expanded westward from northeastern India to Taxila in what is now northern Pakistan. A century earlier, Alexander had rested in this region, then turned away from India and back to the Mediterranean. Later, around 200 C.E., this same area became the State of Gandhara under the rule of King Kanishaka, a patron of the arts. Taxila-Gandhara had enjoyed long trade and travel contacts with Greece and exposure to Mediterranean art. Here, with the support of King Kanishaka, the first sculptural representations of Buddha and the beginnings of elaborate shrine architecture began to appear.

It was from Gandhara that Buddhist religion and art traveled east along the trade routes and up over the mountains along the Silk Road into China and beyond. As Gandharan art and architecture traveled along this difficult and increasingly profitable route, it began to change. It started to reflect the value and variety of trade goods, the changing dynamics of the transplanted merchants and the local people, their systems of governance, and the great esteem in which they held this new religion.

The Silk Road has not been an active trade route for many centuries now, but today the mystique of this vast region attracts tourism, and the number of visitors is increasing daily. What began two decades ago with jeeps carrying television crews across the wasteland has now become a popular international activity. For much of its route through China, the road is now paved, though often camel tracks parallel the right-of-way. Clusters of gas stations, repair shops, motels, and cafes are appearing at once-remote trail intersections. Former camel stops and trading centers have become cities of more than a million residents.

Where it still exists, the legendary Silk Road with its unmarked track has itself become an archive—a linear museum with a limited

visitation. Traces of the Great Wall, crumbling watch towers, and abandoned settlements are reminders of the stamina and defeats of the early merchants and their caravans.

Today, Buddhism, where it survives along this ancient road in shrines or in cliff caves, attracts official caretakers rather than fervent, dedicated monks and wealthy devotees. The art of the Buddhist record is remarkable, and the sites have dramatic appeal; profitable tourism has a clear potential. The danger is that tourism pressures may overburden heritage resources. Money is needed for protection of the sites, for the interpretation of the sites to visitors, for planning a balanced tourism infrastructure.

Conservation at Buddhist sites along the Silk Road ranges from total neglect at some sites to futile battles against time, the elements, and inadequate budgets and to professional, scientific stewardship at others. At this moment in time, the energy within China as it races into the next century bodes both danger and opportunity for tourism and conservation. The scholars and curators of Buddhist sites have an enormous task before them. Tourism should be a helpful adjunct to conservation needs; but, unfortunately, tourism management is not yet sufficiently financed nor sophisticated enough to be able to enact the protective visitor controls that need to be imposed. A 1996 report by the Madrid-based World Tourism Organization indicates that China's tourism increased by 10.9% in 1995 to rank in the top five destinations in the world; and data from China indicate that the country received 46.387 million overseas tourists in that year alone (CITS 1996). Until there is some dramatic change in conservation budgets and tourism planning, the Buddhist sites along the Silk Road in China must be considered endangered.

Today, Buddhism is the daily religion of a quarter of the earth's population, and many Buddhist sites in Asia continue to be active religious pilgrimage destinations. Many long-abandoned sites have been designated by Unesco as World Heritage Sites and are also celebrated attractions for the tourism industry. Most of the recent growth at the great Asian Buddhist sites has been gradual and generally well managed. As with all World Heritage Sites and tourist attractions, however, the number of future visitors is expected to increase dramatically; at many sites the maximum capacity has already been reached. Visitor levels have risen far beyond the expectations of the original builders, frequently beyond the budgets of the conservation institutions that maintain them. Various forms of access control are being considered. For example:

- The tourism plans for the Angkor Wat temple complex in Cambodia are developing faster than its conservation plans. Similarly, Borobodur, Indonesia, experiences as many as three hundred thousand visitors per month. In both cases, these are mostly domestic tourists, and officials are being forced to consider some sort of reservation system.
- At Sigiriya in Sri Lanka, tens of thousands of people assemble each month on the evening of the full moon. The impact of

this domestic visitation is dramatic, overloading roads, utilities, and services.

- The Kandy Esala Perahera festival in August attracts thousands of people on its final day. This used to be an event for Sri Lankans only, but the once-simple religious procession of the Tooth sect has been expanded into a major event complete with bands, dancers, elephants, festival foods, and grandstands. Tickets are issued for reserved seats, and the event is advertised in Europe and America as an international attraction.
- At Lumbini, Nepal, birthplace of the Buddha, the number of tourists is rising. Rather than focusing on conservation needs, developers are building a super-scale park on and around the simple shrine, the bodhi tree, and the Ashok pillar. Visitors are being wooed with new hotels, conference and library facilities, wide roads, and a reflecting pool nearly a mile long.

Tourism is expanding all over the world, and all World Heritage Sites must anticipate increased visitation. A concurrent force is at work that poses serious problems: staggering population growth. Although the numbers of visitors to monuments and museums are already near capacity levels, cultural conservation faces increasing growth pressures in the near future.

In 1950, when the era of mass travel began, the population of the world was 2.5 billion. In 1993, forty-three years later, world population was 5.5 billion. In the year 2026, it is expected to rise to 8.5 billion. Most of this growth will occur in South America, Africa, and Asia. It is impossible to think of the future of either tourism or conservation without absorbing the implications of these statistics.

The question is how to meet that challenge. If conservation and tourism are to succeed, they must develop a planned partnership. There is a need for a comprehensive management plan for each significant site to ensure that the best levels of protection are in place that still allow visitors to have meaningful visiting experiences. This comprehensive plan must first include a plan for conservation. Only after the conservation plan is in place should a tourism plan be undertaken.

The tourism plan should be prepared by tourism professionals rather than by site scholars. Conservation specialists should address the safety and protection of the site and then turn to fellow professionals who understand the intricacies of tourism and visitor management.

Everyone is affected by tourism and has an opinion about it. In recent years, the environmental movement has prompted talk about new kinds of tourism: eco-tourism, sustainable tourism, responsible tourism, and endemic tourism are just a few of the terms used. Also in recent years, *cultural tourism* has become a popular term, now so broadly used that it no longer has a singular definition. Still, everyone seems to like the idea, and no one seems disturbed that there is no broad agreement on what cultural tourism really means. Only a few people who use the term realize that it specifically refers to visitation at monuments and sites.

Another challenge to the management of these great sites is the fact that although governments have funded most conservation programs until now, major cuts have had to be made in the budgets of conservation institutions. Yet, there is a window of opportunity: most governments in their search for money now see tourism as a source of revenue. Because great cultural assets can attract income, conservation budgets can and must, in turn, be increased.

In 1992, the Pacific Asia Travel Association (PATA) commissioned the U.S. Committee of the International Council on Monuments and Sites (US/ICOMOS) to conduct a study that it hopes will increase the level of funding for conservation work in Asia. This study is expected to justify the efforts of travel-industry leaders in their appeals to government organizations for increased conservation budgets.

In the future, conservators will have willing partners if they approach the tourism industry as a constructive collaborator in managing growth and change. In the Caribbean, for example, US/ICOMOS has conducted an awards program with the American Express Foundation, a partnership that has worked to everyone's benefit. Similar industry partnerships need to be nourished.

The Buddhist sites along the Silk Road cannot support mass tourism or local recreational visits. These are important, fragile sites; their conservation will require collaboration among historians, scholars, artists, conservation scientists. Ancient technologies and materials will need to be studied from various perspectives and conservation measures sensitively applied.

In addition to the appeal of the sites, the conservation process will itself become a tourist attraction for many years to come, attracting special "niche" tourists likely to appreciate these conservation activities. Planned properly, this type of tourism may be able to generate greater financial stability for conservation efforts at these sites. This is the paradoxical truth for conservators: tourists are needed to provide funds to protect sites from tourism.

Further, there are now alternatives to mass tourism. The numbers of people traveling are so high, it is possible to select the special segments that will best serve each site. Two recent books on managing tourism at World Heritage Sites are of particular interest (see references). One published for the ICOMOS General Assembly in Sri Lanka was written by the US/ICOMOS Committee on Cultural Tourism (1994). The other, produced as a result of a Pacific Asia Travel Association conference held in Kathmandu, contains an approved set of guidelines for tourism management at heritage sites (PATA 1993). The Kathmandu Declaration, as it is called, emphasizes that the community residents around a site are essential to its proper presentation. These guidelines also look at good tourism as an opportunity to support professional conservation practices.

The basic rule of the tourism industry is, What is good for the residents will be good for the visitors. Domestic pilgrims will be the largest segment of visitors to most Buddhist sites, and their needs must be given priority in planning. The international segments will follow easily.

Conservation planning must come first. But sound tourism planning, within conservation limits, can also extend the historical intent of the original builders, manage visitors to ensure protection of the sites, and give pilgrims and other visitors a worthwhile and dignified visiting experience. The challenge is to find a balance between public access and professional conservation. Success will be achieved by wise application of the skills of conservation and tourism professionals alike and by a shared commitment to excellence.

References

- 1996 **China International Travel Service (CITS)**
CITS News 3(2):3.
- 1993 **Pacific Asia Travel Association (PATA)**
Tourism at Heritage Sites: A Guide to Planning, Education, Management and Marketing. Singapore: PATA Foundation.
- 1994 **US/ICOMOS Committee on Cultural Tourism**
Tourism at World Heritage Cultural Sites: The Site Manager's Handbook. Washington, D.C.: US/ICOMOS.

The Dambulla Rock Temple Complex, Sri Lanka

Ten Years of Management, Research, and Conservation

Senake Bandaranayake

THE UNESCO WORLD HERITAGE SITE at Dambulla, Sri Lanka, is a monastery and temple complex that has been in continuous use since its founding in the second or third century B.C.E. Though small in comparison with Dunhuang or Ajanta, it is still one of the largest painted rock temple complexes in the South and Southeast Asian regions and one of the most important centers of Buddhist pilgrimage in Sri Lanka. Set in a rich, multiperiod archaeological landscape, Dambulla is also an extremely complex archaeological and historical site, a palimpsest reflecting successive periods of human occupation, with a history that extends from prehistoric to modern times.

The Site

Geologically, the site consists of two great rock outcrops, or inselbergs, roughly dome shaped, surrounded by boulder-strewn hill slopes, not unlike the more famous site of Sigiriya just 16 km away. The topography, natural resources, and extraordinary beauty of the site, with its massive rocks interspersed with deeply forested tracts, have made Dambulla an important focus of human activity throughout various historical periods. A map of the area today is shown in Figure 1.

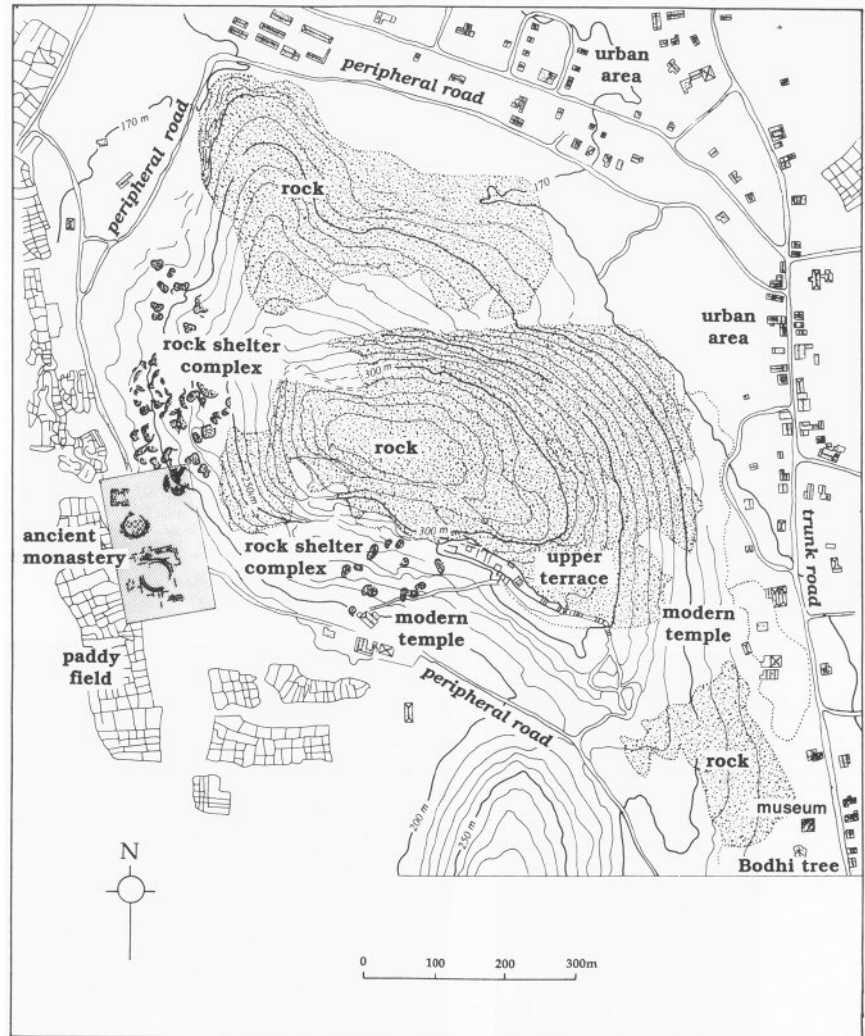
Along the western slopes of the Dambulla rock are a series of large boulders, terraces, and caves that formed the habitat of prehistoric humans. Excavations have yielded remains of prehistoric stone implements, displaced from the rock shelters when they were cleaned out in early historic times. These remains indicate a process of successive waves of human activity at the site, created when one historical period overtakes another, leaving some signs or remains of its predecessors behind.

From Prehistory to History

Prehistoric peoples were succeeded by the first settlers and farmers in the first millennium B.C.E. Dambulla is surrounded by a number of megalithic cemeteries and early historic settlements, the best known of which is Ibbankatuva, which are closely linked with the Dambulla complex. It seems likely that these hinterland farming settlements, such as

Figure 1

Map of Dambulla showing the rock shelter complexes, the ancient monastery, and the modern town and road system.



Ibbankatuva, formed the social and economic base that sustained the early Buddhist monastery at Dambulla (Bandaranayake 1988).

Some time during the third century B.C.E., the western and southern rock face and the surrounding boulder area became the location of one of the largest early Buddhist monastic settlements on the island. The area from the upper terrace downward contains eighty rock shelter residences.

The uppermost group of rock shelters on the southern face of the Dambulla rock continued into the subsequent historical period as the ritual and artistic center of the Dambulla complex (Figs. 2, 3). This upper terrace seems to have been in continuous occupation for more than twenty-two centuries, up to the present day.

The central shrines of the Dambulla complex were formed out of a deep cavern—part natural, part excavated—more than halfway up the western slope of the rock. Screen walls and partitions have created a number of separate chambers, or *viharas*, five of which are in use today (Fig. 4).

During the middle historic period (ca. fifth to thirteenth century C.E.), Dambulla continued to develop as a major religious center. An

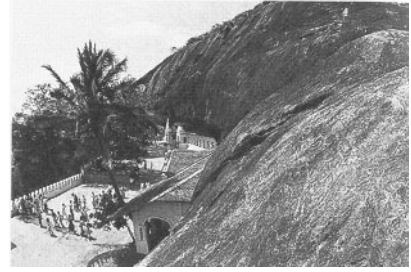
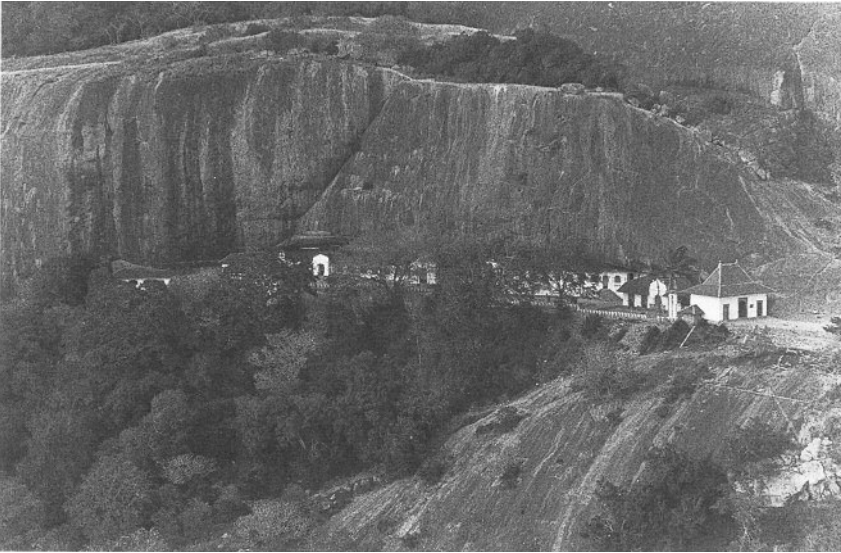


Figure 2
The Dambulla rock temple complex, upper terrace.

Figure 3
The upper terrace, shown with visitors.

important development was the expansion of the temple into an elaborate, freestanding architectural complex at the foot of the rock in the southwestern sector. The upper terrace temples were refurbished at the end of the twelfth century and again in the reign of King Senarat (1604–35), before their complete restoration and repainting during the eighteenth-century Buddhist revival under King Kirti Sri Rajasinha (1747–82) (Bandaranayake 1986). This great eighteenth-century painting cycle remains substantially preserved today, with some additions made in the early nineteenth, mid-nineteenth, and early twentieth centuries.

Sri Lankan Rock Temples

Dambulla as it exists today is one of the best preserved of more than one hundred painted and sculpted rock temples in Sri Lanka (Figs. 5–8). These temples have their origins in a series of early Buddhist rock shelter monasteries. Dating from the period between the third and the first century B.C.E., and distributed throughout the length and breadth of the country, these monasteries are of a specific Sri Lankan type. Located among

Figure 4
The Dambulla rock temple complex, site plan of the viharas on the upper terrace.

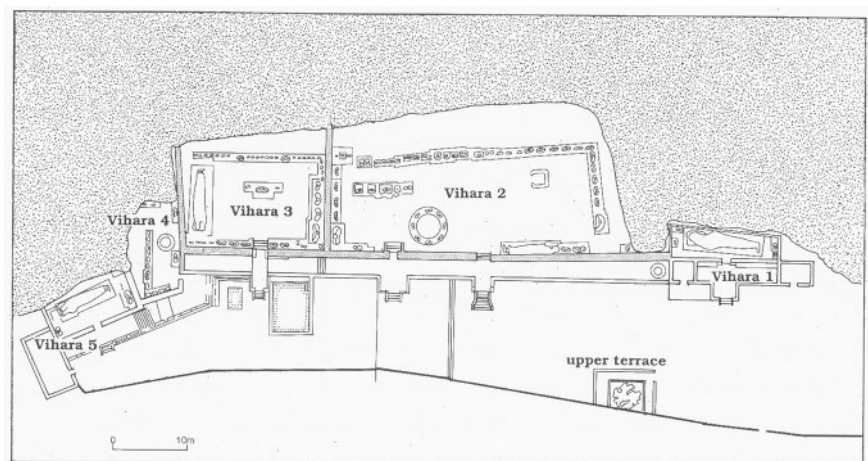


Figure 5, near right

The interior of Vihara 2. The large central panel on the rock ceiling depicts the Buddha's first sermon in the deer park at Isipatana, surrounded by a Thousand Buddha sequence.

Figure 6, far right

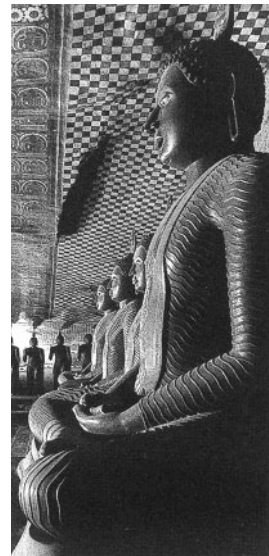
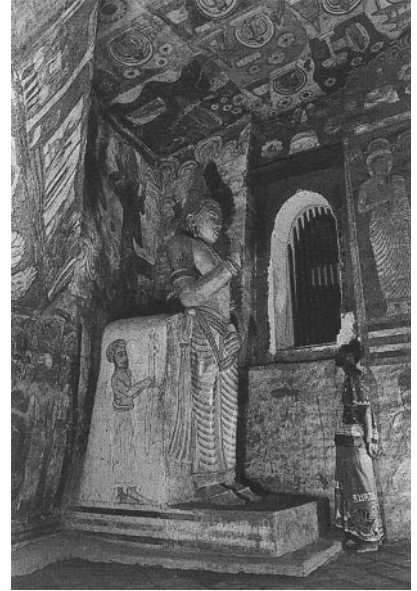
Polychrome sculpture and painted walls and ceiling in Vihara 2.

Figure 7, below

Painted rock ceiling of the "ambulatory" of Vihara 2.

Figure 8, below right

Polychrome sculpture and painted rock ceiling of Vihara 2.



boulders on mountain slopes, they consist of clusters of artificially deepened natural shelters with screen walls, lean-to roofs, and deep drip ledges cut into the rock face just above the roofline. A distinctive feature of many of these monasteries is inscriptions carved below the drip ledge. Originally fashioned as residences for communities of Buddhist monks, the monasteries were subsequently developed into elaborate architectural complexes with rock temples, boulder gardens, and freestanding monuments.

A pan-Asian architectural genre

The Sri Lankan rock shelter monasteries are among the earliest examples of a distinctively Asian type of rock-associated religious monument—more than 80% of them Buddhist in origin—whose evolution and typology have

been studied very little from a comparative, pan-regional perspective. In India alone, there are about twelve hundred rock-cut sites, some of which—like Dambulla—have more than fifty individual rock shelter or grotto units.

Although these various rock temple sites belong to a broadly similar genre, there is considerable typological variety and differentiation between them. Present conditions and the problems of conservation and management probably vary more widely than those involved have even begun to realize.

Basic problems

The basic problems relating to rock temple sites in Asia are the very large number of sites that exist—many in places difficult to access—the inadequate knowledge of these sites, and resource inadequacies. As far as many countries in the Asian region are concerned, “resource inadequacies” involve at least seven major factors:

1. Survey and research; i.e., inadequate overall survey, documentation, registration, and mapping of sites; and an even greater inadequacy of research
2. Policy prioritization, including recognition of the importance of even “unimportant” sites
3. Appropriate institutional formation and development
4. Human resources: scientific leadership and technical, research, and managerial personnel
5. Infrastructure
6. Funding, especially sustainable and continuing funding, particularly with regard to tenured or self-sustaining employment possibilities and regular material supplies
7. Continued training and retraining of personnel and upgrading of investigative and conservation technology and equipment

In formulating the management policy and structure of the Dambulla Cultural Triangle Project, which began in 1982 and was scheduled for completion in 1996, every attempt has been made to address these general issues as much as to the specific problems of site management, research, and conservation.

The Cultural Triangle Project

The Cultural Triangle Project in Sri Lanka is a joint Unesco–Sri Lankan program, involving the investigation, conservation, presentation, and management of five of Sri Lanka’s seven World Heritage Sites. The following discussion highlights some of the program’s main features in terms of the general issues listed.

The most distinctive feature of the Cultural Triangle Project is that it involves, in the Sri Lankan context, an entirely new type of institutional arrangement, which brings together government administrators and

technical experts, university specialists, and private architectural consultants working in association with the temple authorities.

Thus, three or four groups cooperate, while each retains its own authority. This makes for a complex and polycentric institutional structure, whose advantages are (1) the release of a large number of creative energies in the formulation of policy and the implementation of various aspects of the project, and (2) the safeguards provided by a multiplicity of viewpoints in an area of activity where there can be irreversible consequences.

An annual review by a joint Unesco–Sri Lankan Working Group monitors the progress and development of the project. By this mechanism and the participation of international specialists from time to time, the project is able to measure internal standards against international norms where national expertise or resources are inadequate.

Equally important aspects are university-based and internationally collaborative research and training programs, which use the project and the surrounding area as a laboratory and a field school for developing studies of the total archaeological landscape and for the conservation of murals.

Contemporary Dambulla is an urban center with modern services and communications that give the project a good infrastructural base. A major shortcoming is an adequately equipped conservation laboratory, but this is part of a wider situation that is being currently addressed at a national level.

Restorationist traditions and religious requirements

As Dambulla is a living site, the conservation and management of change involves addressing long-standing restorationist traditions of periodic refurbishing (as acts of piety or repair) and changing religious requirements. In Sri Lanka, as in many other cultures, it is traditional to renew wall paintings, as well as to refurbish and add architectural and sculptural elements according to changing religious requirements, artistic fashions, and availability of resources. This process has gone on at Dambulla over several centuries; but, significantly, major changes had not taken place since the 1930s.

In fact, in recent decades the temple authorities at Dambulla—unlike at many other ancient Sri Lankan sites—have upheld a modern conservationist ethic. They argue very forcibly that the preservation of the present character of the site is entirely a result of their millennia-long guardianship of Dambulla. Also, they have readily accepted the heritage management plan of the Cultural Triangle Project and form the critical factor in its implementation.

One specific example is the outcome of a long debate among the project authorities on whether to remove the modern veranda facade at Dambulla and replace it with a wooden colonnade in an eighteenth- to nineteenth-century style, on the basis of somewhat inadequate early photographic documentation. The temple authorities themselves provided the clinching argument that the existing facade at Dambulla was part of the

history and contemporary image of the monument and, as such, should be preserved in its existing form. It can be said that Dambulla, as it appears today, is exemplary as one of the major religious sites in Sri Lanka that has not suffered uncontrolled modernization, vulgarization, or change. This is a result of the interaction between the resources and sensitivity of the Cultural Triangle Project's conservation program and the temple authorities who have supported and participated in it.

Above all, the standpoint and advocacy of the temple authorities has been the vital factor in deciding that the murals at Dambulla, however badly damaged, should be conserved in keeping with modern conservationist principles, rather than with the traditional process still observed at a number of temples where ancient murals are retouched or repainted to make them presentable and readable.

Conservation Strategy

The basic conservation strategy at Dambulla has been to tidy up and maintain the site as it existed at the beginning of the project, while at the same time reorganizing its service infrastructure and presentation.

On the upper terrace and along the main approach, unsightly accretions have been removed, traditional hand-cut stone paving replenished, and an improved water supply and a modern but discreet lighting system installed. At the base of the rock, the bazaar area around an ancient, sacred bodhi tree has been relocated and the tree shrine restored in the form of simple but classical stone-and-sand terraces. In the southwestern sector, excavations have been carried out in the ancient rock-shelter complex and freestanding monastery, and the plain and multiperiod brick structures of the monastery have been conserved. The modern temples along the main trunk road, on the boundary of the protection zone, have been brought into the conservation and layout plan. New religious buildings and a museum to house copies of paintings and archaeological artifacts have also been located here, and plans are under way for off-site parking and a service and shopping precinct.

Mural conservation

The major portion of the conservation program at Dambulla is focused on its murals. By comparison, the murals at Dambulla are much more recent and less extensive than those at Ajanta, and they cover less than one-tenth of the painted area of those at Dunhuang, but they are still one of the largest preserved groups of late-period rock and wall paintings in the South Asian region outside the Himalayan zone. The murals belong to a pan-regional tradition that extends across South and Southeast Asia, especially in Southern India, Sri Lanka, Burma, and Thailand. Dambulla is undoubtedly one of the finest and most impressive expressions of this tradition.

The paintings, which are inside the five main rock temples, belong almost entirely to the post-classic Central Kandyan school of the late eighteenth century. This school of painting derives its name from the city

of Kandy, capital of the last Sri Lankan kingdom of the seventeenth to nineteenth centuries, now also a Unesco World Heritage Site. Fragments of much earlier painting are found just below the drip ledge, outside the present facade, while the presence of an earlier layer of painting below the present painted surface is seen in a few areas and still awaits detailed investigation.

The eighteenth-century murals form the most important artistic heritage of Dambulla. They constitute more than 80% of the surviving paintings, about three-quarters of which are in an excellent state of preservation, covering an area of approximately 3,044 m², incorporating the five shrines. The largest of the shrines is Vihara 2 (Figs. 5–8)—an elaborate complex of paintings, sculpture, and architecture and one of the most ambitious undertakings of the Kandyan artists. Vihara 3 is the next in size and retains its eighteenth-century character. Each of the three smaller shrines (Viharas 1, 4, and 5) has been substantially retouched or repainted or, as in the case of Vihara 1, is in a poor state of preservation.

The paintings consist of mineral and organic pigments¹ laid on top of kaolin (a word derived from “Kao-ling,” a hill in Jiangxi Province in southeast China, where this fine white clay was originally obtained), the paint-receiving layer. The kaolin is laid on a mud-plaster ground applied to the rock or wall surface. The mud plaster has organic admixtures and a plant-gum glue, probably derived from the sap of the wood apple (*Feronia elephantum*) (Weerasinghe 1987).

The major conservation problems at Dambulla (Fig. 9) are:

1. Deterioration of the pigmented surface and the plaster, evidenced by the detachment of the plaster from the rock surface and of the paint layer from the plaster, and the flaking and powdering of both these elements—damage probably caused by expansion and contraction due to thermal and humidity

Figure 9

Conservation problems: detachment, water seepage, salt efflorescence, biological growths, insect damage, and darkening of the surface by soot from oil lamps.



variations in addition to “material fatigue” factors, which are poorly understood

2. Water seepage through the rock ceiling (treated in some areas over the centuries by the painters themselves who painted non-ionic scenes, such as fish in water and floral awnings, which could be easily retouched or repainted), resulting in salt efflorescence on the surface
3. Biological growths and biodeterioration, caused mainly by fungi and encouraged by the humid conditions and the high sugar, or carbohydrate, content of the binding medium
4. Insect damage in the form of nest building on the painted surface or by penetration into the plaster
5. Human damage caused by devotees and visitors touching the painted surface or by soot from oil lamps (the lamps are no longer a problem, but the damage still needs rectification)

One of the major problems for conservation of the site, not just at Dambulla but on a national scale, is inadequacy in four general areas: skilled human resources, institutional frameworks, policy prioritization, and resource allocation. These factors are all necessary in dealing with mural and polychrome sculpture conservation programs in a situation where there are, in a preliminary listing, more than 650 freestanding and rock temples with paintings in need of conservation.

Early mural conservation measures that had been taken at Dambulla in the pre-1983 period, since about the 1960s, mainly involved (1) cleaning with a xylene and ammonia solution in water, (2) application of a protective coating of polyvinyl-acetate emulsion, and (3) removal of insect nests. The basic strategy of the present Cultural Triangle Project’s mural conservation program has been to emphasize investigation, protective conservation, and urgent remedial measures rather than cleaning or reintegration. The work undertaken can be summarized as follows:

1. Investigation: detailed graphic documentation of present condition; environmental monitoring; research (still underway and not conclusive) into plasters, pigments, biological growths, and insect varieties and behavior; monitoring of water seepage through the rock ceiling
2. Protective conservation: early steps to prevent the use of oil lamps inside the shrines; humidity control by improved ventilation measures; attachment of door screens made of netting to inhibit insect entry; measures to deflect water seepage where possible
3. Remedial intervention: consolidation of plaster and paint layer by the application of adhesives and consolidants—mainly, the acrylic emulsion Primal AC33 to fix the plaster support to the rock surface, and Paraloid B72 as a consolidant; removal of insect nests; vacuum cleaning of dust, especially on horizontal surfaces of statues; removal of old polyvinyl-acetate coating

4. Cleaning and reintegration: very little cleaning and reintegration has been undertaken, as it was felt that this was not an urgent measure, and there is no attempt at this stage to fully reintegrate the painted area
5. Training and human resource development: since its inception, the project has paid special attention to training and upgrading and to the development of institutional measures to remedy the national shortage of scientific workers at all levels, especially by combining the training program with project implementation
6. Copying: a copying program, in which the entire complex of paintings is being copied on canvas, is nearly complete and will be displayed and archived in the museum for information and study. The copies are not reconstructions; rather, they document the murals in their actual condition at the present time

Sculpture

Dambulla also has an extremely rich collection of sculpture, both rock-cut and molded in clay and plaster (Figs. 6, 8). This consists largely of iconic representations of the Buddha, rarely bodhisattvas and gods, and three rare portrait sculptures. The statues have a kaolin or lime-plaster finish and pigment. They are basically in a fairly stable condition and have almost inevitably been repainted in relatively recent times. Other than regular maintenance and cleaning, they cause no great problems of conservation.

Note

- 1 The principal mineral pigments are red cinnabar (mercury sulfide, HgS) and orpiment (arsenic trisulfide, As₂S₃) or realgar (arsenic sulfide, As₂S₂), which give red and yellow pigments, respectively. The blue is thought to be derived from the blue indigo dye obtained from species of *Indigofera*, chiefly *I. arrecta*, *I. sumatrana*, or *I. tinctoria*. Yellow is mostly obtained from gamboge, the latex extracted from the bark of *Garcinia morella*. Black is from lamp black, often derived from burning cotton rags or from the sap of the jackfruit (*Artocarpus integrifolia*).

References

- Bandaranayake, S.
1986 *The Rock and Wall Paintings of Sri Lanka*. Colombo, Sri Lanka: Lake House.
- 1988 Approaches to the settlement archaeology of the Sigiriya-Dambulla region. In *The Settlement Archaeology of the Sigiriya-Dambulla region*, ed. S. Bandaranayake, M. Mogren, and S. Epiwatte. Colombo, Sri Lanka: Postgraduate Institute of Archaeology.
- Weerasinghe, J.
1987 Materials and techniques in Sri Lankan paintings. Paper presented at the second SAARC Archaeological Congress, Colombo, Sri Lanka.

Site-Management Lessons from Canyon de Chelly, Lascaux, Sigiriya, and Bamian

Jeffrey W. Cody

WHEN PLANNING for effective conservation of grotto sites, such as the Mogao grottoes at Dunhuang, China's regional authorities and the State Bureau of Cultural Relics might consider some of the site-management practices adopted by other countries to protect their historic grottoes. This article will outline four of those lessons: (1) exercise caution with regard to premature public access; (2) balance local site control with central government assistance; (3) monitor environmental conditions frequently; and (4) be cautious about any conservation intervention.

These lessons are suggested by the management of four widely dispersed grottoes. Nearest to China are the Buddhist sites of Bamian, an area of intense Mahayana monasticism from the third to the eighth century C.E. in northern Afghanistan; and Sigiriya, a Theravada site from the fifth century C.E. in central Sri Lanka. The planning associated with the Paleolithic cave of Lascaux near Montignac in southwestern France and Canyon de Chelly, a U.S. National Monument in Arizona, also has relevant implications. The underlying argument is that historic grotto sites require not only conventional site management but also more specialized monitoring because of their inherent physical conditions, their often remote geographic locations, and the intense tourist-economic implications associated with the uniqueness of grotto sites.

One area exemplifying this uniqueness and remoteness is Bamian (near Shahidan), Afghanistan, 130 km northwest of Kabul and 2,600 m above sea level in a narrow valley at the foot of the Hindu Kush Mountains. Chinese explorers Faxian in the fifth century C.E. and Xuanzang in the seventh century wrote about Bamian as both a commercial and religious center, a site that reflected Buddhism's expanding appeal throughout Central Asia, noted as early as the first century (Grousset 1971). By the seventh century, Bamian had ten Hinayana monasteries whose monks, since at least the third century, had excavated and painted scores of grottoes in the hillsides for monastic cells (Hackin and Carl 1933; Tarzi 1977). Most of these caves have been destroyed, some by Islamic marauders in the eighth century, others by Genghis Khan in the early thirteenth century, and still others by

Afghan rebels as recently as the early 1980s (“Vasari” Diary 1981:14). Before the more recent turmoil in Afghanistan, the most compelling monuments in the region for tourists were the two standing Buddhas, one 53 m and the other 37 m in height, carved into the valley’s cliffs. Xuanzang related how impressive these were when they were gilded over a chalky plaster, a covering that has since entirely eroded (Grousset 1971:82).

Bamian’s grottoes share a cultural affinity with the Mogao grottoes near Dunhuang. The two sites’ similarity regarding tourism also merits consideration. The Royal Afghan Government constructed a small tourist center at Bamian in the mid-1970s after a team of conservators from India assisted in the site’s consolidation (Sengupta 1971). The encouragement the Afghan government implicitly provided to tourists to visit Bamian at a time when tourism was at a peak in Afghanistan demonstrates a first site-management example: to be cautious about attracting tourists if the site will suffer because tourist visits are not supervised properly. In Bamian, the government accommodated tourists, on the one hand, by building a small visitor center and by permitting locals to open guest houses; while, on the other hand, it insufficiently protected the site from tourists, who were allowed for a fee to explore at will and, all too often in the 1970s, to hunt for souvenirs. Even before the civil strife that began in the 1980s, there was no on-site interpretation to help visitors truly understand the site they were experiencing.

Bamian also provides a second lesson: the need to facilitate communication between national and provincial decision makers (including military forces), all of whom ideally should collaborate regarding conservation policies and enforcement. From the late 1970s to the present, Bamian has suffered from military conflicts because the grottoes have been used as places of refuge and have been in the line of fire.¹ Occupation of the Mogao grottoes by Russian soldiers early in the twentieth century is a reminder that, despite geographic isolation, historic grotto sites sometimes unpredictably fall prey to military use. Furthermore, the actions of those wielding power over cultural property at the local level, such as those granting building permits for Bamian guest houses in the mid-1970s, sometimes contradict the intentions of those making decisions at the national level, such as the officials who decided in Kabul in 1969 to cooperate with Indian conservation experts.

Sigiriya, near the archaeological sites of Anuradhapura and Polonnaruwa in the so-called cultural triangle of north-central Sri Lanka, is a site that corroborates another of Bamian’s site-management lessons: Be cautious about attracting too many tourists too soon. Rising 200 m above a lush plain, Sigiriya is a steep mound with a summit covering 1.6 ha, where King Kassapa constructed a fortress palace in 477 C.E., from which he ruled for seventeen years. During that period, the king ordered that Buddhist figures, or *apsaras*—some patterned after contemporary Gupta murals in Ajanta (India)—be painted in shallow niches created by overhangs below the summit (Paranavitana 1961). Of the several hundred *apsaras* that once filled these tempera paintings, only twenty-two survive.² The *apsaras* are somewhat protected from atmospheric damage because of the overhangs

and from human contact because they are out of reach; the frescoes remain largely in the open air and thus are susceptible to damage from humidity and vandalism. The most significant act of vandalism occurred in mid-October 1967 (Udalagama 1970), when vandals climbed halfway up the rock, daubed green commercial paint on several of the wall paintings, scratched out portions of two figures, and stabbed a third panel with a pointed instrument.

At Sigiriya, although there is no tourist center and only a few interpretive signs, the central government has taken measures to bring tourists close to the monument. Furthermore, hundreds of local religious devotees visit the site regularly on certain days according to the lunar calendar. Brick steps have been constructed near massive sculptures of lions' feet at the base of the mound, stone steps have been created by chiseling into the mound, and metal walkways have been attached to ledges to allow for closer access to both the rock paintings and the summit. While these additions have facilitated visits for tourists (despite no guardrails at the summit), they have brought so many tourists so close that the site has suffered, as can be seen in weakened, rusting metal steps and railings.

If Sigiriya's lesson for Mogao is to be wary of too much tourism too soon, then the question raised by the experiences at both Sigiriya and Bamian is how one can shut off the tourist faucet once it has been turned on. The Mogao grottoes' administrators should not look to any one particular case for an answer to this question. However, what has occurred at two other sites provides some insight about how to consider the question. Although geographically removed from the Asian context, Lascaux and Canyon de Chelly yield lessons that resonate for Mogao because of their longer track records as grotto sites of international historic significance.

Discovered in 1940, the multichambered cave of Lascaux contains some of the most memorable examples of European Paleolithic art (10,000–20,000 B.P.). The site is one of approximately 140 such grottoes in France and one of 280 European prehistoric grottoes (Leroi-Gourhan 1979). Lascaux was open to the public until 1963, when deterioration was deemed so severe that the site was closed to tourists (Froidevaux 1955; [Daniel?] 1963). The French Ministry of Culture decided to stabilize the grotto's climate and then to continue to monitor that stability, and to restrict access to similarly threatened sites such as Les Eyzies-de-Tayac-Sireuil (Aquitaine).

To mitigate public outcry, the Ministry then decided to reproduce significant portions of the rock arts (Faux Lascaux 1972). The reproductions were housed nearby in a special center, affording visitors a vicarious pleasure in an appropriate context (Delluc and Delluc 1984). The success of this approach has led to similar ventures in Germany and Japan (Ministère de la Culture et Conseil Général de la Dordogne 1990:41). In taking these measures, the French Ministry demonstrated a recognition that it had erred in allowing too much tourism too soon. To remedy this mistake, the national government allocated resources, communicated with provincial and local councils, and responded effectively to tourist needs. The rationale of the French Ministry to put a premium on site conserva-

tion by climatic control at the expense of universal public access is a site-management lesson that Mogao administrators are heeding: the new tourist center at Mogao opened in 1994 and features reproductions of some of the Mogao grotto paintings. However, one of the ironies of Lascaux is that by protecting the site, the government has mummified it. This action, then, calls into question the logic of accepting Lascaux as the ideal model for grotto site management.

Finally, the management of the Canyon de Chelly National Monument in northeastern Arizona not only confirms the lessons indicated by the previous three cases but also underscores other lesson, particularly from a policy point of view. Canyon de Chelly National Monument, established in 1931 on the Navajo Reservation and Trust Lands, comprises three steep-walled sandstone canyons. More than one thousand rock art sites are included within the monument's boundaries, most of them from the Anasazi culture of 700–1300 C.E. (U.S. Department of the Interior 1989). The Navajo Nation practices traditional activities—such as grazing livestock, farming, and hunting within the monument area; access to the site for non-Navajos is normally limited to the White House Ruins trail. In the past decade, several unresolved issues have illustrated that despite more than sixty years of site “protection” site management at Canyon de Chelly is far from ideal. Four salient issues, as they relate to the Mogao grottoes, are the following:

First, how should the protection of the historical ruins be reconciled with the interpretation of the ways of life of the Navajo today? Resolution of this question would imply significant changes to the visitor center and relevant interpretive programs. Of relevance to Mogao might be first to consider how the Buddhist nature of the site relates to ethnic minorities living in Gansu Province today, and then to interpret those relationships for visitors with appropriate signage and written information in several languages.

A second significant issue at Canyon de Chelly is how to better define and enforce the vaguely articulated boundaries of the monument. To resolve this would imply the allocation of more government staff and resources in a time of budgetary reductions. In light of this problem, Mogao's managers today might well consider the issue of site boundary carefully because of what it implies for future managers who will inherit today's definitions.

Third, administrators at Canyon de Chelly are asking how to prevent damage to the site from heightened commercial and residential development. Despite the remoteness of the monument when it was established, only six decades later the area is coveted by private companies for its raw materials and by tourists for its pristine location. Mogao policy makers might heed this lesson as well, especially in the context of current provincial disputes about illegal dumping of toxic wastes (Yeung 1993).

Finally, Canyon de Chelly administrators are considering the question of how to avoid overlapping jurisdictions among the National Park Service, the Bureau of Indian Affairs, and the Navajo Nation. Too much inaction, duplication of effort, and misunderstanding have resulted from

not knowing who should decide questions regarding land use, trespassing, vandalism, and site conservation. Although Mogao's administrators might be relieved to hear that the United States, too, has serious problems regarding one work unit's control over another unit's actions, the lesson is that the site ultimately suffers unless questions of jurisdiction are resolved early and, in an ideal sense, amicably and comprehensively.

What, then, are the four crucial site-management lessons suggested by Bamian, Sigiriya, Lascaux, and Canyon de Chelly?

1. Don't be seduced by the economic benefits of tourism by allowing access too soon. All of the sites outlined above have had to modify their policies regarding human contact with their grotto sites. Careful planning now will save money, and better protect the site, for the future. Prepare for the unpredictable. Provide more interpretive material for tourists, rather than less, respecting their desire to understand the site even if they are not permitted universal access.
2. Balance local site control with central government assistance, specifically determining who will handle each issue. Bamian illustrates that the scale is tipping toward localism; Canyon de Chelly shows what can occur when too much jurisdiction is exercised by overlapping national agencies; Lascaux demonstrates an attempt at finding a middle ground.
3. Monitor the grottoes' physical condition as often as feasible, and correct problems as soon as possible. Today's solutions (allowing visitors in Lascaux, or constructing metal stairways in Sigiriya) might well become tomorrow's problems.
4. Because each grotto site is unique, each solution requires careful study before intervention. Because there is no single model to follow, there is a need to be flexible and vigilant. Based on the consideration of site-management lessons gleaned from four sites on three continents, Chinese administrators should strive for careful site management with distinctive Chinese characteristics. What are those characteristics? That is for the Chinese to decide.

Notes

- 1 In the fall of 1993, an unnamed cultural affairs officer at the Embassy of Afghanistan in Washington, D.C., verified that Bamian had suffered an unspecified amount of damage from military activities. Because of "more pressing social needs," he said, no comprehensive survey of the damage has been conducted. For an earlier indication of damage to Afghan historic sites during the recent civil turmoil, see "The 'Vasari' Diary" 1981:14.
- 2 As reported by Udalagama (1970), Khan Ullah, an Indian chemist, determined in the early 1950s that the tempera paintings had originally been applied to a trilayered surface consisting of (1) a plaster of liver-red alluvium, vegetable fiber, and rice husk on the rock surface; (2) a composition of sand, clay, lime, and vegetable fiber; and (3) a sand and lime mortar.

References

- [Daniel, Glyn?]
1963 Editorial. *Antiquity* 37 (September):172–73.
- Delluc, B., and G. Delluc
1984 Lascaux II: A faithful copy. *Antiquity* 58 (November):194–96.
- Faux Lascaux pour les touristes, Un
1972 *Connaissance des Arts* 244 (June):11.
- Froidevaux, Yves-Marie
1955 Aménagement des grottes de Lascaux. *Monuments Historiques de la France* 1 (July–September):97–105.
- Grousset, René
1971 *In the footsteps of the Buddha*. Translated from the French by J. A. Underwood. New York: Grossman.
- Hackin, Joseph, and Jean Carl
1933 Nouvelles recherches archéologiques à Bamiyan. In *Mémoires de la délégation archéologique française en Afghanistan* 3. Paris: G. van Oest.
- Leroi-Gourhan, A.
1979 *Lascaux inconnu*. Paris: Centre Nationale de Recherche Scientifique.
- Ministère de la Culture et Conseil Général de la Dordogne
1990 *Archéologie des Grottes Ornées*. Montignac: Ministère de la Culture et Conseil Général de la Dordogne.
- Paranavitana, Senerat
1961 Significance of the paintings of Sigiri. *Artibus Asiae* 24 (March):382–87.
- Sengupta, R.
1971 The preservation work. *Marg: A Magazine of the Arts* 24 (March):44.
- Tarzi, Zmaryalai
1977 *L'Architecture et le décor rupestre des grottes de Bamian* (Paris: Imprimerie Nationale).
- Udalagama, D. B.
1970 Cloud Damsels of Sigiriya rescued. *Art News* 69 (Summer):32–33.
- U.S. Department of the Interior
1989 *Joint Management Plan for the Canyon de Chelly National Monument*. Washington, D.C.: National Park Service, Bureau of Indian Affairs, and Navajo Nation.
- “Vasari” Diary, The
1981 Are Afghanistan’s treasures safe? *Art News* 80 (Summer):14–15.
- Yeung, Chris
1993 Workers riot over dumping of waste. *South China Morning Post* (September 27):1.

The Role of Documentation in Defining Conservation Strategies at Grotto Sites

Stephen Rickerby

THE FIRST and most important step in the conservation of any cultural site is to collect and analyze information about its physical history and present condition. Documentation plays a critical role as a tool for decision making, particularly in relation to the often insurmountable deterioration problems that affect cultural sites. Confronted by these threats, the limitations of many physical conservation interventions are apparent, though often only after ineffective interventions have been made. The main aim of documentation should be to provide information that can forestall such mistaken interventions in the future by identifying, if possible, exact sequences and rates of decay over time, thus helping to establish what can and cannot be safely treated in the long term.

Documentation Strategies

Defining appropriate conservation strategies with documentation as a basis was the focus of a two-week training course, "The Management of Grotto Sites," held at the Yungang grottoes in Shanxi Province in October 1992, organized by the Getty Conservation Institute with the State Bureau of Cultural Relics of the People's Republic of China. The course was organized around a step-by-step planning process to introduce the principles and practices of systematic site management to a group of site managers, conservators, conservation scientists, and other specialists from grotto sites all over China.¹

Advances in science and technology are currently being applied to the preservation of China's grotto sites at an unprecedented rate. The situation was somewhat different in 1983, when Luo Zhewen of the State Bureau of Cultural Relics summarized the problems facing such sites:

In tackling the destructive factors of nature, such as the wind and rain, sunshine, moisture, lightning and thunder, earthquakes, insects, micro-organisms and so on, which keep on corroding and damaging historical relics by weathering stone carvings, discolouring mural paintings and deteriorating organic materials . . . we need advanced science and technology. However, many

technical problems have not yet been solved, and demand our further efforts in this area (Bourke et al. 1983:45).

The scientific and technical advances now available are to be welcomed, but the direction in which conservation endeavors can be pushed by such developments should also be questioned. The recent history of site conservation in the West is replete with interventions motivated by the intention to arrest decay permanently; this has proved a challenging task indeed, often with disastrous consequences. An example was the widespread policy of detaching wall paintings from their cultural sites in order to preserve them in museum environments. Such interventions have irrevocably altered the original sites of these paintings and inflicted massive damage on the paintings themselves; in many cases, deterioration has only been hastened in the museum environment.² With hindsight, it is possible to say that better prior documentation could have led to better-informed strategy decisions and reduced the likelihood of such catastrophic interventions.

In current practice, however, documentation acquired by scientific investigation is put to many uses, both beneficial and otherwise. Analysis is used advantageously, for example, to increase the scant knowledge of original materials and techniques employed in the construction and decoration of grotto sites. Such information is of value in its own right yet can also have conservation implications. At Yungang, for example, a recent investigation of the sculptural polychromy of Cave 6 has highlighted the deterioration of lead-containing pigments as a factor that affects the preservation of the site (see Piqué herein). Rarely, however, is such documentation actually used to prevent or restrain inappropriate interventions. Typically, treatment is considered an unavoidable choice at threatened cultural sites, a predetermined course of action that is reinforced by acceptable prior documentation—"acceptable" in this context meaning documentation that is selected to justify an intervention.

The reasons for this prevailing scenario are partly understandable, though in the long term hardly justified. Certainly, cultural sites such as grottoes are faced with major problems of decay. At Yungang, for example, exposure to harsh environmental conditions has exacted a relentless toll on the sandstone rock. Situated in one of the largest coal-producing areas in China, the Yungang grottoes is subject to airborne pollution that has in modern times exacerbated deterioration; an estimated two thousand uncovered coal trucks pass along the main highway in front of the site daily (see Christoforou et al. herein). Cultural sites worldwide are affected by problems of similar severity, to which may be added a newer range of threats in recent years associated with mass tourism. At the Longmen grottoes in Henan Province, for example, visitors now number more than a million per year, of whom some fifty thousand are foreigners; the record for a single day was seventy thousand, when the pressure on the site approached intolerable limits.³

Confronted by such problems, managers and others responsible for the protection of cultural sites find themselves under intense pressure

to take action in the form of physical interventions. In many cases, this is supported by copious data from prior documentation processes. Cultural sites of international renown are the subject of repeated investigations and studies, often under the auspices of prestigious conservation organizations. A familiar refrain is that enough long-term documentation has been done and that the time to intervene is now, before these cultural monuments become little more than a memory.

But how accurate is this diagnosis? Without belittling the seriousness of many known problems affecting cultural sites, it is often the manner in which threats are perceived rather than a true assessment of their nature that becomes an impetus for conservation interventions. Frequently, too, these perceptions are motivated by external events that take little account of the individual circumstances of a particular site. An example is the introduction of legislation for preserving cultural monuments, which is typically matched by an upsurge in conservation interventions. No one would dispute the necessity of such legislation, but in providing the opportunity to intervene, this decision is too often made without regard for the real needs of a particular site.

What are the real needs of a threatened cultural site, and how should they be assessed? These questions were explored during the Yungang training course, when participants were asked to report on the condition of some of the more seriously deteriorated painted caves and to assess their current conservation needs. Basic condition surveys were made using photographs or baseline drawings superimposed with transparent sheets to record graphically the different categories of damage and decay. Exposed to severe weathering, the caves showed clear evidence of salt efflorescence and crust formation, rock splitting and exfoliation, and pigment loss; and the initial consensus of opinion was that they required urgent physical interventions to stem these manifestations of decay. In the case of one of the grottoes examined, historic photographs were compared with the cave's present condition. The course participants were surprised that decay had not progressed in any major visible form over a period of about twenty years; the one area of dramatic alteration was the clearing of the floor level, undertaken during a recent archaeological excavation, which had exposed more deteriorated portions of the rock walls.

These simple exercises highlighted the main assumptions and discrepancies in the way decay is frequently perceived by those who care for cultural sites. The *appearance* of decay is taken as proof of progressive or alarming deterioration demanding urgent attention. In turn, manifestations of decay are too easily linked to specific causes that in reality are complex and interrelated and that remain misunderstood, even as decisions are made to undertake major physical interventions. Whereas many forms of natural decay are insidious and gradual, human actions that we often imagine as beneficial—conservation interventions, archaeological excavations—can cause dramatic and sudden alterations of far greater impact to cultural sites. This neither suggests that environmental threats never have sudden consequences nor underestimates natural decay mechanisms. The effects of inexorable weathering are obvious at many grotto

sites in China, especially as seen in efforts made in the Ming and Qing dynasties, when attempts were made to restore eroded carvings with modeled mud plaster. But in assessing the present condition of a cultural site, all causes of change must be examined—including the conservator's own interventions and activities.

Conclusions

The comprehensive documentation of cultural sites is too often neglected in favor of other forms of immediate intervention. What is required is much more broad-based documentation, providing information on the earliest known physical condition of a cultural site and all subsequent alterations to its context, fabric, and other internal features. Achieving these goals is not difficult, though analysis of collected data is more complex. Information can be derived from many and varied sources: archaeological data, historical photographs, archival and conservation records, oral histories, et cetera. Combining this information with ongoing site documentation—photographic surveys, graphic condition reports, inventories, and other relevant materials—constitutes a comprehensive record that should be used as the basis of all decisions regarding site preservation.

Advances in science and technology also offer opportunities to enhance documentation and contribute to the improved diagnosis of problems of decay. An example is the development of computer-image processing and digital documentation, enabling accurate and quantifiable analyses of change and decay (Esposito and Vitolo 1989:347–58). Increasingly, conservation science should be applied to the study of sequences and rates of change over time, not just to current manifestations of decay and proposals to intervene in them.

Whether documentation is conducted by traditional methods, with the aid of modern technology, or a combination of both, it is essential that records are retrospective and ongoing. The importance of correlating information from current investigations with data from the physical history of a site cannot be underestimated. It is the only means of assessing whether decay is past, current, or progressive; avoiding repeating previous mistaken interventions; informing decisions regarding the need for maintenance rather than higher levels of intervention to limit future deterioration; and, if new interventions are necessary, providing a sound basis on which to make appropriate treatment decisions.

Acknowledgments

The author extends his thanks to Marta de la Torre, Training Program director at the Getty Conservation Institute, for the opportunity to teach the grotto site-management course at Yungang; to Margaret Mac Lean, now director of the Documentation Program at the Getty Conservation Institute, who, as senior training coordinator for the China course, provided much guidance on which this article draws; and to Sharon Sullivan, director of the Australian Heritage Commission, who co-taught the course and also imparted guidance in that task. Her experience and ideas contributed much to this article.

Notes

- 1 The training course was coordinated by Margaret Mac Lean, formerly Training Program senior coordinator at the Getty Conservation Institute and now director of the Documentation Program there. The instructors were Sharon Sullivan, director of the Australian Heritage Commission, and the present author. For a fuller discussion of the course curriculum, see Sullivan herein.
- 2 For a discussion of the detrimental effects of wall paintings detachment, see Torraca 1983:1–18.
- 3 Statistics supplied to the GCI Training Program by the Longmen grottoes site staff.

References

- Bourke, Max, Miles Lewis, and Bal Saini, eds.**
- 1983 *Protecting the Past for the Future. Proceedings of the Unesco Regional Conference on Historic Places, Sydney, 22–28 May 1983.* Canberra: Australian Government Publishing Service.
- Esposito, A., and S. Vitolo**
- 1989 "Techniche di "image processing" in archeologia e restauro architettonico: Applicazioni su sezioni sottili petrografiche. In *Il Cantere della Conoscenza: Il Cantiere del Restauro. Atti del Convegno di Studi, Bressanone, 27–30 Giugno 1989*, 347–58. Padua: Libreria Progetto Editore.
- Torraca, Giorgio**
- 1983 Environmental protection of mural paintings in caves. In *International Symposium on the Conservation and Restoration of Cultural Property, Conservation and Restoration of Mural Paintings 1, November 17–21, 1983, Tokyo, Japan*, 1–18. Tokyo: Tokyo National Research Institute of Cultural Properties.

Conservation Survey of the Tam Ting Caves

Benita Johnson



Figure 1
View of the limestone cliff housing the Tam Ting caves as viewed from across the Mekong River.

CONTAINING THOUSANDS of sculptures of the Buddha, the Tam Ting caves consist of two limestone caves, upper and lower, situated on the west bank of the Mekong River in the Lao People's Democratic Republic (Lao P.D.R.). Tam Ting is an active Buddhist shrine and also one of the nation's major attractions for both Lao and foreign visitors (Fig. 1). Unfortunately, however, a growing number of tourists to the site has dramatically increased the potential for damage to the caves and their sculptures. Theft and a lack of security, inappropriate past restorations, the growth of mold, and infestation by wood borers, termites, and bats have all contributed to the deterioration of the caves.

Following a survey of conservation needs in Southeast Asia in 1990, Andrew Durham, then head of conservation at the National Gallery of Australia, suggested that the caves warranted an extensive conservation project but cautioned that there would be practical, ethical, and logistic difficulties associated with it (Durham 1991:37). He envisaged the project as having several progressive stages, the first of which was completed in October 1992.¹ The objectives of Stage One were to

- identify and assess the nature of the site and its contents with particular reference to conservation and management parameters (including the range of artifact materials and techniques represented),
- survey the major physical features of the site and the spatial characteristics of its assemblages,
- outline the broad conservation and management issues,
- determine priorities for future conservation and project works, and
- provide a set of interim management recommendations.

Cultural Context

Religion

Today, approximately half of the population of Lao P.D.R. are Theravada (also known as Hinayana) Buddhists. Many sources state that Buddhism

was introduced to the region between the sixth and eighth centuries C.E.; there are grottoes in Lao that are thought to have been used as Buddhist shrines from the ninth to tenth centuries (Vistarini 1993). It is commonly believed that Buddhism reached Lao from India through Burma, Thailand, and Cambodia. Over the centuries, the religion has greatly influenced the values, customs, and behavior of the Lao people.

Prior to the introduction of Buddhism, animist beliefs and ancestor worship predominated. These beliefs, known as Phi, still survive among several of the ethnic hill tribes in northern Lao, as well as through myths and legends of present-day seasons and festivals. The practices of Phi are thought to have benignly coexisted with those of Buddhism until the sixteenth century, at which time Buddhism was declared the state religion in Lao by King Fa Ngum, the first monarch of Lan Xang.

Although officially banned, Phi still remains the dominant non-Buddhist belief in the country, frequently existing parallel to and/or in combination with Buddhism and Brahmanism. The Tam Ting caves illustrate this point, as the caves contain at least one Phi figure—a guardian figure in the upper cave (Fig. 2)—and several cast-cement Ramayana figures in the lower cave, in addition to the thousands of sculptures of the Buddha.

The Buddha sculptures

The focus of Lao traditional art has been religious; since the fourteenth century, it has been primarily Buddhist and heavily influenced by Thai culture and its artistic styles (Seckel 1968:62). The Tam Ting caves contain sculptures that stylistically represent Lao, Thai, and some Chinese forms, with differences in robe and headdress types, suggesting a chronology of styles. The sculptures range from larger than life-size statues to smaller than finger-length figurines (Fig. 3).

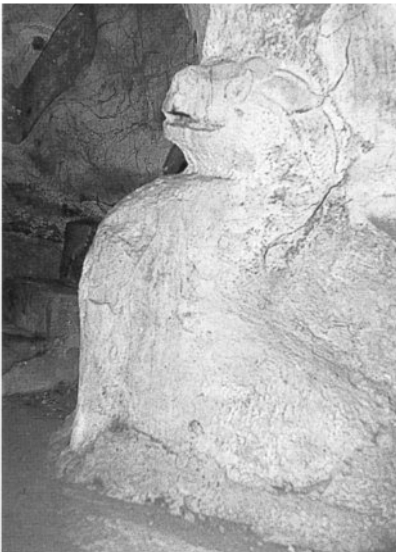


Figure 2
Guardian figure of the upper cave, unique in that it is the only sculptural form carved directly from the limestone bedrock.

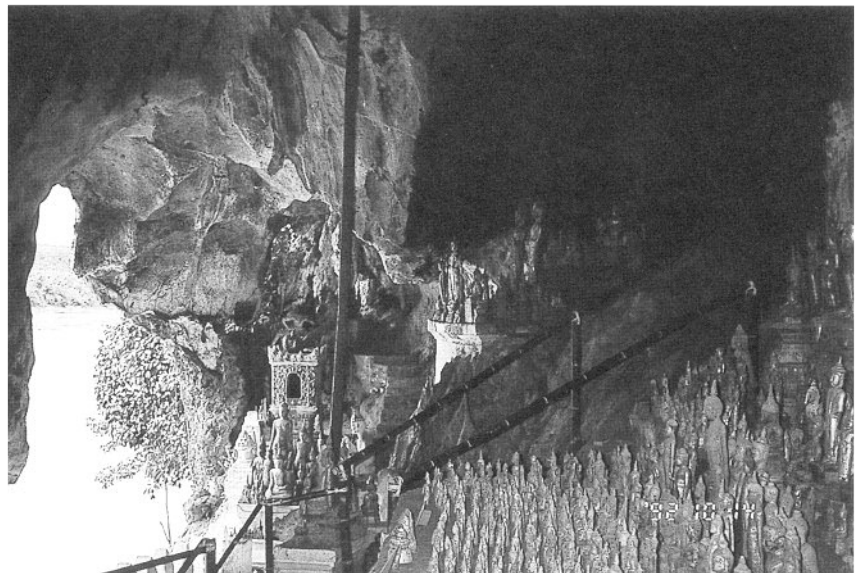


Figure 3
Sculptural group, showing the size and number of sculptures as seen from the interior of the lower cave.

Lao sculpture of the sixteenth to eighteenth centuries, at the height of the kingdom of Lan Xang, is most distinctively Laotian. Sculptures were usually made of bronze, stone, or wood; and the subject was invariably the Buddha. In the Tam Ting caves, most of the figures were carved from wood, but a few were also fashioned out of tree resin (sometimes covered with silver sheeting), horn, and ceramic. A few bronze sculptures may still be found in the caves, although most of these, as well as gold and rock crystal sculptures, have been removed since 1975. Virtually all the sculptures found in the caves are lacquered and gilded. The lacquer applied was usually black, but sometimes red lacquer was added over the black. Like other Buddhist sculptors, Lao artisans emphasized features thought to be representative of the historical Buddha, including a beaklike nose, extended earlobes, tightly curled hair, and so on.

Two types of standing Buddha images are distinctively Lao. The first is the “calling for rain” posture, which depicts the Buddha standing with hands held rigidly at his sides, fingers pointing toward the ground. This posture is rarely seen in other Southeast Asian Buddhist art traditions. The flat, slablike earlobes, arched eyebrows, and aquiline nose are uniquely Lao, as is the commonly upward-curled bottom hem of the Buddha’s robe. Many sculptures of this style are found in the Tam Ting caves.

The other original Lao image type is the “contemplating the bodhi tree” Buddha. The bodhi tree, also called the “tree of enlightenment,” refers to the large banyan tree in Bodhgaya, India, beneath which the historical Buddha was said to have been sitting when he attained enlightenment in the sixth century B.C.E. In this depiction, the Buddha is standing in much the same way as in the “calling for rain” pose, except that his hands are crossed at the wrist in front of his body. Very few examples of this form are found at Tam Ting.

Although not uniquely Laotian, the Tam Ting caves contain many sculptures of the Buddha seated in the “calling the earth to witness” position—his left hand in his lap and his right hand palm down over his knee. Another style found in the caves is the “meditation” position, with the Buddha sitting cross-legged with his hands cupped, palms upward, in his lap. A rarer form depicts the Buddha walking. A sculpture of the Buddha lying on his side depicts the Buddha in death, but this form was not observed in the Tam Ting caves.

Buddhist sculptures in Lao are not found only in temples or shrines. They also are found on high shelves, or altars, in homes and shops.

Environmental Context

Climatic factors

Lao is in the tropical monsoon zone and has two basic seasons: the wet monsoon from May to October and the dry season from November to April. The province of Luang Prabang receives an average rainfall of 1,000–1,500 mm a year. The coldest time of year is from December to January, the height of the dry season, when nighttime temperatures drop to 5–10 °C. In the wet season, daytime temperatures reach 25 °C.

During the seven days of the site visit discussed here, outdoor relative humidity varied from 76% to 91%, with temperatures ranging from 10 °C at night to 20 °C during the day. Rain fell constantly for six consecutive days.

Relative humidity readings for the upper cave decreased from 83% just inside the entrance to 72.5% at the back of the cave. The lower cave recorded readings of 80% to 69% RH from the front to the back of the cave, respectively.

Wildlife

Poisonous tree snakes and centipedes are common around the Tam Ting caves. A python was said to live in the lower cave but was never seen by project members. Wasps and bats, which present distinct conservation problems, are found in both caves. Although crocodiles and tigers were common to the region until approximately twenty years ago, neither inhabits the area today.

Site Description

Tam Ting consists of two limestone caves within a low but locally prominent limestone hill, situated on the west bank of the Mekong River and immediately downstream of the mouth of the Ou River, latitude 20°2', longitude 102°13'. The fishing village of Pak Ou faces the caves from the opposite side of the river and is approximately 35 km upstream from Luang Prabang. The majority of the limestone hill supports a tropical mesophyll forest cover with a tall woodland structure.

It is thought that until the early part of the sixteenth century, the caves were used as a sacrificial site for the many hierarchical Phi gods, which were believed to watch over the people. From the sixteenth century until 1975, the royal family, who lived in Luang Prabang, often visited the caves and used them as a Buddhist shrine for worship, coronations, annual New Year's festivals, and the end of the wet-season boat races. A natural spring found at the lower cave was the source for sacred water, having been used in coronation ceremonies. The royal family commissioned their own artists and artisans who produced sculptures for the caves, while the monks from Luang Prabang maintained the shrines. As of this writing, only one royally commissioned sculptor, in his eighties, survives. Regrettably, the arts of carving and gilding are rapidly disappearing in Lao, although some monks still apply gilding to wat (Buddhist temple) exteriors in Luang Prabang, and the resurgence of these arts is being encouraged in the fine arts schools of Vientiane and Luang Prabang (Vistarini 1993).

Traditionally, there were separate areas in the caves where only men were allowed, and women were forbidden to touch any of the sculptures. No one was allowed to wear shoes or hats inside the caves. Today, however, these restrictions do not seem to apply, and local men even smoke in the caves.

As the caves are active Buddhist shrines, both contain remnants of incense sticks, withered flowers, and other plant material, particularly in front of the altarlike sculptural groupings. Both caves contain evidence of human cremation remains (Fig. 4).

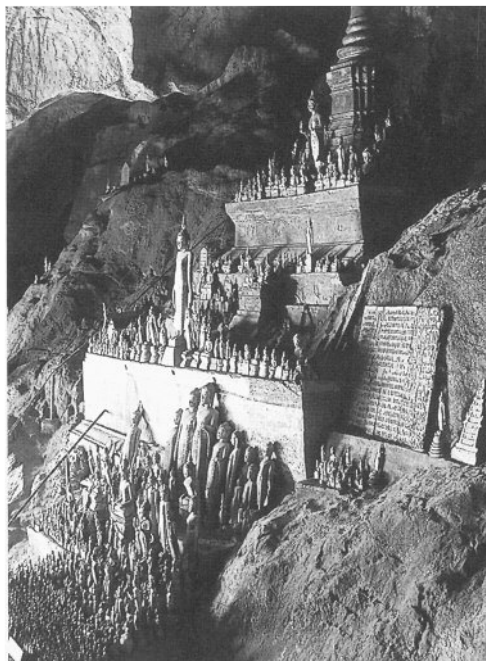
A dominant visual feature of both caves is the major sculptural groupings containing numerous Buddhist figures. There are approximately four thousand upright, relatively intact figures in both caves; yet, according to local people, this represents only about one-quarter of the sculptures that were present before 1975. The figures are predominantly made of wood covered with lacquer, which in turn has been covered with gold leaf. Sculptures and artifacts made of bronze, ceramic, resin, silver, and horn were also noted. The majority of the sculptures are not permanently installed and are easily moved. Photographs of the lower cave in the late 1960s indicate that significant rearrangement of sculptures has occurred since that time (White and Garrett 1968:765).

Based on the interpretation of stylistic criteria and a limited number of inscribed dates, the sculptures appear to date from at least the seventeenth to the twentieth century, with the majority displaying stylistic traits suggesting eighteenth- and nineteenth-century origins. The state of preservation of individual sculptures does not seem to reflect their age; rather, the materials of their construction, location in the caves, and previous history of usage and handling have contributed to their deterioration.

There is considerable evidence of the restoration and maintenance of the caves and their sculptures over an extended period of time. A plaque found near the mouth of the upper cave states that some restoration of the caves' contents was carried out in 1932 and advises that the king will punish anyone caught defacing the sacred site.

Figure 4

Some cremations are found in association with the sculptures. Note the stupa at the top of the cave.



The assemblages of Buddha sculptures and the riverside cave context provide Tam Ting with its major tourism appeal; paradoxically, these same features and their potential for tourism present the greatest challenges for the conservation of the site.

Upper cave

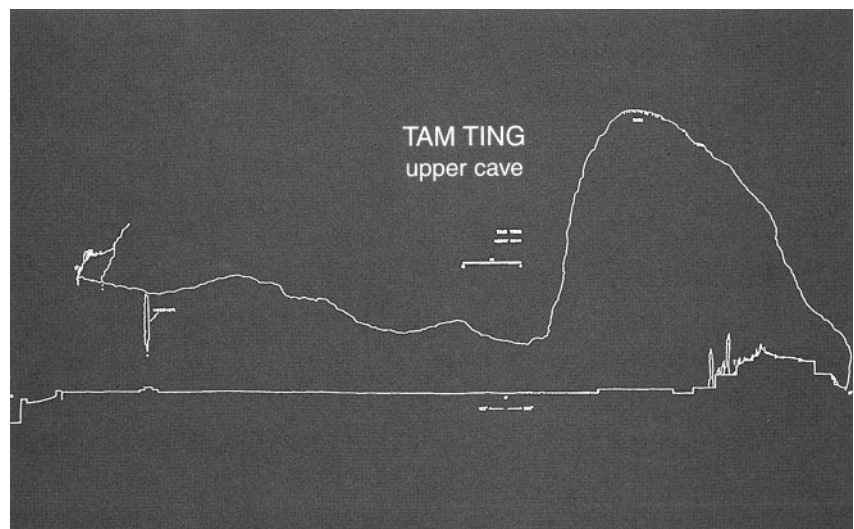
The mouth of the upper cave is located two-thirds of the way up the hill, approximately 50 m above the Mekong River on a steep slope to the south of the riverside cliff. A continuous path and series of stairs provide access from a separate river landing. Although sometimes quite steep, the stairs on this route (241 steps from the river level at the time of this survey) are in relatively good condition and are kept quite clear of vegetation.

These stairs and the path from the lower cave meet at a junction where a covered eating area has been built to accommodate site visitors. A short walk away from the covered area is a toilet block. In addition, a garbage dump is situated in a small gully close to the block, consisting primarily of refuse from packed lunches, most notably nonbiodegradable plastics. Exposed to wind dispersal and to wildlife, the dump is having an increasingly negative impact on the visitor areas.

Another covered eating area with an adjacent single toilet block, added in 1993, is located just below and to the north of the upper cave entrance. Wooden tables and chairs are located in the eating areas, but water must be carried up to the site from the river below.

The upper cave has a predominantly level floor, extending for 55 m into the dark interior, and reaches an approximate maximum height of 20 m (Fig. 5). The interior consists of a level and continuous series of caverns and broad passages culminating in two large caverns. As with the lower cave, cave development is limited and currently inactive. The upper cave appears to contain an extensive deposit of accumulated sediments, including pockets of alluvially derived clastic fills and a potentially extensive archaeological deposit.

Figure 5
Approximate cross section of the upper cave.



A considerable time period and occupational history is indicated by the cave's built features. Various brick platforms and wall complexes occur throughout the cave, most notably in side niches and the end caverns. The entrance to the cave has two large wooden doors behind an open iron grillwork grate, topped with an intricately carved wooden lintel; the lintel and doors are reported to date from the nineteenth century. The lintel still contains traces of polychrome paint and gilding but also suffers from much termite attack. Although the iron grate is locked at night, access is still available into the cave through small side openings or over the top of the iron grate. Consequently, the cave is not secure from intruders. The sides of the gates have been stuccoed and contain some relief carving, although much is now missing. A large, Chinese-style Buddha is located outside and to the right of the entrance (Fig. 6). Small niches in the limestone surrounding the entrance contain small Buddha sculptures. Some tree roots have grown around the cave entrance from the forest that grows above it. Several benched garden beds are situated on both sides of a rectangular entrance platform and stairway.

The upper cave is deeper and higher than the lower cave and has a relatively flat floor. The largest and highest portion of the cave, at its distal end, is home to a small colony of bats, their presence being most noticeable from their odor, noise, and droppings. A guardian figure has been carved out of the parent limestone and is located close to the interior mouth of the cave. It is believed that such figures watch over the rains and rivers, in addition to protecting entrances and stairways of shrines (Naenna 1990:3). With the exception of this figure, no carvings of the actual limestone walls are found. However, rock art—in the form of painted or stenciled gilt images, resin applied in low relief, and writing—is found on the rock walls. Some of the written material appears to record the presence of contemporary visitors; attempts have been made to scrub these marks off the walls.

Figure 6

Entrance to the upper cave, revealing nineteenth-century lintel, recent iron grillwork, and Chinese-style sculpture.

Figure 7

Cave interior with visitor candles, the use of which is damaging the sculptures. Note incense behind the front sculpture.

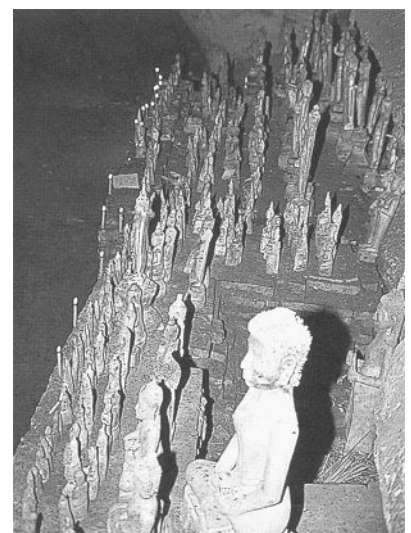


Figure 8
Entrance to the lower cave from the Mekong River.

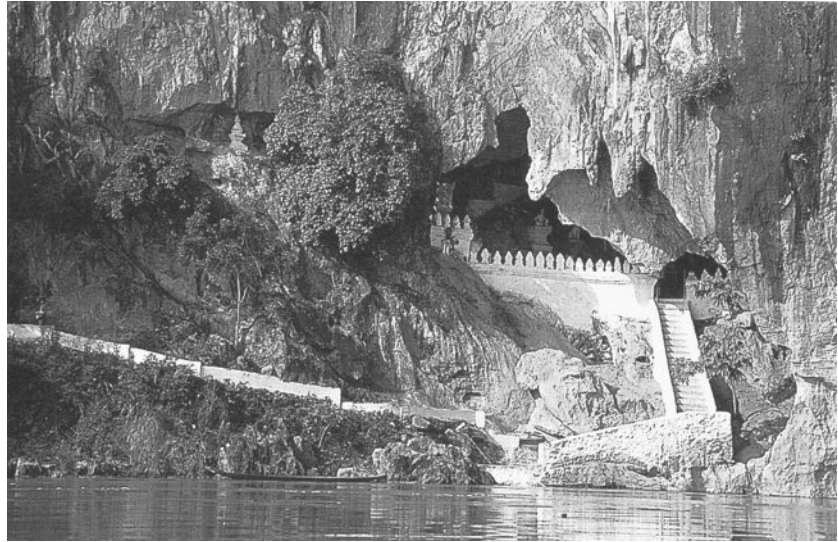


Figure 9
Eroded pathway joining the two caves.

Carbon residues are found on the walls and ceilings, and lumps of wax are found on ledges in front of sculptural groupings. These are all residues from the use of candles, which both worshippers and other visitors use to illuminate the cave (Fig. 7).

It is unclear what exactly had been restored during the 1932 intervention recorded by the plaque at the entrance to the upper cave. Several sculptures were noted to have been broken and then repaired in the past; many of these repairs in the upper cave are of high quality, although the adhesives used are unknown. In general, the condition of the sculptures in this cave is much better than of those in the lower cave, despite the fact that some of the upper-cave sculptures are older. Based on stylistic attributes and inscriptions, the sculptures date from the seventeenth to the twentieth century, most having been made in the eighteenth and nineteenth centuries.

An approximate count of fifteen hundred intact sculptures was made in the upper cave. This number is only an estimate and does not include most of the sculptures toppled over in the rubble or individual figures found in scattered niches.

Lower cave

The mouth of the lower cave forms a prominent landmark visible from the river and is situated in the basal portion of an extensive vertical river-bank cliff line (Fig. 8). Access from the river, adjacent to the cave mouth, is provided by a series of steps (thirty-six from the river level at the time of this survey). Here the river is considerably deeper than the downstream landing, making loading and unloading more problematic. A pathway adjoins these stairs with the stairs to the upper cave; parts of this pathway and associated steps have eroded down the hillside and are hazardous to path users (Fig. 9).

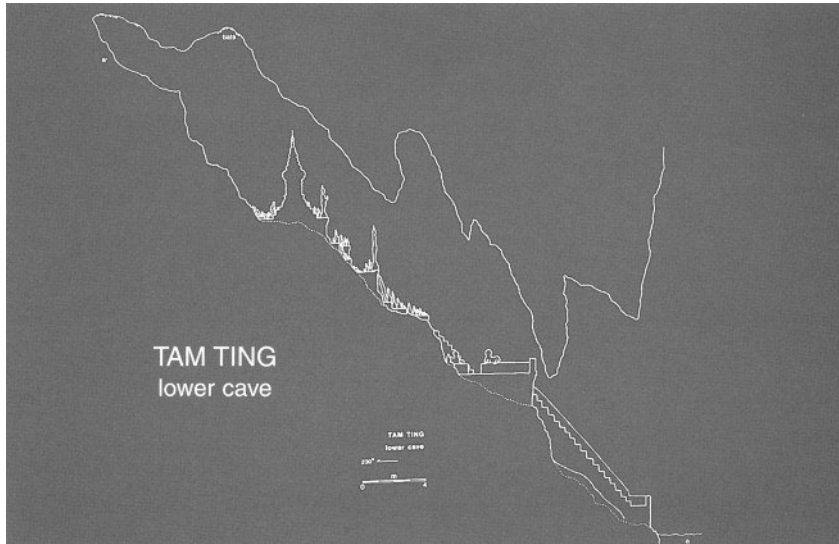


Figure 10
Approximate cross section of the lower cave.

Figure 11
Main area of worship in the lower cave.

The lower cave is steeper and more shallow than the upper cave, with a steeply inclined natural floor, consisting of flowstone and bedrock features, that descends to the level of the Mekong River at the mouth of the cave. The cave extends for approximately 35 m from the entrance with a similar maximum width and height at any one point of around 15 m (Fig. 10). As the cave is comparatively shallow, natural daylight allows viewing of most of the interior. Limestone development is limited to extensive flowstone deposits, associated columns, and pool deposits. Apart from isolated drips, the cave appears relatively dry.

An altarlike arrangement of sculptures is the focal point of the lower cave. This grouping is closest to the river's edge and has a flat cement platform in front of it that serves a religious function: most worshippers leave offerings of flowers and incense here (Fig. 11).

A series of retaining walls, staircases, and platforms has been constructed to provide both an open, level space near the cave mouth and a sequence of smaller joined or isolated rectangular platforms on which to place sculptures of the Buddha. A large stupa (dome-shaped Buddhist shrine) is situated on the highest platform. Cast-cement sculptures depicting figures from the Ramayana are found throughout the lower regions of the cave. On the lower platforms, the cast-cement figures and associated architectural features are regularly whitewashed, with some smaller features having been recently painted in red enamel paint. Two small reliefs depicting lizards or crocodiles have been cemented onto a limestone wall near the front entrance. A sign reading "spring" in English points to the right side of the cave. Although a water source was not located by the survey team, it may be a seasonal spring, since it is well known that these waters were used in royal coronation ceremonies.

Most Buddha sculptures found in the lower cave date from the nineteenth century. Recognizable standing sculptures number approximately twenty-two hundred.

The lower cave also exhibits more recent intervention. In addition to the recent painting of architectural features and non-Buddhist sculptures, many of the figures have been cemented into the limestone rock in an effort to prevent theft. In some cases, all that now remains are hardened lumps of cement containing wooden stub remnants. Further intervention took place in conjunction with the Princess of Thailand's visit. To improve safety for the royal party, bamboo railings and posts were embedded into concrete blocks set directly into the limestone foundation. The extent of rock markings on the walls is less than in the upper cave, although the range of types is similar. Both bats and wasps inhabit this cave.

Limitations of the Survey

Several factors limited the scope and degree of the initial fieldwork. On-site fieldwork was conducted for seven of the fifteen days allocated to the project; the remaining time was spent in transit and conducting necessary liaison and support work. The Princess of Thailand's visit, which took place during the site survey, precluded any work in the caves on that day. The unanticipated requirement for overnight stopovers to ensure flight connections within Lao also significantly reduced the available time on-site. As a result of these factors, photographic coverage of the sites was conducted at a preliminary level only, and the mapping of the lower cave was done quickly, resulting in varying levels of accuracy.

A lack of knowledge of the Lao language, culture, and Buddhist beliefs predicated the type and level of understanding achievable regarding the cultural context and dynamics of the site. The historic and contemporary oral information gained during fieldwork can therefore be considered only as dependent primary data rather than corroborated information.

Although the fieldwork provided a reliable assessment of the physically definable environmental and management constraints of Tam Ting, the survey had neither the time nor human resources to assess the contemporary human values associated with the caves. As a result, information is limited regarding factors such as the level of local, provincial, and federal managerial participation; the use of economic resources; and the Lao cultural values of the site.

In keeping with the preliminary and assessment nature of this initial survey, the use of sophisticated equipment and materials was kept to a minimum. This ensured flexibility within the potential constraints of unknown site contexts and facilities. Time limitations also precluded the opportunity of sending supplies in advance. Finally, six days of mud-producing rain and the inevitable stomach ailments common to foreign visitors, which were also suffered by the Lao team members, made the working conditions less than ideal. The resulting documentation of Tam Ting should not, therefore, be considered comprehensive or systematic beyond the requirements of the survey's objectives.

Interim Recommendations

The survey produced suggested measures to protect the caves and their contents until further conservation methods could be implemented. The

recommendations, submitted to the Australian Department of Foreign Affairs and Trade in a report dated 19 November 1992, were as follows:

1. Site visitors should be directed not to touch or handle the Buddha sculptures. Reasons for this instruction should be given. Site managers and custodians should touch the sculptures only when absolutely necessary and should refrain from moving the sculptures from their current locations. The majority of the sculptures in Tam Ting have suffered extensive borer and termite attack, leaving them extremely fragile. In many cases, it is only the very thin layers of lacquer and gilding that hold the figures together. Lifting a sculpture by the head or arm is likely to result in breakage. Unfortunately, this type of inappropriate handling and consequent damage was witnessed several times during the six-day period despite attempts at prevention. Every time an object is handled, its rate of deterioration is increased and the stability of exceedingly fragile pieces is threatened.
2. All of the floor and wall deposits should be protected from impact. There should be no further disturbance to the cave floors by digging or implanting objects within them. The deposits in both caves appear to have major potential as an archaeological and scientific resource and should be conserved for future research.
3. No further sculptures or nonarchitectural artifacts should be fixed in place or restored using cement. Several sculptures have been cemented in place in the lower cave. Aside from the detrimental effects concerning preservation, it has proved to be ineffective in deterring the deliberate breaking off or accidental damage of sculptures (as evidenced by several lumps of cement with sculptures missing).
4. The removal of graffiti from the walls of the cave should not be attempted until adequate methods are devised and an appropriate survey and recording of the rock markings is carried out. Some graffiti may prove to have historical or cultural value, while the act of using solvents and abrasives may further damage associated rock art and its substrate.
5. The use of enamel paints, and any painting in the interior of the caves or of the wooden entrance to the upper cave, should not be allowed until the appropriate paint types and techniques are defined. An unknown type of white paint, possibly whitewash, is regularly applied to the architectural and some in situ sculptural features in the lower cave. Buddha sculptures in close proximity to these painted walls have been splattered with the paint, creating serious conservation problems for those pieces (Fig. 12). It may, however, be considered necessary by Lao site custodians to repaint some of the whitewashed areas within the lower cave. In this event, care must be taken



Figure 12
Result of recent whitewashing in the lower cave.

- in any future application of whitewash to avoid all surfaces of the Buddha sculptures and to apply paint only to those walls and features (non-Buddha sculptures and architectural elements) already painted and maintained in this way. Portions of the platforms in the lower cave have also been painted with red enamel paint. More stringent precautions must accompany the use of this paint. Should any of this paint inadvertently land on the sculptures, it will be difficult to remove in the future.
6. Smoking and littering within the caves should be prohibited and this policy posted and enforced by tour guides.
 7. The on-site disposal of garbage created by tourists needs to be improved. The present surface dump located adjacent to the lower toilet block contains numerous nonbiodegradable materials, including a multitude of plastic trays that are gradually being dispersed over the wider region. The dump is visually obtrusive and may seriously threaten the quality of visitor experience in the near future. It is suggested that the surface dump be replaced with a disposal pit and that the existing garbage be buried. In the future, tour guides should be responsible for taking their groups' garbage back with them to Luang Prabang (i.e., taking away everything they brought to the site, including lunch remnants and all disposables). Tour groups should be discouraged from using synthetic plastics.
 8. Installation of electric lights in either cave would be detrimental to the preservation of the site and should not be considered as a visitor-management option. Electric lights would increase ambient temperature intermittently, and hence create fluctuations in relative humidity, a cause of damage to artifacts. Plant nutrients, in the form of dust and bat droppings, exist within the caves. Increased light levels could consequently promote the damaging growth of organisms. In addition, greater illumination of the sites may not be necessary to provide a rewarding visitor experience. Several visitors to the site commented on the appropriate ambience of the dark caves and the use of candles in the upper cave. It is suggested that the cultural value of the ambient and traditional light sources be explained and promoted by tour guides (Fig. 13). The use of handheld torches (flashlights) is to be encouraged.
 9. Visitors should not be allowed access to the caves without an appropriate tour guide or government representative. Guides should not leave a cave until all members of their group have left. Visitors should only be allowed on pathways and staircases, and they must be advised not to climb on the platforms or the limestone formations.
 10. It is important that, prior to entering the cave sites, guides explain conditions of entry to members of their tour group, as well as the conservation reasons for these restrictions.

Figure 13

Cave interior, showing ambience created by visitor candlelight.



11. It is highly recommended that each tour group be limited to ten to fifteen people, with a minimum of one tour guide per group per cave. The lower cave, in particular, cannot safely accommodate more people than this at any one time, and greater numbers would not allow for a full appreciation of the nature of the site.
12. To aid visitor safety, it is recommended that the pathway leading from the lower eating area to the lower cave be leveled and reinforced. Parts of the path and associated steps have eroded down the hillside and are potentially hazardous to path users.
13. It is recommended that rainwater be collected, particularly at the upper cave, for human use. At the time of the site visit, water was being manually carried up from the Mekong River to service both toilet blocks.
14. It is suggested that translations of this document be circulated to all relevant bodies associated with and/or responsible for the management of Tam Ting, including the Lao Office of Tourism. Translated copies of these recommendations should be provided and explained to all on-site workers and tour guides at Tam Ting.

Recommendations for Future Site Management

It is further recommended that the following steps be taken to encourage the future preservation of the caves:

1. Site security should be significantly improved.
2. Authorized site-specific interpretive signs, ideally in several languages in addition to Lao, should be installed along the pathways and near the designated eating areas of the site. These signs should not obscure the features of the site or impede photography; they should, however, be illustrated and cover the subject matter succinctly (Lambert 1989:37).
3. Simple brochures or leaflets providing site-specific information should be made available for sale at the site. Studies have found that the most effective method of disseminating this

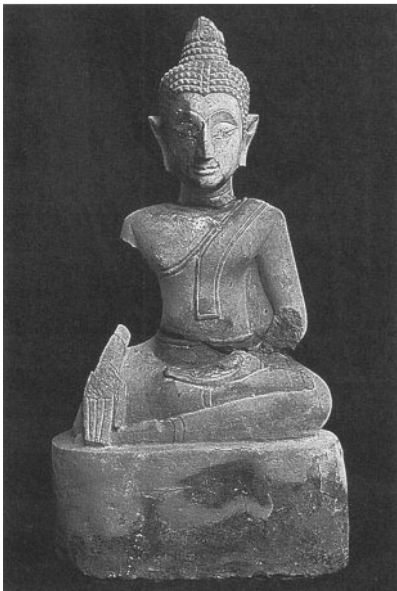


Figure 14
Figure repaired using identifiable fragments.

- information is for official guides to sell printed literature at a nominal fee, in person, to the visitors.
4. A visitors' book and pencil should be kept at the caves to reduce the risk of site graffiti. Guest books can offer an alternative to vandalism, as they have shown to be effective as an outlet for graffiti and offensive comments.
 5. Visitor access to the site should be restricted to built-platform viewing areas, not the use of the limestone formations as platforms or areas within hand's reach of the sculptures. Low barriers, possibly using natural plant-fiber rope or bamboo fences, might be effective psychological deterrents to touching or picking up sculptures.
 6. Bats and wasps should be removed from the caves and kept out by the use of screening material. First, however, the bats should be identified to determine if they are an endangered species.
 7. Samples of the platform brickwork should be inspected by a conservation architect to determine the need for their replacement. They appear to lack cohesion and strength, thereby endangering the Buddha sculptures.
 8. Graffiti should be identified and removed appropriately.
 9. Further research should be undertaken on the religious and cultural significance of the site and the art history of the caves' Buddhist images. There is also a need for further research to determine where the majority of the caves' sculptures have been relocated.
 10. Samples should be taken of sculpture materials (i.e., lacquers, gilding, and the various substrates, such as wood, bronze, resin, horn, and ceramic) and then analyzed for exact composition. Although not directly relevant to the management program of the site, information derived from these analyses can greatly assist in future conservation treatment, art and archaeological studies of the area, and methods of manufacture (Fig. 14).
 11. Small wooden carvings should be sold as souvenirs at the entrance of the caves. Although images of the Buddha may be found for sale in the markets of Luang Prabang and Vientiane, this practice is frowned upon by devout Buddhists. It is therefore suggested that the local villagers of Pak Ou be encouraged to carve images of Phi figures or to imitate some of the caves' architectural features and sell them to Tam Ting visitors. This would provide the villagers with additional income as well as reduce the risk of cave-sculpture theft.

Postscript

Since this paper was presented in 1993, the project team, including staff and students from the University of Canberra, as well as federal and provincial staff of the Lao Ministry of Information and Culture, have returned to the site in 1993, 1994, and 1995. Some of the aforementioned

recommendations have been implemented, while others continue to be addressed. Site work has been concentrated primarily in the upper cave, where the main worshipping area is being partially excavated and restored. The project is scheduled to continue for the next two years.

Acknowledgments

Funding for this conservation project was generously supplied by the Australian Ministry of Foreign Affairs and Trade and the Lao Ministry of Information and Culture. The project staff would sincerely like to thank Michael Mann, former Australian ambassador to Lao, and Thongsa Sayavongkhamdy, director-general of the Lao Department of Museums and Archaeology, Ministry of Information and Culture. For the 1993–95 seasons, the author's gratitude is extended to her esteemed colleague Brian Egloff, also of the University of Canberra, and the Lao team members representing the federal and provincial departments of the Ministry of Information and Culture. Last, warm thanks are extended to the local Council and the people of Pak Ou who good-naturedly put up with foreign idiosyncrasies and put great effort into welcoming the project staff into their homes and lives.

Note

- 1 The project was headed by the author in cooperation with Kelvin Officer, consulting archaeologist at Navin Officer Archaeological Resource Management. Assistance in administration and fieldwork was provided by Bounheng Bouasisengpraseuth, deputy director of Museums and Archaeology, Ministry of Information and Culture, Vientiane; and Somboun Bounthavong, Division of Cultural Affairs, Luang Prabang. Translation was provided by Bounheng Bouasisengpraseuth.

References

- Durham, A.
1991 Visit to South East Asia, 10 December 1990 to 2 January 1991. Report submitted to the Australian Ministry of Foreign Affairs and Trade, Canberra.
- Lambert, D.
1989 *Conserving Australian Rock Art*. Canberra: Aboriginal Studies Press.
- Naenna, P.
1990 *Costume and Culture: Vanishing Textiles of Some of the Thai Groups in Lao P.D.R.* Thailand: Studio Naenna Co.
- Seckel, D.
1968 *The Art of Buddhism*. New York: Greystone Press.
- Vistarini, W.
1993 Conversation with author, Shepparton, Victoria, Australia.
- White, P. T., and W. E. Garrett
1968 The Mekong: River of terror and hope. *National Geographic* 134(6):737–39.