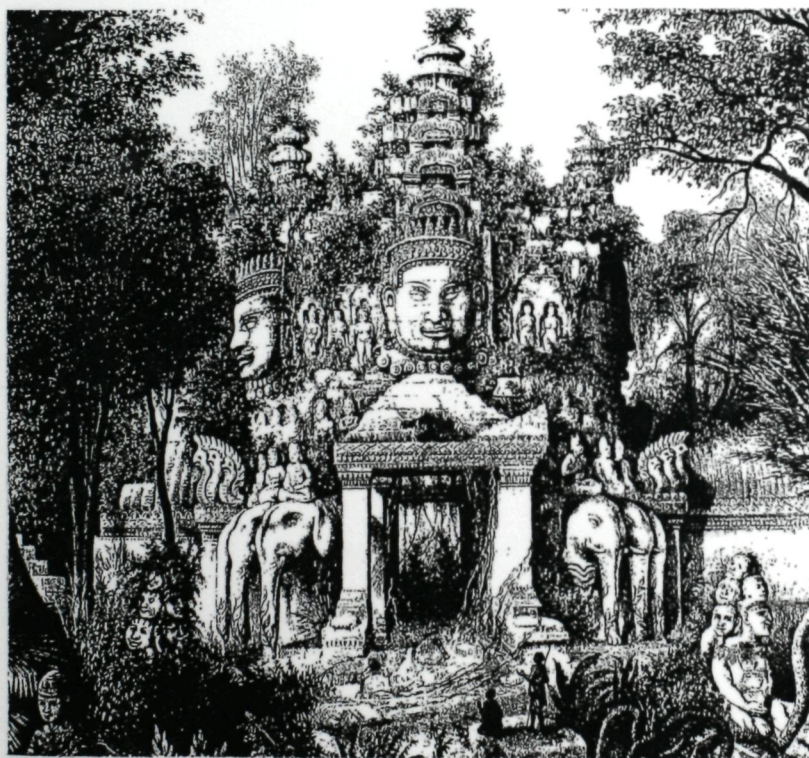


# **CONSIDERATIONS FOR THE CONSERVATION AND PRESENTATION OF THE HISTORIC CITY OF ANGKOR**

Siem Reap, Cambodia

## **REPORT I OVERVIEW**



**WORLD MONUMENTS FUND**

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PRESENTATION OF THE  
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**WORLD MONUMENTS FUND**  
New York

September 1992  
Revised





Dancing Apsara, Angkor Wat.

## CONTENTS

FOREWORD.....	6
1. INTRODUCTION TO ANGKOR	
Location and Setting.....	11
Environment.....	12
Historical Sketch.....	13
Current Situation.....	15
Existing Administrative Structure .....	16
Summary.....	17
2. CONSIDERATIONS FOR THE CONSERVATION OF ANGKOR	
Basic Conservation Issues .....	19
Building Materials and Their Threats .....	23
Summary.....	26
3. RECOMMENDATIONS	
Basic Needs .....	27
Conservation Principles.....	28
Conservation Training .....	31
Management .....	33
Inventory .....	34
Administration.....	36
Legislation.....	39
Protection of Movable Cultural Property .....	39
Environmental Protection .....	40
Cultural Tourism.....	41
Extension Activities.....	42
4. A CAMPAIGN FOR ANGKOR	
A Framework for Fundraising .....	44
Development of an International Campaign .....	45
Role of the World Monuments Fund.....	45
5. APPENDICES	
A. Historical Overview of Angkor .....	47
B. Khmer Architectural Development.....	58
C. Angkor After the Decline of the Khmer Kingdom.....	63
D. Conservation History at Angkor.....	65
E. Selected Bibliography .....	72



## FOREWORD

This report is the first of three documents summarizing the plans and recommendations that have resulted from three field missions to the Historic City of Angkor in Cambodia conducted by the World Monuments Fund (WMF) between December 1989 and March 1992. In December 1989 WMF sent a team of conservation specialists to Cambodia to ascertain the condition of Angkor resulting from 20 years of civil strife and isolation from the outside world. The mission was organized with the formal approval and support of the State Government of Cambodia (SOC). During the three week mission the team made initial contacts with both key personnel in the Cambodian government responsible for the administration of Angkor as well as with the faculty and students of the Department of Architecture at the University of Beaux Arts (UBA), Phnom Penh, and spent eight days at the site. In discussions with government officials, the team learned of the country's need for assistance in developing a conservation management system including training and the development of special conservation methodologies for the historic site of Angkor. At the same time, it was learned, through direct observation, that policies for monument conservation and a tourism development structure were a matter of urgency if Angkor is to retain its unique unspoiled qualities and environment.

At the end of the mission, a verbal report on the team's findings and recommendations was made to Prime Minister Hun Sen, and later presented at UNESCO's First International Round Table of Experts on the Preservation of the Angkor Monuments held in June 1990 in Bangkok. At this time, WMF proposed a second mission to address more specifically the themes of management, training and technology taking the Buddhist complex of Preah Khan as a prototype.

WMF fielded a second mission in March 1991, in conjunction with Sophia University in Tokyo. The result of WMF's efforts during the second mission was the draft document, *Preah Khan Conservation Project - Stage I*, which set forth the basis for a pilot conservation program, summarized the research undertaken during the mission and proposed activities for the future.

The results of WMF's first and second missions to Angkor were presented in draft form at the Second Round Table of Experts on the Preservation of the Angkor Monuments, held in Paris in September 1992. *Report One : Historic City of Angkor Preparatory Guidelines and Recommendations* provided an overview of the conservation challenge faced at Angkor, and *Report Two: Preah Khan, Stage One*



addressed the conservation parameters at the religious sanctuary of Preah Khan. They contain, as appendix material, most of the data gathered by WMF in its first two field missions.

The third mission, also undertaken in collaboration with Sophia University, and in cooperation with UNESCO, and in cooperation with UNESCO, served to design a holistic pilot conservation program at Preah Khan that would address representative architectural conservation priorities at the site, including emergency structural stabilization, archaeological research, preparation of a computerized inventory, materials conservation, interpretation and long-term maintenance. These activities are seen within the context of providing guidance and training, through a long-term partnership, to Cambodian professional and support personnel at the site. A proposed plan for the orchestration of these initiatives at Preah Khan is summarized in *Report III: Preah Khan Conservation Plan*, of the present series of reports.

At the First Angkor Round Table in 1990 it was agreed that UNESCO should encourage international participation in the conservation of Angkor by facilitating cooperative efforts in the following areas:

- implementation of measures required to preserve the Angkor site;
- development of a Master Plan; and
- establishment of procedures for international support, research and technical activities.

Perceiving its most significant role as assisting in the methodological and technological aspects of the collaborative effort, WMF has directed its emphasis in the present report toward the development of guidelines for conservation activities at Angkor and an operational framework necessary to support these activities.

Recognizing the present severe depletion of manpower and resources that have resulted from the recent conflicts in Cambodia, it is understood that the first step in establishing a conservation program will be the redevelopment and expansion of the Department of Conservation in Phnom Penh and the offices of Conservation d'Angkor in Siem Reap. It is hoped that this can be accomplished through different forms of assistance, including programs in training, research and conservation.

Realizing, likewise, the need to enhance the existing administration, WMF is proposing in this report a series of recommendations for the establishment of the necessary administrative framework to manage such a major conservation undertaking.

The present report, *Considerations for the Conservation and Presentation of the Historic City of Angkor* (short title: *Angkor Considerations*) summarizes and presents the information gathered during the first two missions organized by the World Monuments Fund. It recommends developing a Conservation Management Plan for the Historic City of Angkor, local and national training programs and well coordinated site research and analysis. It also raises some key issues such as the need for conservation guidelines, definitions of interventions and a determination of the precise conservation issues faced at each of the many structures which comprise the overall site.

The ultimate responsibility for the conservation and presentation of Angkor lies in the hands of the Cambodian Government. To make the requisite decisions, it is essential that the government continue to develop a strong and effective competence within the country's administrative system. This is especially so in light of the large task which lies ahead and the international attention which is increasingly being focused on Angkor.

The recently developed National Heritage Protection Authority of Cambodia (NHPAC), aided by an international advisory group of conservation specialists as coordinated by UNESCO, should provide guidance and support for the large and internationally significant Angkor project. The World Monuments Fund hopes to be part of that project.

\* \* \*

The World Monuments Fund is a not-for-profit private organization based in New York, USA whose purpose is to assist in the preservation of man's most significant artistic and architectural heritage through the planning, development and funding of major conservation projects worldwide.

## ACKNOWLEDGMENTS

WMF is grateful to the individuals who have served as members of its three Angkor research missions, and to the experts who have reviewed and made the suggestions for improvement of these reports. WMF hopes that, in their presently revised form, these reports will prove useful in formulating a *Conservation Plan for the Historic City of Angkor*.

Specialists who have contributed in various ways to the production of these reports include: John Sanday, Dr. Corneille Jest, Dr. Claude Jacques, Bonnie Burnham, John Stubbs, Sam Heath, Rebecca Anderson, Daniel Burke, Gini Dofflemeyer, Bruno Bruguier, Christine Hawixbrock, Dr. Frank Preusser, Fred Aldsworth, Stan Armington, Dominique Lajoux, Norma Joseph, Lori Anglin, Scott Cunliffe and Robertson Collins.

Special gratitude is expressed to WMF's hosts in Cambodia, in particular, Prime Minister Hun Sen; members of the Ministry of Culture including Minister Hang Chuon, Ouk Chea and Pich Keo; Uong Von; members of the University of Beaux Arts in Phnom Penh, including Deans Chuch Phoeurn, Hem Bun Tong and Hor Lat.

Colleagues and collaborators from other governmental organizations who have been of particular assistance include Professor Yoshiaki Ishizawa of Sophia University and his colleagues; Minja Yang, Richard Englehardt, Matthais Dermitzel and Veronique Dauge of UNESCO; and Dr. Leon Vandermeesch and Dr. Bruno Dagens of the Ecole Francaise d'Extreme Orient.

WMF's efforts have also been aided by important contributions from concerned individuals acting on their own initiative, both in Cambodia and throughout the world. WMF thanks these individuals, who are too numerous to specify, for their interest in the conserving and presenting the Historic City of Angkor.

WMF also expresses profound gratitude to its sponsors, without whose financial support these missions would not have been possible.



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## CHAPTER 1

### INTRODUCTION TO ANGKOR

Location and Setting

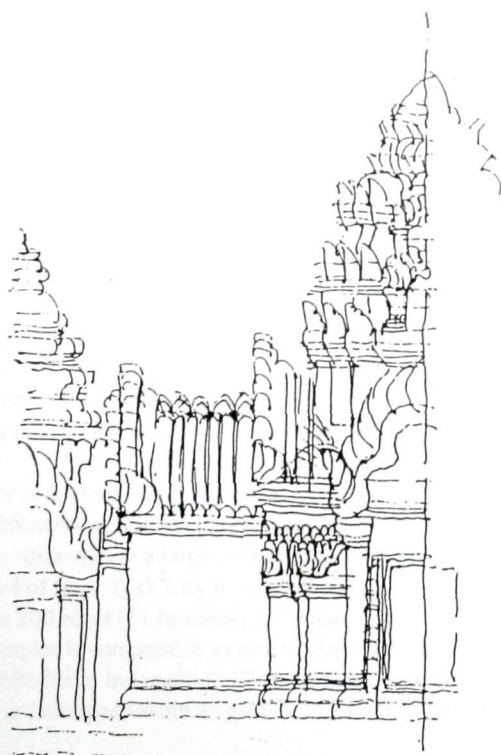
Environment

Historical Sketch

Current Situation

Existing Administrative Structure

Summary



## **1. INTRODUCTION TO ANGKOR**

### **LOCATION AND SETTING**

Cambodia lies between 10 and 15 degrees north of the equator and between 102 and 108 degrees longitude east. Thailand borders the north and west boundaries of the country; Vietnam and Laos lie to the east and the northeast. The total area of the country is about 112,000 square kilometers which today contains a population of an estimated 8.4 million people.

Two thirds of the country is flat and is drained of the monsoon rains by the Mekong River. The remainder is a mountainous highland, consisting of the two major mountain chains known as the Elephant mountains and the Cardamons along the western and northern boundaries. In general, the mountains are densely forested and largely unpopulated save for scattered villages.

A central plain covers about one third of the country and supports 90% of the population in four different ecosystems, which can be defined as the riverbanks (levees); the lowlands (bengs); the upper terraces; and the plain around the Tonle Sap (Great Lake). It is here that the earliest evidences of habitation have been found and where the Khmers established their empire. The Historic City of Angkor falls within the lowlands at the north end of the Tonle Sap.

Angkor is located within the basin of the Stung Siem Reap. Two hillocks dominate this plain: the Phnom Bakeng a few kilometers to the northwest of Angkor Wat and the Phnom Khrom at the northern end of the Tonle Sap. The environs of the Angkor complex are forested with a tall canopy of large trees such as the banyan and the ficus.

The Historic City of Angkor is approximately seven kilometers to the north of the town of Siem Reap. The remnants of this unique culture encompass more than forty temple complexes and are scattered over a large area in excess of 160 sq. km. Angkor compares in size to one third of New York City or twice the size of San Francisco. Angkor Wat alone occupies 200 acres (81 hectares) and Preah Khan, 140 acres (56 hectares). Each of these temples is comparable in size to sites such as Sukhothai in Thailand (70 sq. km.); Borobudur in Indonesia (117 sq. m.) and the Imperial Palace complex in Beijing, which is contained within an area of 178 acres (72 hectares).



# CAMBODIA

(KHMER REPUBLIC)

0 50 100  
Scale of Miles

T H A I L A N D

Nakhon  
Ratchasima

Buriram

Ubon Ratchathani

Pakse

Samtong

ANGKOR  
(Ruins)

Siem Reap

Roluos

Battambang

Kompong  
Thom

Pursat

Kompong Chhnang

Kompong Cham

Lovek

Udong

PHNOM PENH

Kompong Speu

Kompong Kantuot

Chamkar

Takeo

Luong

Kampot

Kompong Som

Phu Quoc  
Island

Ha Tien

Oc-Eo

Stung Treng

Kratie

Tay Ninh

Bien Hoa

SAIGON

Quan Long

Pleiku

Ban Me  
Thuot

V I E T N A M  
S O U T H

Chang I

Cardamom Mountains

Elephant

Gulf of Siam

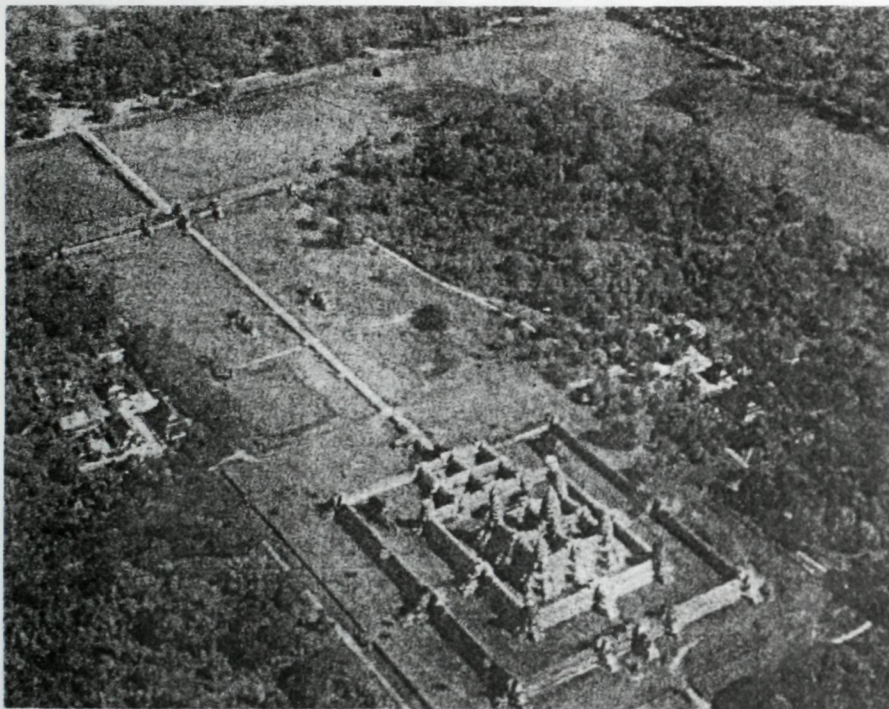
Mekong River

Basak River

Mekong River Delta

South China Sea





Aerial View of Angkor Wat, Looking North (c. 1970).

## ENVIRONMENT

The climate at Angkor is "tropical monsoon," characterized by a short rainy season, a prolonged dry season and irregular but generally plentiful rainfall, occurring between May and mid-October with often a two week dry period in July or August. Average daily rainfall varies between 3.8 mm on the west coast of the country to 1.4 mm in Phnom Penh. Siem Reap itself has an average daily rainfall of 1.4 mm. Practically no rain falls between mid October and May. Ambient temperatures increase from December through April or May from an average of 24 to 36 degrees Celsius.

The creation of Angkor was an immense technological achievement. Whereas cities generally live off an already established agricultural prosperity, Angkor was conceived to create its own prosperous agriculture. The land beyond Angkor is not well watered naturally, and therefore gigantic barays, or reservoirs, were built to store water, both to



**LEGENDE**

- Route principale
- Route secondaire
- Chausée-d'origine khmère

**BAYON** Ensemble monumental de 1<sup>ère</sup> importance  
**Ta Som** Monument d'importance secondaire  
**Bat Chum** Site archéologique

Echelle : 1 / 30 000

Pr. = Prasat

Echelle : 1 / 50 000



fill the moats and canals in the city and to irrigate the fields beyond the city. The water flowed from the high points where the barays were located to the Tonle Sap in the south. These irrigated tracts provided fertile land where several crops each year were grown, which were the source of support for the strength and prosperity of the Khmer empire.

Indravarman I, who reigned from 877 to 889 A.D., was responsible for the construction of the first colossal baray, the Indratataka, near Lolei. He established there the principles for Angkor's irrigation system. The construction of this baray, which measured 7 kilometers by 1 kilometer, was certainly one of the greatest engineering feats of its time. Today this baray is dry whereas the West Baray, which is of similar size, has been excavated and restored for fish cultivation in the last twenty years. From these great reservoirs, navigable canals channelled the water to moats encircling the temple complexes and served as a mode of transportation for people and goods. It is said that the stone used to build the Angkor temples was quarried from the northern hills around Kulen and brought by barge to Angkor.

## **HISTORICAL SKETCH**

The Khmer people are said to have moved into the Mekong basin from the north some 4,000 years ago to occupy the area described today as Cambodia. They are physically and culturally quite distinct from the Thais to the west and the Vietnamese to the east.

Earlier Khmer history is obscure, but by the 9th century the Khmer Kingdom had become a powerful civilization, governed by a dynasty founded by King Jayavarman II, which ruled the country from 800 A.D. onwards. Its cultural heritage and political ideals were derived from the Indian heritage and translated by the South East Asian culture of Funan, from which at a later date Buddhism also spread.

The Khmer kingdom was gradually extended until it reached its pinnacle in Jayavarman VII's reign (1181-1205). From the 13th century onwards, the southwesterly expansion of the Thais gradually began to erode Khmer dominance and Angkor was abandoned as a royal seat. This resulted in the slow decline of the capital city.

After the final demise of Angkor as the capital city in 1432, the monuments were gradually engulfed by the tropical forests. Nonetheless, local peasants who no doubt frequented the temples and dwellings, kept the fast growing jungle at bay and some of the irrigation channels freed for their own use. History indicates that the site was visited intermittently, and in some instances reoccupied. It is for this reason that the complex of Angkor Wat has always been kept free of undergrowth. Before its disintegration in the mid-15th century the city of Angkor was, from all accounts, a very

vibrant and vital cultural center. Even in its "Dark Ages," it still retained a glimmer of its glorious past for the local community.

During the 14th and 15th centuries, the political and economic control of the country was largely centered at Phnom Penh, where access could be found to maritime trade routes that were just beginning to be opened.

During the second half of the 17th century threats to Khmer supremacy came from the Champa to the east, and by the end of the 18th century pressure was felt from Siam on the west and Vietnam on the east, with Cambodia eventually emerging as a semi-independent state subordinate to both of its larger and more powerful neighbors. The boundaries of the state established at the height of the Angkor empire had diminished considerably as a result of internal strife and incursions by the larger powers.

The establishment of Cambodia as a French protectorate in 1863 saved it from being apportioned between Thailand and Vietnam. As the latter was already a French colony, the dividing boundary with Vietnam was considered more an administrative convenience than a delineation along ethnic or historical lines.

During its administration as a French protectorate, many Chinese and Vietnamese entered the country and began playing increasingly significant roles in Cambodia's economic development. Whereas over the centuries the Chinese had been gradually immigrating to the rural areas, the recent arrivals established a more tightly knit business community in the towns. The Vietnamese settled more in the countryside and were active in fishing on the Tonle Sap.

Despite recurring aggression from Thailand, the French maintained control of Cambodia until independence was declared in 1953.

Today Angkor preserves its vitality as a functioning part of the eco/cultural system of Cambodia and is the principal symbol of Cambodia's rich cultural patrimony. Angkor is still home to a much smaller number of people, and villages are again developing around the stone temples in less permanent wooden and brick dwellings as must have once dotted the terrain surrounding the former capital. There are indications that these inhabitants will again serve as the protectors of the monuments.

The Khmers have remained predominantly Buddhist and belong to the Hinayana or Theravada Sect, which is predominant in other Buddhist communities of South East Asia. Although all religious activities were stifled during the recent period of conflict and many of the brethren were displaced or killed, there is again a noticeable Buddhist presence in Cambodia. At Angkor, for example, monks have returned to several of the religious complexes, where prayer meetings are regularly convened.

## CURRENT SITUATION

Access to Angkor is by direct flight from the present capital, Phnom Penh, to Siem Reap, the provincial capital. Formerly there were several direct international flights, but international air traffic was discontinued in the mid 1970s and has not yet been resumed. A highway system links Siem Reap with Phnom Penh over a distance of about 100 miles. Roads and bridges have been repaired to make access possible, although at present the use of the road is restricted.

Upon arrival at Siem Reap, access to Angkor, which is about seven kilometers from the town, is direct. Relatively well maintained asphalt or gravel paved roads lead to most of the sites within the complex. Small buses and taxis are available and are controlled through Angkor Tourism, the government tourist bureau presently located at the Grand Hotel in Siem Reap.

At the time of writing, the only accommodation that serves Angkor is the Grand Hotel at Siem Reap. It has about sixty rooms as well as large reception facilities. There is also a small annex, the Apsara, attached to the hotel. Proposals are in hand with foreign investors to upgrade and expand the hotel; in addition, there are plans to construct several new hotels in the vicinity.

Services in Siem Reap, such as water and electricity, are somewhat restricted. Power supplies are cut at certain times of the day and switched off in the town at night.

Immediately upon arrival at the temple complexes of Angkor, the visitor is aware of the presence of worship once more pervading the sites, whether at a small shrine dedicated to a local spirit, a broken statue at the foot of a tree, a large stone Buddha swathed in a saffron robe, or a reclining Buddha that has been set into an old shrine. The perfume of incense sticks and flowers permeates Angkor Wat, where a well-known Vishnu sculpture is worshipped as Lokeswore and is adorned daily with flower garlands and offerings of incense. During recent years and especially between April 1975 and January 1989, religion was eradicated; monks were killed or deported, shrines violated, sculptures mutilated and religious artifacts destroyed. But this systematic destruction did not eliminate faith, and since 1979 veneration has been taking place in open air shrines where the local communities assemble for worship. In Angkor Wat the two pagodas to the north and south of the main temple have been repaired and monks have returned. Smaller temples have been erected in Angkor Thom around the Bayon and to the North of Phimaneakas.



## EXISTING ADMINISTRATIVE STRUCTURE

During the Ecole Francaise d'Extreme Orient's period of extensive research and restoration activities at Angkor, Conservation d'Angkor was created, in collaboration with the Cambodian government, to establish a certain autonomy and to set the historic city of Angkor aside from the other archaeological sites in Cambodia. Until 1970, Conservation d'Angkor was an autonomous body with a Conseil d'Administration, consisting of representatives of various ministries empowered to make decisions. The conservator in charge of Conservation d'Angkor executed these decisions. Conservation d'Angkor was responsible for maintaining the monuments and the infrastructure, the roads and forests of the Parc d'Angkor.

Despite political unrest, work under the supervision of Conservation d'Angkor continued through the beginning of 1970. In 1979 peace returned to Siem Reap and the region; and in August of the same year the Ministry of Culture attempted to reestablish Conservation d'Angkor.

Today Conservation d'Angkor is directly under the jurisdiction of the Department of Monuments and Museums of the Ministry of Culture and it retains a small staff of administrators and site workers totalling about 100 people. This staff consists of a director, topographers, draftsmen, stone restorers, drivers, mechanics, carpenters and modelers as well as site guards. It also has access to a casual labor force of several hundred, some of whom were called upon to undertake the recent clearing of the sites of undergrowth.

The Ministry of Culture, is made up of nineteen different departments. Critical to culture and conservation are the Department of Monuments and Museums which consists of four museums, three in Phnom Penh and one at Siem Reap; the Department of Technical Research; the Department of Administration and the Department of Finance. Museums in the provinces, like the provincial monuments, are under the control of the provincial authorities with technical assistance provided by the Ministry.

As of October 1992, the above mentioned system of cultural resource management is placed under the National Heritage Protection Authority of Cambodia (NHPAC), established by the Supreme Council of Cambodia. During the transitional period, until a new government is established, UNESCO and the United Nations Transitional Authority in Cambodia (UNTAC) will be members of this Authority.

## SUMMARY

The Historic City of Angkor and the other monuments in the region represent the only remains of a once thriving and powerful civilization, developed over a period of six hundred years. These temples built of either stone or brick were regarded as dwellings of the gods. By contrast, man's dwellings, including the palaces, were built mostly of timber and ephemeral materials, and have vanished entirely. The more permanent masonry structures have survived remarkably well for almost one thousand years, and today constitute open books of the Khmer culture which the knowledgeable observer can often decipher and interpret without difficulty.

When Cambodia was granted independence from France in 1953, Angkor Wat was adopted as a national symbol for the new Khmer nation. In the recent hostilities, Angkor has remained a symbol for all the various fighting factions. As a symbol of a civilization that once dominated all Indochina and much of present day Thailand, the towers of Angkor Wat have graced the flags of all the recent regimes, announcing to an international audience the ancient glory of the Khmer kings and the cultural heritage of its people.

Despite the good intentions of the Ministry of Culture and the State Government, there is a severe lack of trained personnel at all levels to undertake the conservation of Cambodia's cultural heritage. Also evident is the absence of a consistent conservation philosophy, especially in the field of monument conservation. These shortcomings could engender a large amount of inferior work which could be averted by proper training and the use of the most current conservation methodology and technology on the monuments.

Continuous intervention over the last century, led by various French scholars who have made considerable efforts to restore and maintain the monuments of Angkor, has provided not only a tradition for maintaining the monuments, but also detailed records, which will serve as a basis for future interpretation and conservation planning by the Cambodian government. Due to the hiatus caused by war, this tradition must now be reestablished and expanded upon to meet current needs and standards.

In the early 1960s Angkor became a favored destination in South East Asia for the serious traveller. A sizeable tourist infrastructure had begun to develop around Angkor, and an estimated 45,000 tourists visited in 1969/70. Fortunately, very limited construction took place in and around the monuments at that time. In the years since, Angkor has slipped back into oblivion as far as world travel agendas were concerned. But recently, as a result of peace initiatives, Angkor is again becoming a popular tourist destination.



There is little doubt that Angkor will regain its prominence as a tourist destination in the near future. The historic city must therefore be suitably prepared for a vastly increased number of future visitors. Careful plans must be laid to accomodate the anticipated influx of tourists, and the monuments must be properly conserved and presented. Otherwise, the magical experience of visiting this unspoiled special place could be lost forever.



Ficus Tree at East Gopura III, Preah Khan (1968)



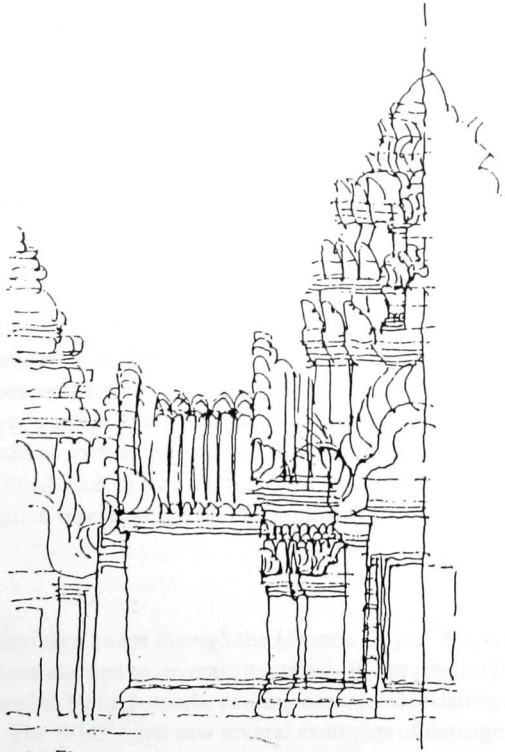
## CHAPTER 2

### CONSIDERATIONS FOR THE CONSERVATIONS OF ANGKOR

Basic Conservation Issues

Building Materials and Their Threats

Summary



## **2. CONSIDERATIONS FOR THE CONSERVATION OF ANGKOR**

### **BASIC CONSERVATION ISSUES**

During the first WMF mission in 1989, the team visited the majority of the sites within the Angkor conservation area and identified, during its rapid survey of the monuments, the common conservation issues which are outlined below. The inspection was only visual and the conclusions drawn were based upon discussions among the WMF team, representatives of Conservation d'Angkor, the Archaeological Survey of India (ASI) team at Angkor Wat and the staff of the Department of Conservation in Phnom Penh.

#### **The Effects of Age**

Angkor was evacuated in the middle of the 15th century when the capital was moved under the threat of foreign incursions. Apart from the major restoration interventions in the Angkorian Period and subsequent times, little else was done to maintain these structures except for the clearing of jungle from the main sites. In spite of various apparent constructional deficiencies and harsh monsoon conditions that have affected the structures over the centuries, the majority of these monuments stand today, although in varying stages of disrepair. It is a wonder that they have not long since deteriorated into heaps of rubble.

#### **War Damage**

From the various reports received through the media, the outside world was under the impression that the temple complexes had been severely damaged by the incidents of war. Fortunately, there has been very limited damage to the structures. Visible damage was mostly the result of gunfire and was usually only cosmetic. The temple complexes were sometimes used as shelters for warring factions and it was learnt that at least one of the temples, at Preah Koh in Roluos, was used as a storehouse for salt which has had significant negative repercussions on the brickwork.

#### **Hurricane Damage**

An unusual and devastating hurricane swept through the Historic City of Angkor on August 31, 1989, causing serious damage to several structures. It was reported that over 750 mature trees were toppled by high winds, causing considerable damage to the temples and enclosure walls. The WMF team saw several examples of damage to temple structures and noticed a dramatic example of destruction at Banteay Kdei, where a large falling tree shattered one of the gopuras and sheered a column in half vertically, from its capital to its base.

## Effects of Vegetation

There are graphic examples in Ta Prohm and Preah Khan of vegetation that has taken an almost irreversible hold on the structures. In many cases the task of keeping the jungle clear of the extensive linear temple complexes has been totally neglected for decades, if not centuries. As a result, large trees have engulfed the structures and have created a unique blend of architecture and nature. André Malraux, particularly moved by this harmony, recommended to the EFEO in the 1950s that the temple complex of Ta Prohm should remain a captive of the jungle. Over the last twenty years, through force of circumstance, little effort has been made to keep the sites clear, and many trees of the ficus variety have again grown over and around the stone structures.



Root Damage, Preah Khan

## Drainage Problems

Angkor is famed for the vast and complex hydrologic system that was used to bring water to the moats and canals surrounding the temples and palaces. Over the centuries the system has silted up, and storm water drainage subsystems that once functioned within the complexes have been forgotten or ignored. Improper drainage of rainwater within the building complexes represents a major conservation consideration.

The Indian team has made a study of the drainage system at Angkor Wat in order to locate the original drainage pattern inside the complex, and has concluded that much of the damage to its foundations has been caused by standing water.

## Damage Relating to Open Access

General access to Angkor has never been restricted although the site's remoteness and the lack of an extensive road network render it relatively inaccessible. At present, a modest amount of traffic passes through the complex, often close to the temples, along asphalt roads. Physical damage caused to the gopuras by large trucks is unfortunate and preventable. Uncontrolled vehicular access also facilitates looting as it provides easy transportation for targeted large scale sculptures.



## Theft and Related Destruction

More damage is apparent from wanton destruction of the temple sculpture in efforts to decapitate or separate elements of bas-relief from their stone backing, than from warfare. It is also evident that many standing icons have been uprooted and removed. Where size or weight defied looters, they resorted to removing heads or limbs, leaving behind the torsos. Some priceless works of art have been removed from the site and reserved for safekeeping by members of Conservation d'Angkor, while others have found their way into private collections, usually outside the country.

A former problem has been the pilfering of metal cramps that were used to bond the stone structures together. Throughout Angkor examples can be found of vandals having cut into joints between stones to remove metal cramps, leaving the structures weakened and at risk of collapse.



Evidence of Looting, Preah Khan 1992

## Design and Construction Defects

The vastness and structural complexity of some of the major temple sites, such as Angkor Wat, the Bayon, East Mebon and Pre Rup is remarkable, as is the ingenuity of the builders of these monuments and the incalculable amount of labor that must have been expended on these undertakings. The structures were built using massive stone blocks, some weighing over four tons, which were placed *in situ* for finished carving. Once stacked in position the stones were sculpted in elaborate sections, and were often undercut to create deep cornices, string courses and podia. This carving, especially of the heavily undercut plinth moldings, seems to have frequently caused considerable structural instability, resulting in much stonework being dependent on metal cramps for horizontal support.

It seems, from the available evidence, that the foundations of these massive structures were very shallow, often made up of placed earth fill, as in the case of the "temple mountains," whose cores were usually built of a very friable laterite stone foundation.

Because of its porous nature, the laterite tended to serve as an effective medium for moisture movement. Thus, countless cycles of moisture movement have weakened many of the stone-clad structures of Angkor, often posing major restoration challenges for conservators.

The tying back of this sandstone facing material to the laterite substructure appears to have been done without consistency. There is evidence of both stone and metal wedge-shaped ties having been used to connect stones to each other but there appears to be no significant bonding back to the laterite core structures. This has led to a failure clearly seen, for example, in the retaining wall of Bakong at Roluos, where rainwater has percolated between the stone veneer and its laterite support, causing considerable damage including partial collapse.

### **Defects in Temple Mountain Structures**

The "temple mountain" or pyramidal structures of Angkor are very susceptible to instability and structural failure. The design concept of the structures appears to have included a conscious desire to achieve a sense of monumentality through a false sense of scale. The stairways leading to the temples are double the size of a comfortable human step upward with risers of up to 45 cm (18 inches) and treads of only 15 cm (6 inches). In contrast, the doorways are often smaller than expected for the probable purpose of exaggerating scale. The normal angle of repose for an unconsolidated structure or mound is about 45 degrees though the majority of the "temple mountain" structures are set between 50 to 60 degrees making them very unstable.

During the 1960s French archaeologists and restorers under the auspices of the EFEO planned and commenced a major restoration intervention at Baphuon, a temple mountain structure which had partly collapsed. The tiers leading to the temple superstructure were very unstable, and realizing this the team decided to dismantle the terraces, to number the stone blocks and to construct reinforced concrete retaining walls to which the sculpted stonework would be reattached. While work was in progress, the engineers recognized the instability of the mound and decided to consolidate it temporarily with laterite and clay. The plan was to later place the concrete retaining walls behind the decorative stone facade. This intervention remains unfinished at this time due to interruptions caused by the war. Using Baphuon as a case in point, it is possible to detect similar problems of structural failure in several of the other temple mountain structures. The central temple structure of Angkor Wat, for example, is seriously threatened by instability due to the combined steepness of its earthen and laterite base and the extensive undercutting of the richly carved stone veneer surface. Deterioration of the exterior stonework has resulted from salt action and other erosion that has further caused structural movement that is particularly visible on the southwest tower of the quincunx.



## **Defects in the Linear Structures**

The most common failures in linear structures such as walls, hallways, and loggias are seen in their roof structures. The absence of horizontal tying systems in stone vaults can allow heavy corbelled arches to spread, overloading their column and wall supports. Eccentric loading is thus transferred to the support systems, often causing columns to rotate and walls to deflect. In time, complete structural failure occurs. An example of this condition is seen in the surrounding galleries at Angkor Wat where the heavy roof structures of the galleries are held in their misaligned position by crude modern concrete buttressing. Similar examples can be seen throughout Angkor.

## **BUILDING MATERIALS AND THEIR THREATS**

It appears that a relatively limited number of types of building materials were used at Angkor throughout its history, although combinations of their use and details used in construction have varied widely. The remains of the Historic City of Angkor seen today give the impression that only the sacred structures were built of more durable masonry materials. This supposition remains to be fully proved by archaeology in areas other than the monumental sites.

### **Sandstone**

Most of the larger temple complexes and the remaining foundations of the palace compounds are partly constructed of and faced in sandstone. There are different varieties and colors of sandstone found among the monuments of Angkor, but the most prevalent type is gray with tinges of yellow, blue and pink. This stone, which is typically fine-to-medium grained, was quarried near the Kulen Hills, 15 km to the northeast of Angkor. Exploitation of these quarries was probably always difficult since access to them from Angkor was difficult. It is reported, even prior to the arrival of the French in Angkor, that the quarries had been abandoned since the good stone supplies had been exhausted. However, recent information indicates that there is ready cut stone still available (see *Report III*).

The temples at Angkor were constructed using dressed stones laid with no mortar. Weight and friction kept the stones in place after careful and precise cutting and rubbing to form tight joints. In some cases, a bonding agent made possibly from tree sap is said to have been employed.

The temple structures of Angkor have endured very harsh environmental conditions due to the tropical climate. After abandonment, most, if not all, of the monuments of Angkor were invaded by jungle and the ensuing damage caused by vegetation and water percolation. The majority of the structural failures seen in sandstone at Angkor appears, however, to relate to the original design and constructional defects described above.



Due to the monsoon climate at Angkor, there has been considerable damage to masonry from moisture. This moisture dilutes and activates sulfates present either in the ground or in the material itself, and the salt-laden dampness is then drawn through the stonework by capillary action. During the drier months the sulfates crystallize beneath the stone surface and cause disintegration, usually by the action of spalling. An equally active destructive element is the high percentage of feldspar (a clayey substance) in the chemical constituents of the stone. If subjected to moisture the clay swells and is washed out, often causing extensive delamination.

Where stones were incorrectly bedded in the construction process, as often occurred at Angkor, surface delamination from either or both of the above-mentioned actions can occur more easily. In addition, these cycles of deterioration are not solely dependent on the presence of rain water. High humidity, as is often experienced in this climate, can also cause sulfate and feldspar reactions.

The stone structures in the Historic City of Angkor are frequently covered with a variety of cryptogamous organisms such as mosses, lichens and algae. The extent of damage caused by these organisms is relatively minimal. The damaging effects of such biological growth are mainly due to variable amounts of moisture presence which occurs in the biological growth process. Methods to remove or control biological growths, paradoxically, can cause more damage than if they are left untouched.

Theobacillus, a microorganism that develops in bat excreta, attacks and destroys damp stonework. Surface deterioration caused by theobacillus is similar in the appearance to delamination described above.

### **Laterite**

Laterite stone is a soft material when quarried, and hardens when exposed to dry air. It is probable that laterite was excavated to form many of the moats and barays at Angkor. Geological surveys of the area indicate that layers of laterite also exist near Phnom Kulen and in the vicinity of Banteay Srei as well as in the province of Kompong Cham. The material was also used extensively in the fabrication of Khmer temples in modern day northeast Thailand.

Due to its soft and porous quality, laterite lacks significant strength either in its load-bearing capacity or its resistance to normal weathering. It was usually used in simple block form, though sometimes entire structures were constructed of laterite. Occasionally it was carved to form moldings for plinths and cornices. Its stability and strength varies considerably between its dry and wet states. When used as a foundation material or as a structural core, its condition is often hard to determine because of its visual inaccessibility. Today it is considered a poor choice of building material for use in traditional masonry construction due to its strength limitations.

## **Brickwork**

A finely laid, high quality clay brick was the primary building material in all the early structures in Roluos and Angkor. In all cases, bricks were used as a core material and covered with a high quality decorative stucco finish. As different brick sizes were used, it is possible to roughly date brickwork constructions. Bricks measuring approximately 12 by 16 by 30 centimeters are of the Pre-Angkor Period (7th-9th centuries). The Angkor Period bricks are somewhat smaller. Modern replacement bricks, used in restorations by Conservation d'Angkor, have been stamped "CA."

Some structural failure in brickwork at Angkor can be noted today. This is usually the result of moisture action and salt crystallization. Bricks are more vulnerable than stonework to salt deterioration, due to their relatively high porosity. Examples of this type of deterioration can be seen at Preah Koh and Lolei, in the Roluos group, and at Bat Chum.

## **Stucco**

The stucco used as a finish material on the brick monuments in Angkor was made of lime and a coarse sand. It appears to have been mostly applied to brickwork as either a decorative or a protective finish. In most cases it was finely modeled after it was applied. What little stucco remains indicates that it was applied in thick layers, is very durable and adheres well to the brickwork.

No examples of extensive areas of original stucco still exist in Angkor. Some of the brick temples at Preah Hoh in Ruluor and Pre Rup have small areas of stucco which demonstrate the high quality of application and remarkable detail of this very perishable material. The remains of some decorative stucco finishes painted red in color can be seen in some quarter vault ceilings at Preah Khan. No efforts to date have been made to conserve or restore any stucco work at Angkor, although UNESCO fielded a mission in February 1992 to study the brick and stucco structures of the site.

## **Timber**

Timber played an important role in all periods of construction and in probably all building types at Angkor. From archival and artistic sources, it seems that up to the 13th century, timber was used for non-religious buildings such as pavilions and dwellings. There is also the tradition, still seen today, of building temporary sanctuaries using lighter and more easily handled wood, which is soon replaced in more permanent masonry construction.



Due to the perishable nature of timber, there are very few examples of wood building remains at Angkor. The remains of only a few door lintels and timber supports can be noted today in some of the gopuras. Scant evidence of a panelled wood ceiling can be seen at Bantay Kdei. All evidence of timber super-structures and interior furnishings and fittings have long since disappeared.

### **Metalwork**

The use of metal in construction appears to have been limited to anchors to tie stone blocks together and possibly for sheets of metal used to line some of the sanctuary walls. There are several examples of holes in masonry, set at regular intervals, used to attach some type of wall covering. These holes are especially noticeable in the central tower base of Preah Khan. More recently, the EFEO have used metal straps and reinforcing bars to conserve and to structurally reinforce some building components.

### **SUMMARY**

The above-mentioned conservation problems at Angkor are generic and are described here in the most general terms. Given the size of Angkor and its adjacent sites, with its scores of major monuments and hundreds of lesser structures, the task of conserving the architectural remains is enormous. A general knowledge of the building material pathologies of the entire site is an important and necessary background for any conservation activities which are planned for a particular site. No two structures and their conditions are alike at Angkor, especially due to the countless number of varied states of deterioration found at a given site. The proper approach for conservation work at Angkor must include a knowledge of the materials and conditions of the site, sensible conservation methodologies, very careful project planning, and the time, energy and resources to execute the task. The principal physical problems of the monuments of Angkor having been thus defined, the remainder of this Report will address other issues which must be considered in order to preserve and present Parc d'Angkor.



## CHAPTER 3

### RECOMMENDATIONS

Basic Needs

Conservation Principles

Conservation Training

Management

Inventory

Administration

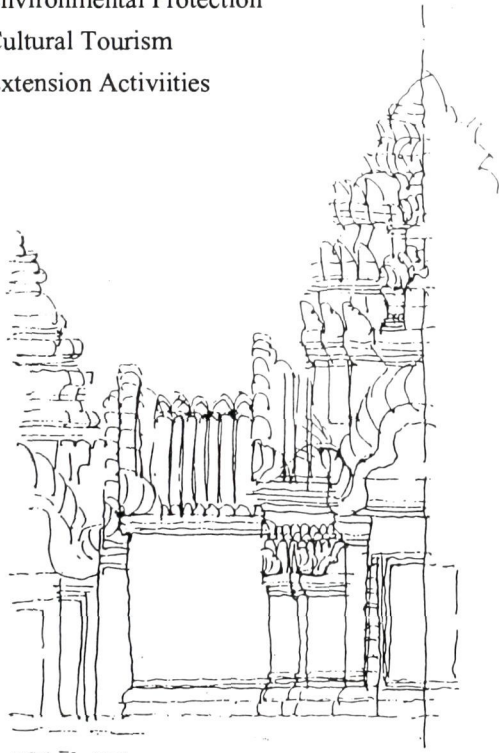
Legislation

Protection of Movable Cultural Property

Environmental Protection

Cultural Tourism

Extension Activities



### **3. RECOMMENDATIONS**

#### **BASIC NEEDS**

The following section contains general recommendations for the conservation and presentation of the Historic City of Angkor, and is addressed to all individuals, national and international entities interested in contributing to an effort to safeguard the site. At this time and for the next several years, addressing the following needs should be the priorities for conserving Angkor:

- rapidly address deteriorating conditions throughout the extensive site of Angkor as the first step in a general program to protect, conserve, present and maintain the monuments;
- develop a sound conservation and management philosophy for the site;
- develop and place into service skilled teams of administrators, conservators, technicians and craftsmen to augment the present limited manpower capacity.

#### **Principles and Procedures**

There are no established operating principles or procedures to guide work carried out by those working or planning to work at Angkor. It is therefore recommended that some basic principles and procedures be established to enable all projects to have common standards for both research and conservation implementation activities.

Ideally, prior to any intervention on any site at Angkor, it is recommended that the overall site be studied in order to establish and articulate general conservation objectives, taking into account the principles and possible interventions listed below. Each site should be studied in relation to its adjacent sites, and, insofar as is possible, to the whole city. Specific site conservation plans should be based upon conservation guidelines set forth formally and administered by the Cambodian Government through Conservation d'Angkor.

## **Planning Tools**

To address these needs the following planning tools should be developed:

- Guidelines for the Conservation and Presentation of the Historic City of Angkor which place conservation-related activities within a framework of general planning, development of infrastructure and encouragement of cultural tourism.
- A Cultural Tourism Plan for the Historic City of Angkor, as well as for Cambodia, to support the conservation efforts at Angkor.
- A comprehensive Conservation Management Plan to undertake the repair and conservation of the Historic City of Angkor.

## **CONSERVATION PRINCIPLES**

### **Criteria for Intervention**

A statement of general principles for conservation intervention should be made as clear and succinct as possible since many different professions and crafts would be expected to comply. Most of the following suggested principles are based upon criteria set forth in the ICOMOS Venice Charter of 1964. Selected principles that reflect the specific architectural conservation problems of Cambodia - and, in particular Angkor - are cited below.

1. The conditions of a structure or site must be fully documented prior to any intervention.
2. Historic evidence should not be destroyed or altered. In exceptional circumstances previous interventions can be removed for the well-being of the structure.
3. Any intervention must be the minimum necessary and should be governed by serious respect for the aesthetic and physical integrity of the structure.
4. All methods used during conservation and repair must be fully documented, including the coding of introduced or new materials.
5. All procedures adopted for conservation should be substantially reversible or have minimum impact.



6. Only well researched and proven conservation technologies should be utilized. Each should be carefully tested before application.
7. A plan for the maintenance of a conserved site or structure must be developed in conjunction with all major interventions.
8. A reasonable effort should be spent to make conserved sites intelligible for the visitor, to maintain safe conditions at each site, and to protect the character-defining elements of each site from tourist wear.

### **Degrees of Intervention**

The adoption of definitions of various types of interventions which may be applied at Angkor is essential to the establishment of commonly understood work procedures. The following definitions are proposed:

**No Intervention** It is often sound practice to advise either a "moratorium" or that no intervention should take place on a site or structure for an indefinite or set period of time. Untimely interventions can cause more damage than if no work were undertaken at all. Often new thinking or technology can present a better alternative several years hence. Therefore it may be appropriate for various reasons to leave areas of a site "as found."

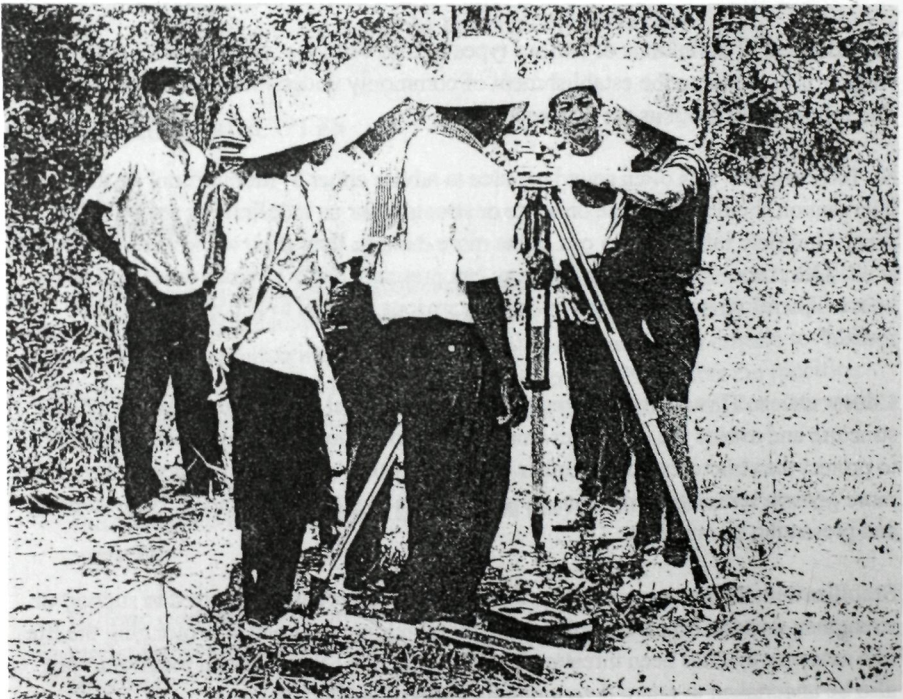
**Conservation** This approach is restricted to the minimal repair and maintenance of a structure and avoids the use of new materials. It may involve a degree of intervention to protect the structures from weather cycles and other associated problems. Used in a more generic sense the term "conservation" refers to the overall activity of preserving and presenting an entire site.

**Stabilization** This process involves the minimum intervention required to support or strengthen areas of imminent collapse. Any rebuilding is aimed at prolonging the life of a structure that has been threatened with destruction. Stabilization measures may also be undertaken to retard deterioration of specific materials.

**Reconstruction or Anastylis** As many of the structures at Angkor have collapsed, it is possible to deduce by careful survey and analysis how to reconstruct these structures. Restoration by anastylis (re-erection of collapsed building components) using the original material is justifiable when supported by firm archaeological evidence and when it makes a ruin more comprehensible. Lacunae which have been infilled should be distinguishable from original material on close examination.

**Maintenance** Regular and careful upkeep of a site and its structures should be undertaken to prevent the reappearance of destructive vegetation and moisture problems. The periodic monitoring of the stability of structures and implementation of routine maintenance measures is a form of intervention intended to guard against the need to undertake major interventions in the future.

**Archaeological Excavation** Archaeological excavation at historic structures is intended to gather evidence pertaining to the history of a structure and its builders. While archaeology can yield critically important new information that may be relevant to the conservation and presentation of a site, excavation is in itself a destructive process and therefore should be kept to a minimum. The results of archaeological excavations should be incorporated into the conservation plans developed for a structure.



University of Beaux Arts Students Learning Survey Techniques, March 1992.



## CONSERVATION TRAINING

One of the greatest contributions to be made through support of field conservation programs in the Historic City of Angkor is the further development and continuation of a training curriculum. There is no formal training in conservation theory or technology in Cambodia today. During its first mission, the WMF team met with the faculty and students of the Department of Architecture and Archaeology at the University of Beaux Arts at Phnom Penh for general discussion and the sharing of information. One result of this meeting was the introduction of the theme "Promotion Angkor," a motto for the first class to be graduated from this facility in twenty years. Focusing upon the urgent need for training in the field, WMF suggested on-site training as a priority during its next mission and, in collaboration with Sophia University, was able to set up this activity. Twenty-five students from the Department of Architecture and Archaeology were selected and taken to Angkor for introductory level training on site in the history of Angkor, the philosophy of building conservation, general survey methodology and archaeology. The success of the experiment in education proved very promising for immediate further development. Details of the initial training program and a list of the work the students produced are included in *Report Two: The Preah Khan Conservation Project*.

The Sophia University group also undertook site training in archaeological excavation, geological research and measured drawing surveys at Banteay Kdei, the site chosen as the Sophia University pilot project.

Before any long term conservation work can be undertaken at the Historic City of Angkor, it is essential to establish professional training standards, to effectively train numbers of young people along the lines of the apprentice system and to develop multidisciplinary conservation teams. Programs should be formalized immediately to enable students to participate in both the preparatory and implementation stages of projects. It is recommended that training programs be developed for several possible architectural and archaeological conservation activities and be accessible to all personnel with conservation responsibilities in Angkor.

### Professional Training

**At the University of Beaux Arts, Phnom Penh** It is recommended that a discipline for architectural conservation be introduced as a general subject at the university and that certain provisions be made for a few students to specialize in this field at the graduate level. Formal training should be offered in the fundamentals of architectural conservation at both the undergraduate and graduate levels for students of architecture,



engineering, archaeology and history. Specialized courses in building conservation should also be offered. In addition, a specially designed Graduate Program in Architectural Conservation at the University of Beaux Arts should be developed. An intermediate step might include participation of Cambodian students at international training centers.

**At International Centers** It would be appropriate to link Cambodian academic programs in conservation to courses offered at the International Center for Conservation in Rome, (ICCROM), and to the regional centers in India, Sri Lanka and Thailand. This would provide opportunities for students who have already completed course work in architecture or a related field to train abroad, preferably within the region, in architectural conservation. Wherever possible this training experience should also be related to hands-on conservation work.

**At Conservation d'Angkor** Given the initial success of on-site training activities during WMF's March 1991 mission, in which staff members from Conservation d'Angkor participated, it is recommended that consideration be given to developing a basic training program at Conservation d'Angkor in Siem Reap. A nucleus of staff at this center could commence urgent site work and carry out background research for Angkor projects with the assistance of students.

It is recommended that the Departments of Architecture and Archaeology at the University of Beaux Arts incorporate into their curricula accredited internships or courses that offer opportunities for students to participate in the preparation and implementation of projects at Angkor. It is further recommended that arrangements be made by Conservation d'Angkor to develop an internship program with the University. This should be specifically designed for students of architecture and related fields and tailored to periods of activity during both the preparatory and implementation stages of as many planned or active projects at Angkor as possible. As a matter of institutional policy, the staff of Conservation d'Angkor should continue to participate in training activities.

### **Training in the Crafts**

Without skilled craftsmen it will not be possible to implement conservation work at Angkor. It is recommended that a crafts training program be initiated to implement approved projects.

**At Conservation d'Angkor** It is evident that some of the craftsmen who worked with the French team in the 1950s and 1960s still live in the Siem Reap area, and a few are still associated with Angkor. The skills of currently available craftsmen have not been appraised; however, using some of these craftsmen as advisors, it should be possible to

again form a basic core of trainers at Conservation d'Angkor to develop a training program for stone masons and carvers. Both trainers and trainees will be required to refine their skills relative to the procedures and the principles of appropriate conservation practice at Angkor. Training in several disciplines, ranging from the structural repair of collapsed buildings to the repair of damaged objects might be established. Basic training in conservation technology should be taught to craftsmen in conjunction with the training of professionals as outlined above.

**At On-Site Pilot Projects** It is recommended that the most feasible approach to developing a training program in the building crafts is to establish a pilot conservation project, or projects, at Angkor. (See *Preah Khan Reports II and III* for suggested general on-site training program curricula.) It is likely that competent and suitable trainers from abroad will be needed to supervise this program, at least initially. If possible, they should be drawn from neighboring countries which share a similar cultural heritage.

## MANAGEMENT

### The Conservation Plan - Its Purpose

The conservation of historic monuments and sites almost always requires a multidisciplinary approach in order to adequately address the broad range of aesthetic, historical and scientific considerations which often exist. Architectural conservation is a developing field that concerns itself with an increasing number of issues. The diverse concerns of the discipline require both rational and resourceful planning for all proposed conservation projects which must be carried out by a well coordinated team. The conservation management plan for a site is a strategic planning document which will assist in the planning and execution of any conservation project whether it is for the Historic City of Angkor, on the "macro" scale, or a smaller component of the overall site such as Preah Khan.

As there are several public and private organizations prepared to provide assistance to the Cambodian government, there appears to be a great need to establish a framework for the development of a conservation management plan for the entire Historic City of Angkor and, if possible, nearby tourist facilities and access points.

If properly executed, the Conservation Plan for Angkor would become the basic planning reference for all future conservation and presentation activities at Angkor. It would identify a series of sub-projects centered around several significant monuments within the complex as well as priorities for these projects, which would be developed and eventually implemented under the guidance of Conservation d'Angkor.



Establishing a development framework for the conservation and presentation of all sites is an immediate and fundamental requirement. After this, interventions can be undertaken in a logically scheduled sequence that is linked to realistic budget cost estimates.

It is recommended that an international advisory committee be established to assist the Government of Cambodia in drawing up guidelines for a conservation management plan for the Historic City of Angkor. It is further recommended that UNESCO be appointed the administrative body responsible for the coordination of a Conservation Plan for the Historic City of Angkor. [Note: These two recommendations were adopted at the Second Angkor Round Table held in Paris September 7th-10th, 1991.]

### **Timetable**

The development of a Conservation Plan for Angkor can be undertaken only in close collaboration with the Cambodian government and should be developed within the government's time schedule. The development of such a comprehensive management plan will require careful coordination and will necessitate the input of several different disciplines. While this process is underway, the following interim measures should be implemented:

**Procedures for the Conservation of Historic Structures** Before any work on the conservation of historic buildings is undertaken at Angkor, it is strongly recommended that a set of principles and procedures for future conservation work be adopted by the Cambodian government, as recommended in the previous part of this report. These should also be endorsed and, if necessary, expanded upon by UNESCO as acceptable standards for all conservation work undertaken in Angkor. It is recommended that an administrative body, known as the Angkor Commission, apply these standards to all proposed work before giving its clearance for any work to proceed relating to a monument in the Historic City of Angkor.

**Procedures for Archaeological Excavations** Similar to the proposed standards and guidelines for the conservation of historic structures, it is recommended that a set of stringent rules be developed to control archaeological excavation within the Historic City of Angkor. For example, it is recommended that archaeological excavations always be a part of building conservation projects, where such investigations would be useful, and that adequate provisions be made for the conservation of excavated materials.

### **INVENTORY**

A complete inventory of all the known structures at Angkor will be an essential part of the Conservation Plan. Existing data relating to each of these sites needs to be located,



verified and compiled in a computer system that provides researchers, technicians and administrators with an easily accessible reference.

### **Identification of Sites**

It is recommended that the existing "Legal Inventory" listing, as compiled by the EFEO teams, be checked and updated as necessary. This revised inventory should list all the Khmer monuments associated with Angkor, and all items cited should be covered by legal protection for the region.



Completion of Architectural Inventory Forms, Preah Khan, 1992.

### **Individual Site Inventories**

The compilation of a computerized Preah Khan site inventory was initiated in March 1991 by the WMF team. This basic inventory locates all items (i.e., cells, courtyards, terraces) by grid reference coordinates and records data such as architectural descriptions, structural condition and construction type. A survey methodology was established in collaboration with the 1991 mission from Sophia University, which includes a photo-illustrated glossary of terms. Both teams have tested the Computerized Architectural Inventory System for site recording.

The Preah Khan architectural inventory is designed to document exactly what is found at the site, making it possible to both locate and quantify the aspects of any single

building component. Based on this information it is possible both to analyze problems holistically and to schedule conservation activities in a variety of ways, including by priority. For example, all the areas in danger of imminent collapse are noted for priority action.

The inventory can and should be continually updated as site conditions change and new information comes to light. It is suggested that any Angkor inventories should be compiled using identical or compatible computer systems and programs, in order to share information as well as for comparison purposes.

### **Database Use and Development**

At the present stage in the general planning process, there exists an opportunity for all parties concerned with future research or conservation at Angkor to collaborate on the compilation of the inventory system for Angkor. It was suggested at the 1990 Angkor Round Table in Bangkok that there should be a means of bringing together the results of investigations of the Angkor site, both past and present. It was further suggested that the development of a computerized system specifically for Angkor was at that stage not feasible, although over time it should prove increasingly desirable.

WMF has, however, made considerable progress since the 1990 meeting, collaborating on site with the Sophia University team, and on the development of a building inventory system and database. An inventory system has been developed and data are being compiled in a computerized database tailored for the Preah Khan site. After comments on this system have been received from the various organizations working at Angkor and the system is substantially completed, the program will be made available for use in the preparation of conservation plans for sites elsewhere at Angkor. The present system has been designed also to accommodate other computerized sources of information.

### **ADMINISTRATION**

In order to undertake a major program of conservation at the Historic City of Angkor, it will be necessary to strengthen the conservation specializations within the existing Ministry of Culture and Information's Department of Conservation, Museums and Tourism and of the Conservation d'Angkor Department in Siem Reap. Since 1989 UNESCO has played an increasingly strong role in the conservation of the cultural heritage of Cambodia. Their inauguration of the UNESCO office in Phnom Penh in November 1991 marked the beginning of a formal on-site presence for the administration of a variety of programs relating to conservation.

## **The Angkor Commission**

Following WMF's first mission the team recommended the formation of an Angkor Commission at a national level with its director responsible to the Prime Minister's cabinet. It was recommended that the Commission consist of high-level government officials who will ensure the development and smooth operation of all Angkor projects. The Commission would be responsible for facilitating the selection of an advisory group of the best qualified technicians and planners for the development and expansion of the existing Conservation d'Angkor. The Commission should also coordinate the planning and preparation of a Conservation Plan for the Historic City of Angkor, as well as the develop and coordinate an international fund raising campaign.

During discussions with the Cambodian Government it was suggested that the following government members should form the proposed "Angkor Commission."

1. Representatives of the Ministry of Culture in the disciplines of legislation, conservation and conservation training.
2. Representatives from the Ministry of Foreign Affairs.
3. Representatives of the Ministry of Education, especially for the teaching of history, archaeology and architecture.
4. A representative from the Ministry of Agriculture specializing in forest management.
5. A representative from the Ministry of Transport concerned with means of access (e.g., road, air).
6. A representative from the Department of Construction, Planning and Development.
7. A representative of Department of Tourism concerned with tourism development and the promotion of Angkor.
8. Representatives from the Province of Siem Reap for culture, urban planning and tourism.

[Subsequent to the preparation of this report, the National Committee for the Rehabilitation of the Monuments and Museums of Cambodia was formed, which was superceded in October 1992 by the National Heritage Protection Authority of Cambodia (NHPAC). See also *Report III.*]



## **Conservation d'Angkor**

Conservation d'Angkor, the organization responsible for the maintenance of the monuments within the Historic City of Angkor, is seriously understaffed and under-financed. Due to its important links with past activities in Angkor, it is strongly recommended that it be revitalized and made again an effective operating agency for all activities in Angkor (see recommendations in *Report III*).

### **An International Advisory Committee**

An advisory committee consisting of specialists from the following disciplines should be formed to act as advisors to the government and divisions within specifically concerned with Angkor and possibly to participate in the training program for Conservation d'Angkor. Advisory committee members should include specialists in the following areas:

- Conservation Planning
- Architectural Conservation
- Conservation Science
- Conservation Training
- Archaeology and Anthropology
- History
- Ecology
- Civil Engineering
- Tourism Planning and Development
- Economics
- Management and Development
- Site Management
- Landscape Architecture
- Fund Raising and Promotion

Such an advisory committee should be established immediately to assist the government in the critical early stages of planning. It would be commissioned with the principal task of undertaking a mission to assist the NHPAC and Conservation d'Angkor in the development of the conservation management plan. It is also recommended that the Angkor international advisory committee help in the development of suitable conservation training programs aimed at the reestablishment and augmentation of Conservation d'Angkor.

Although focused on the administration of Angkor, these proposals should anticipate administration of monuments and sites conservation elsewhere in Cambodia.

[Note: A proposal for the establishment of an Angkor international advisory committee has been submitted by the National Committee for the Rehabilitation of the Monuments and Museums of Cambodia to UNESCO. A variation on the above recommended advisory service is presently in formation with the NHPAC.]

## **LEGISLATION**

Existing legislation pertaining to the Parc d'Angkor was last revised in 1968. It is strongly recommended that the present legislation be reviewed and updated to anticipate all potential conservation considerations for both the Historic City of Angkor and the other national sites. It is further recommended that such revisions take into account the conservation legislation of other countries designed to protect major architectural sites. There is a need for enhanced legislation to protect the individual national monuments of Cambodia, including Angkor, as well as to control development within and around the site. Legislation should be directed towards the protection of both movable and immovable property, protecting it against destruction, disfigurement and illicit export.

As important as the monuments themselves is their relationship to their environs. It is recommended that specific legislation in the form of planning control should be drawn up to protect both the natural and significant man-made contexts of each of the temple complexes. Protective buffer zones should be extended around the delineated boundaries of the Historic City of Angkor, the Roluos Group; the isolated hill sites, such as Phnom Kulen; and the secluded individual sites such as Banteay Srei. Strict planning controls should be established within these buffer zones to prevent any new development.

It is recommended that the Historic City of Angkor be more clearly delineated and a series of zones established both within and around the site. This is particularly important in view of tourism development that is likely to take place in the near future.

Conservation legislation should be designed in such a way as to be constructive rather than punitive, providing assistance to local inhabitants and landowners on the best way to benefit from their association with this unique site. Enforcement of protective legislation is of utmost importance since legal encroachment, whether it be illicit building or theft of an artifact, tends to have a cumulative effect.

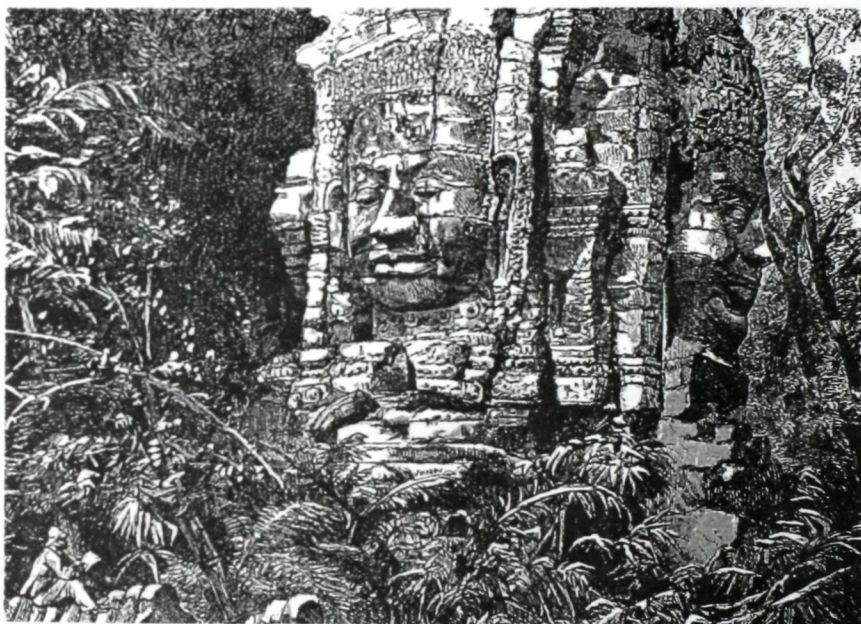
## **PROTECTION OF MOVABLE CULTURAL PROPERTY**

Theft and vandalism are major concerns at Angkor. The best deterrent for this will probably always be the presence of guards at each site. In addition, the maintenance of an inventory and photographic record of all physically vulnerable objects at Angkor is



recommended. The Ecole Francaise d'Extreme Orient is in the process of compiling an extensive inventory of sculptures both at and from Angkor. In addition it should be the responsibility of every specific conservation project team to carry out extensive surveys of all sculptures and inscriptions at sites where they are working.

During the First Angkor Round Table Meeting there were discussions concerning the illicit export of works of art. Great efforts have been made in the province of Siem Reap to deter local vandalism. However, more effective solutions need to be found to stop the unlawful export and receipt of Khmer art from Cambodia. UNESCO is playing a particularly important role in addressing this critically important issue.



Artist at Angkor, c. 1880

## ENVIRONMENTAL PROTECTION

A special characteristic of Angkor is its natural relationship to its environment. Some might consider the presence of large trees within the monumental sites as a threat to the structures; however, these trees represent a significant aspect of the historical development of the place. Likewise, the rebirth of religious activities within the old temple complexes and the presence of farming communities has animated the historic city and contributed greatly to the unique ambiance experienced by the visitor to Angkor today.



An environmental impact study should be undertaken and suitable plans drawn up to provide an appropriate infrastructure for both local inhabitant activities and for tourism development. The purpose of such a study would be to identify the critical issues and to limit land development to a minimum around the Historic City of Angkor. Issues of access, utilities and transportation will require careful study and when decided upon, should be guided by strong regulations from an early stage.

Beside the buildings and their relationships that comprise the Historic City of Angkor, the water collection and irrigation systems which served the site represent a monumental human accomplishment. The environmental analysis of Angkor should include a thorough survey of the vast hydrological system, with the intent to restore at least parts of the system, to boost agricultural production for local farmers. Restoration of some of the barays and canals will also permit the historic structures to be interpreted again in their former settings.

Specific studies for the re-integration of farming and religious activities as well as studies for the protection and control of the jungle are also to be recommended for inclusion as part of the Conservation Plan for Angkor.

## **CULTURAL TOURISM**

A cultural tourism consultant serving as a WMF team member strongly recommended that tourism at Angkor should be tightly controlled and mass tourism avoided. The first major consideration for Angkor is to protect and present properly the historic monuments and their environs. Priority should therefore be given to funding the development of an administrative structure to address these purposes rather than heavy investment in tourist facilities.

In the wake of the recent civil strife, Angkor has been out of the limelight and its meaning lost to an entire generation of young people. It is appropriate, therefore, that it should once again assume its previous international status.

The Historic City of Angkor has great economic potential for Cambodia. A unique opportunity exists to utilize Angkor as a focal point for the growth of all of Cambodia. This asset, however, must be developed to its benefit rather than to its detriment.

As Angkor increasingly becomes a much sought-after destination, a policy of exclusivity, in the form of fewer international visitors who pay higher price for the opportunity of visiting this unique site, may prove to be the best means of controlling erosion of the site and area by tourists. The present tourist facilities in Siem Reap should be upgraded, well trained guides provided and the site better presented with controlled access.

It is further recommended that a comprehensive Cultural Tourism Strategy for Angkor be developed. Among measures to be considered should be the introduction of specific taxes on visitors to support conservation.

The Cultural Tourism Strategy should have as its goals the generation of funds to be reinvested in the conservation and presentation of the site, and the education of new generations of Cambodians to accept the responsibility of preserving this great cultural asset. Through integrated planning and programming this potential can be realized, and the devolution of the site into another mass tourism destination in South East Asia can be avoided.

[In Fall 1992, UNESCO commissioned a Zoning and Environmental Management Plan" which intended to address tourism development as well as a number of other overall site protection issues.]

## **EXTENSION ACTIVITIES**

Although WMF's principal interest in Angkor is in the field of architectural conservation, the WMF team has, during the preparatory stages of this report, become aware of the need for holistic planning. During the research period in the field a list of associated needs was drawn up in the hope that appropriate institutions and organizations capable of filling these needs might join the program. These ideas include:

**A Conservation d'Angkor Laboratory** It is a pressing requirement that a scientific laboratory be established within the Conservation d'Angkor facility. As the requirements for the conservation of historic buildings and the conservation of objects are usually different, it is proposed that there should be separate units that share, where possible, common equipment. The staffing and equipment for these units should be planned by field oriented scientists and conservators who understand the remoteness of Angkor. Once a list of requirements has been drawn up, contributions of equipment should be solicited on a collaborative basis.

The services of both the building conservation unit and the objects conservation unit should be available to all groups and individuals working at Angkor.

**An Archaeological Research Program** Little is known about the details of everyday life of the inhabitants of ancient Angkor. There has been no concentrated archaeological program designed to research these aspects at Angkor. Surprisingly little is also known about the substructures and early occupants of the major monuments of Angkor. Although major archaeological excavations throughout the complex are not

considered a priority at this time, an integrated program that is closely allied to the proposed Conservation Management Plan for the Historic City of Angkor would be desirable. *Reports II and III* on Preah Khan recommend that conservation work at that site involve both historical research and archaeological investigation. Such excavations should be carried out to the highest possible standards and should serve as on-site experience for Cambodian archaeology students.

**An International Research Center** The establishment of an international research center in Siem Reap has been discussed amongst the various research groups. Such a center could provide facilities for research scientists and scholars from around the world. It could also result in the development of a documentation center for Angkor. It could perhaps also be combined with plans for a museum for the province of Siem Reap which is being discussed. The success of such a proposal would depend, however, upon both material and financial commitments that interested institutions are willing to provide to the enterprise.



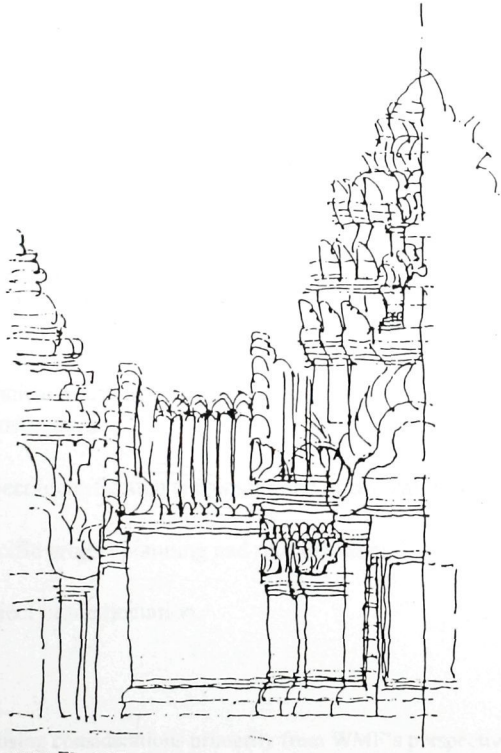
## CHAPTER 4

### A CAMPAIGN FOR ANGKOR

A Framework for Fundraising

Development of an International Campaign

Role of the World Monuments Fund



## **4. A CAMPAIGN FOR ANGKOR**

### **A FRAMEWORK FOR FUNDRAISING\***

Fund raising for the conservation and presentation of the Historic City of Angkor can begin in earnest only after a campaign has been developed and specific funding targets have been identified. The development of a fund raising campaign is also dependent on the political situation. There are, however, various key organizations that have expressed concern for the conservation of Angkor and it is hoped that they and other organizations will continue to provide assistance to the promising prospect of a revitalized Cambodia.

Based on the recent interest expressed by a variety of national and international organizations, it is evident that there are willing donors of both financial and technical assistance. These resources cannot be used to their full capacity until an acceptable conservation philosophy is articulated, at least a draft Conservation Master Plan is in place and a basic administrative structure exists to guide and develop them.

#### **International Level**

Fund raising by international agencies should be coordinated to advance the goals set out in the Conservation Plan for the Historic City of Angkor. Four principal funding activities can be defined:

- Support for technical assistance to Cambodian conservation administrative institutions;
- Support for project identification (inventory and prioritization activities);
- Support for specific project planning and mobilization;
- Support for project implementation.

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\* This section addresses fundraising considerations primarily from WMF's perspective as a not-for-profit private charitable organization. The institutional perspective of the same subject has been defined and is being continuously developed by UNESCO, in concert with UNTAC, in support of Cambodia and many of the various international relief and conservation organizations working in the country.

## **National Level**

Support at the national level for administrative operations and site maintenance must be accommodated within the Cambodian Government's budget. Allocation of funds generated through tourism could serve as a spur to encourage the investment of funds by international philanthropic sponsors. The national government might also explore licensing agreements (hotels, films, exhibitions) for concessions directly related to Angkor as a means to generate funding to support conservation.

## **DEVELOPMENT OF AN INTERNATIONAL CAMPAIGN**

Concerted efforts and a significant investment of funds will be required to raise funds to conserve Angkor. It is recommended that an international campaign be launched, as soon as possible, under the auspices of the Angkor Commission and coordinated by UNESCO. Early steps in the program would include the following:

1. Appointment of an international honorary committee for Angkor, headed by His Highness Prince Sihanouk.
2. Launching of an international public appeal orchestrated by UNESCO.
3. Establishment of national fundraising committees composed of private philanthropic leaders, government representatives and specialists in the field.

## **ROLE OF THE WORLD MONUMENTS FUND**

To date, the objectives of the field work sponsored by WMF at Angkor have been to assess the condition of the site, to encourage the adoption of standards for conservation, and to initiate on-site training for Cambodian students. With the completion of planning for a pilot project at Preah Khan, WMF's work would enter a new phase - of project mobilization. The goals of this stage of work would be to enhance the technical resources available on site, in anticipation of undertaking restoration work; to implement some emergency conservation measures at Preah Khan and prepare the site for a long-term conservation program; to further conduct some critical materials conservation tests; to formalize relationships with Cambodian officials; and to begin to assemble a work force.

Because of the magnitude of the single temple complex of Preah Khan, this stabilization and mobilization process could require more than one season's work, and



could consume all the financial means that WMF can presently envision committing to the program. There are many benefits to continuing work on this tentative scale, without undertaking any major intervention:

- continued strengthening of Conservation d'Angkor and its facilities;
- continued sponsorship of student training exercises, while the University of Beaux Arts seeks to develop a stronger curriculum in the area;
- continued fostering of exchange of technical expertise between Cambodian professionals and outside experts;
- encouragement of public concern for the future of Angkor; and
- participation in and promotion of a holistic scheme to preserve Angkor as a living cultural center rather than as a monument frozen in time.

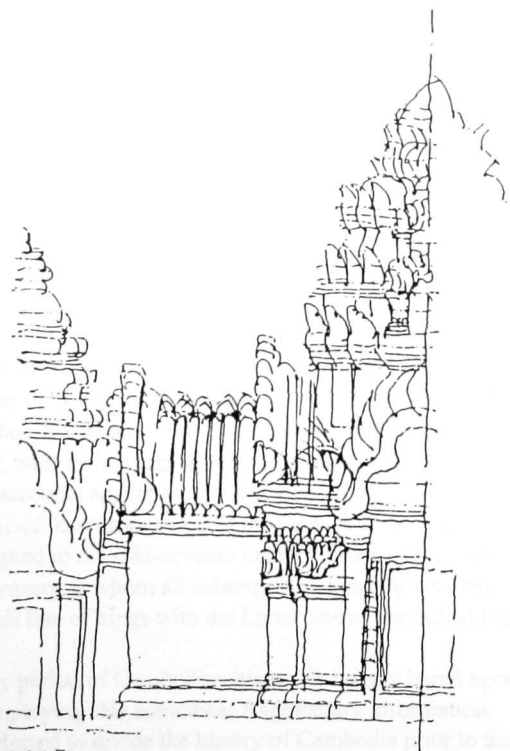
This is the role that WMF foresees at Angkor in the coming years, rather than that of a sole project "sponsor" whose specific goal is the completion of a project to save a given structure. If this process is successful, the tasks and responsibilities of conservation will be eventually absorbed within a workable framework under Cambodian leadership, and WMF's catalytic mission will be accomplished.



Bas Relief at The Bayon, 1990.

**APPENDICES**

- A. Historical Overview of Angkor
- B. Khmer Architectural Development
- C. Angkor After the Decline of the Khmer Kingdom
- D. Conservation History at Angkor
- E. Selected Bibliography



## **APPENDIX A**

### **HISTORICAL OVERVIEW OF ANGKOR REGION**

#### **Historical Terminology**

It is important at the outset to acknowledge the inaccuracy of the adjective Angkorian commonly used to differentiate between the classic Angkor period of Khmer history, commencing with the appearance of Jayavarman II (802-850) in the Angkor region from that which preceded it, the so-called Pre-Angkor Period (1st AD-802). The use of this term in the context of Khmer history would suggest that the Angkor region was not only first settled in the later period, but also played a pivotal role throughout the course of its development. In point of fact, however, the contrary is more correct. Some of the monuments in the Angkor region (e.g., Prasat Ak Yum and Prasat Kok Po) can clearly be assigned to the earlier Pre-Angkor period, thereby suggesting that the region was already politically and economically viable as early as the 7th century. Hence, the number of other Pre-Angkor structures lost to the ambitious building campaigns of later rulers, while unknown, is an issue that should not be ignored. Additionally, the first kings of the so-called Angkorian period were not installed precisely at Angkor, but in the Roluos region, some 15 km to the southeast. Thus in spite of the inaccuracy of the term, this report will adopt the common usage in order to avoid unnecessary confusion.

#### **Pre-Angkor Period**

Like various other South East Asian countries, Cambodia traces its origins back to the union of a foreigner and a *naga*-princess, whose father ruled a water-drenched land. According to one version of the story a brahman named Kaundinya married the princess, and in return for clothes, his father-in-law increased his territories by drinking the water that covered the land; built them a capital; and changed the name of the country to Kambuja. Similar accounts appear among the legends of the Pallavas and Cholas of South India. The earliest known mention of the version of this legend in South East Asia has been assigned to the mid-seventh century and seems to establish the legitimacy of the Lunar Dynasty to whom all subsequent Khmer rulers claim their descent; additionally it links this line of kings with the Lunar line of the Indian legend.

What is known about this early period of Cambodian history is largely based upon Chinese dynastic histories. Employing this somewhat fragmentary information, Europeans have traditionally elected to divide the history of Cambodia prior to the generally acknowledged emergence of Angkor into two major periods, that of Funan (1st AD-c. 550) and that of Chenla (ca. 550-802). These designations seem not to have





any real validity, being but names of kingdoms with whom the Chinese had commercial relations and it seems that they did not correspond to the whole of the Khmer nation, but only to two of several kingdoms and principalities.

Descriptions of Funan have traditionally placed it in the south of Cambodia in the vicinity of Angkor Borei where numerous artifacts have been recovered. In reality, the perimeters of this ostensibly important kingdom are unknown; nor is it clear whether Angkor Borei was a vital part of it. Nevertheless, there is little doubt that whoever lived in this region were Khmers. There is ample evidence that they entered into trade relations with both India and China through the port city of Oc-*eo* which seems to have served as a principal artery through which the Indianization process extended inland.

While Indologists emphasize India's civilizing impact on ancient Cambodia, socially oriented scholars stress the indigenous responses of the Khmers to this foreign impetus. In actuality the cultural transformation of ancient Cambodia was understandably complex, involving both the "Great" traditions of India, including Sanskrit, Hinduism and Buddhism, and the "Little" traditions of Cambodia such as Khmer, local mythology and ancestor and nature cults.

The name Funan may reflect a linguistic tie to the old Khmer word for mountain (*bnam*); recent research suggests that it may have had its ritual center at Ba Phnom or at another hill site in nearby Vietnam and that Funan was likely not to have been a significant, unified kingdom. According to Chinese histories a principality of this name offered tribute to the Chinese emperor on an irregular basis between the years AD 253 and 519. It has been suggested that several city states banding together may have offered tribute to China as a kingdom in an attempt to seek Chinese assistance against outside threats. Chinese historical records and French scholars may have independently exaggerated the role of this ancient kingdom for quite different reasons.

Inscriptional evidence and fragmentary architectural remains fail to corroborate the existence of unified kingdoms or large urban centers. Like other parts of early South East Asia, ancient Cambodia was likely comprised of a collection of small city states each equipped with a court supported by a food-growing peasantry who could also be called upon in case of conflict. Each ruler of such states thought of himself as a universal monarch in the tradition of ancient India as well as a local chieftain. Typically he traced his lineage to the legendary Kaundinya. Leadership was measured by success in battle and the perceived ability to provide protection; in recognition of this fact, rulers from the Funan period onward incorporated the suffix *-varman* into their names (originally "armor," hence "protection").

The inland territory north of Funan very likely formed in part what the Chinese annals have called Chenla, a name which has remained for them the name of the Khmer country until the 18th century. The Chinese add that Chenla was a "vassal of Funan,"



but that description seems not to have been entirely accurate for this entire period since there are some periods during which it is quite difficult to assess the relationship. We are led to believe that like the territory to the south, the northern heartland was divided into a multitude of small kingdoms or principalities, of which the traces of only a few remain, in particular those of Chenla. The name itself may reflect an awkward Chinese rendering of the ruler Citra [sena] who played a significant role in this early period, inheriting a kingdom established in the vicinity of Kratie. Both he and his brother Bhavavarman I stretched the limits of this empire as far north as Northeast Thailand.

Among the significant rulers who are known to have occupied the kingdoms of Funan and Chenla are Jayavarman I, Rudravarman and the brothers Mahendravarman and Bhavavarman I. The latter king installed himself at Sambor Prei Kuk and left his name in an inscription as far north as Battambang. In the south he certainly conquered a part of the territory of Funan, notably in the region of Prei Veng, but one does not know from what king it was seized.

After the death of Viravarman, his son under the name of Mahendravarman continued to expand his territories extending his influence as far north as modern Khon Kaen in present day Northeast Thailand. For some reason, upon the death of his brother which has been roughly fixed around the year 600, Mahendravarman assumed the throne at Sambor Prei Kuk and relinquished his apparent conquests which are clearly recorded in the ancient inscriptions.

During this same time period the ambitious grandson of Isanavarman I, Jayavarman I (655-691+) attempted to reclaim his territories in the north. There is ample evidence of this king's presence in southern Cambodia, but he seems to have established his capital, Purandarapura, in the Angkor region and may even be responsible for the founding of the pyramid temple of Ak Yum. After his death the country seems to have reverted to joint possession and the kingdom of Aninditapura established at Angkor. While there is some confusion regarding the possessions held by various rulers the existence of numerous small independent kingdoms must be acknowledged of which the names of Sambhupura (near Sambor of the Mekong), Vyadhapura (near Prei Veng) and Bhavapura (near Sambor Prei Kuk) have been preserved. Clearly there were others since some of the names of their kings are known; however, neither the names of the kingdoms or their actual locations are known. Certain cities like Hariharalaya in the Angkor region (Roluos) or Indrapura (Kompong Cham) are notable exceptions. The latter may have been the capital of the combined kingdoms of Vyadhapura and Sambhupura and they were used by Jayavarman II before he was consecrated in 802 on Phnom Kulen, initiating the classic period of Khmer history characteristically termed Angkorian.





### The First Kings of Angkor:

Traditionally, Angkorian history commences in the year 802, the date associated with Jayavarman II's consecration as *cakravartin*, the Sanskrit title meaning "Universal Emperor." His background is not altogether clear; he seems to have come from "Java," an indistinct country shortly before our first trace of him in the vicinity of Kompong Cham (770); he first seized the kingdom of Vyadhapura (Prei Veng region), then that of Sambhupura (Sambor of the Mekong River Valley, to the south of Kratie); he then selected Indrapura as his capital, which was situated between the two kingdoms and to the east of Kompong Cham. He subsequently moved his capital to Wat Phu, the

site held sacred by the Khmers for centuries, and then tracing the Dangrek chain, he descended on the Angkor region where he installed himself first at Hariharalaya (Roluos) in a place not yet identified. He later left the region to found a new capital at Angkor called Amarendrapura, undoubtedly to serve as a base for his new conquests. That he soon abandoned this region as well seems to reflect his new aspirations.

Mount Mahendra (today called Phnom Kulen) was where Jayavarman II chose to install himself and had himself consecrated as "king of kings," renewing thus the ancient pretension of Mahendrarvarman who died around 610. The title of *cakravartin* which he assumed seems to have been more a reflection of his most fervent desires than reality. The novelty which attended this pretension was appropriated by subsequent successors regardless of their actual power or authority. Sometime after his consecration on Mount Mahendra, Jayavarman II returned to Hariharalaya where he died around 835.

After the relatively uneventful reign of Jayavarman III (c. 35-c. 877), Indravarman I (877-889) assumed the throne. His reign was relatively brief. He enlarged the domain of Jayavarman II, first by ostensibly annexing the southern extremity of Cambodia where he has left material evidence at Phnom Bayang. Afterwards, he seems to have expanded his authority northwards beyond the Dangrek, approximately 75 km northwest of Ubon. A late 9th century inscription from this region recognizing his authority is the first inscripional evidence identifying a Khmer king in this region since that of Mahendrarvarman nearly three centuries earlier.

Reigning at Hariharalaya (Roluos), Indravarman I constructed first the temple of Preah Koh, which was dedicated to his ancestors, and surrounded it with an immense enclosure possibly to enclose his palace. At this time he constructed the embankments of Indratakata, "the basin of Indra," the first *baray* (reservoir) of any significance realized in this region; and finally, he erected his temple of state, the Bakong.

### **Foundation of Angkor**

Upon his death which occurred around 889 if not one or two years earlier, serious conflicts erupted over the regnal succession, and it is generally believed that it was not his son who ultimately assumed the throne. Serious controversy arose among the pretenders to the throne and it is quite possible that it was during this time that the temple of Bakong was secularized. This could explain why Yasovarman I abandoned the Roluos region, installing himself some 15 km northwest at Phnom Bakheng and thus founding the first city of Angkor, notwithstanding the earlier developments around Kok Po and Prasat Ak Yum.

Yasovarman I was consecrated in 889. His first significant undertaking was the construction of the great reservoir which was known as Yosodhara, recalling that of its

founder. This immense basin which today has been reclaimed for farm use originally measured 7 km by 1800m in width. In time, he erected in its center a temple (Lolei) which seems never to have been completed.

From the beginning of his reign, he erected numerous *asramas* (hermitages) throughout the empire, which was bounded by the Mun River on the north and extended into the southern reaches of present day Cambodia. The extent and the quality of his control over the entire territory is somewhat unclear. The vicinity around Kompong Thom, for example, was actually independent and known under the name of Bhavapura, a kingdom which appears again later in the course of Khmer history.

Apart from the temple of Lolei, a number of other monuments in the Angkor region are attributed to his reign; noteworthy among these is that of his temple of state erected at the summit of Phnom Bakheng and consecrated around 906--at the center of his capital, Yasodharapura, which was enclosed in a levee of earth delimiting an area of 16 square km; others include the temples which crowned two hills of a roughly comparable distance (14.0 km) from Phnom Bakheng to the south and northeast (Phnom Krom and Phnom Bok), forming an interesting triad of temple mountains, which even today serve as defensive outlooks for the region.

Yasovarman died in 910 and was succeeded by his son Harshavarman I who reigned for approximately 10 years. He constructed the small pyramid temple of Baksei Chamkrong at the foot of Phnom Bakheng, the purpose of which remains somewhat enigmatic; it is not even certain whether he originally erected a *prasat* at its summit as the existing tower is somewhat later in date.

Harshavarman was succeeded by his brother, Isanavarman II, but the year of his accession is uncertain as are his actual achievements. There is reason to suppose that the *cakravartin* title resurrected by these two kings was largely an affectation.

Isanavarman II died shortly before 928. And, it was in this year that Jayavarman IV consecrated himself as "king of kings," not at Angkor, but some 50 km northeast of there at Koh Ker (Chok Garyar). He did not move his capital as historians have thought for some time; instead he merely seems to have conserved the territory he had previously held prior to assuming the crown. (Some of the inscriptions suggest its occupation since 921.) It is not even certain that he obtained his regal post through combat, since it would have been easy enough to install himself at Angkor.

Like his predecessors, Jayavarman IV diligently applied himself to the construction of irrigation works in his capital at Chok Garyar in spite of a terrain that was much less favorable than that of Angkor. In particular, he designed the Rahal, a *baray* of more modest proportions (1200m X 560m) than that of Yasovarman I. Previously there was no concrete evidence of this king in the Koh Ker region or the south of Cambodia



in the vicinity of Ta Keo and Phnom Bayang; now it is certain that he administered an empire considerably less extensive than that of Yasovarman I, and more in keeping with that managed by his immediate predecessors.

Little is known of Jayavarman IV's son, Harshavarman II: his throne was quickly brought into dispute shortly after his accession (c. 940), and it is possible although not yet certain, that he was eliminated by his successor, Rajendravarman.

### **Rajendravarman and his Successors**

Rajendravarman was already the king of the small kingdom of Bhavapura located in the center of Cambodia when he established himself in the Angkor region and consecrated himself as *cakravartin* in 944, reaffirming his wish to continue the work of Yasovarman I. It is probable that he installed himself in Yasovarman palace as he undertook extensive restoration of the ancient city of Yasodharapura. He also re consecrated the temple of Baksei Chamkrong (948) and undoubtedly built the *prasat* at its apex, dedicating it specifically to his predecessors, invoking them as the protectors of the kingdom. He subsequently erected the temple East Mebon on an island which was situated in the precise center of the Eastern Baray and consecrated it in 953. At this point he seems to have decided to establish a new capital to the south of East Mebon and he undertook the construction of his palace, presumably designed by the architect, Kavindrarithana, who is also credited with the design of Buddhist temple of Bat Chum and the magnificent basin of Sras Srang. In 961, Rajendravarman consecrated his temple of state, Pre Rup.

By 950 Rajendravarman II was pitted in battle against his Cham neighbors and was additionally challenged by internal rebellion at home. Anxious to maintain his control outside the Angkor region, he undertook a number of unpopular reforms that may well have instigated the rebellions that ultimately are thought to have claimed his life (967). His palace was abandoned and the court subsequently installed itself near Phnom Bakheng around one of his sons, Jayavarman V. There is reason to believe that the latter was rescued as a child by his spiritual teacher, the famous Yajnavaraha, founder of one of the great architectural masterpieces of Cambodia, the temple of Banteay Srei which was consecrated 968 or 969.

If the inscriptional evidence during Jayavarman V's reign is to be believed, this was a peaceful period. In 978 work was undertaken to establish a new capital along the bank of the Eastern Baray, of which few traces remain today. He also constructed a new temple of state, Takeo (Ta Keu), which he seems never to have completed.

Upon his death in the year 1000, the political situation became very confused. The Khmer empire had at its helm a certain Udayadityavarman I of whom there is no trace at Angkor and who disappeared mysteriously the following year. Two kings

subsequently appear on the scene and have pretensions to being consecrated *cakravartin* in the course of the same year (1002). The first, Jayaviravarman, ruled only in Angkor and the neighboring region of Battambang, residing in the palace constructed by Jayavarman V. He confined his capital within a defense wall between the moats of Angkor Thom and the northwest corner of the Eastern Baray of which only the northern part now remains. This undertaking is noteworthy as it is the first time a Khmer king is known to have fortified his capital.

The second such king was Suryavarman I who may have begun his rule in the region of Sambor on the Mekong. He subsequently spent the next nine years in bitter territorial disputes, ultimately bringing him to Angkor, the echoes of his bloody battles following in his wake.

Since neither of these kings seems to have had any relationship to Jayavarman V, it is relevant to question the legitimacy of Udayadityavarman I and note that the origins of Jayaviravarman and Suryavarman I are equally abstruse. Such confusion may well have emerged out of the great political reforms of Rajendravarman.

### **Suryavarman I and his Successors**

Suryavarman I disdained the palace of his rival which he ultimately gifted to one of his disciples, who remodeled its appearance into what today is known as the Royal Palace of Angkor Thom. Within its enclosing walls he additionally erected the modestly proportioned temple mountain of Phimeanakas.

Suryavarman I seems to have been a great administrator according to contemporaneous inscriptions although little is mentioned of his actual accomplishments. Nevertheless, it is now certain that the Western Baray (8 km X 2200m) previously credited to his successor, was constructed during his reign. He also constructed the temples of Phnom Chisor in the south of Cambodia and of Preah Vihear on a promontory in the Dangrek Mountain range. Ultimately he can be also attributed with the construction of several buildings in the Preah Khan complex to the east of Angkor.

Like his predecessors Mahendrarvarman and Indravarman I, Suryavarman I pushed the perimeters of his realm northwards. Although there are traces of his administration as far west as Lopburi in present day central Thailand, the actual extent of his conquests in this direction are still uncertain.

After a reasonably long reign, Suryavarman I was succeeded by Udayadityavarman II in 1050. In spite of the numerous rebellions that confronted him during the course of his 16-year reign, Udayadityavarman II was not deterred from assuming the role of builder. At Angkor itself the great temple of the Baphuon has been attributed to him, replacing Phimeanakas built by Suryavarman I as temple of state. It is also to him that



the creation of the Western Mebon, erected in the center of the Western Baray, has been attributed.

New unrest arose in the northwest in 1065, shortly followed by problems in the east. During this period Udayadityavarman II was replaced by Harshavarman III who inherited both the internal rebellions of his predecessor and intermittent raids by his Cham neighbors.

In 1080, it is possible to verify that Jayavarman VI was at the head of the Khmer nation and that he belonged to the nobility of Mahidharapura, a city-state of which no trace has yet been found and for which no location is known. However there is no evidence that this king had established his capital at Angkor and some believe that he actually ruled from Phimai in northeastern Thailand. Beyond the immediate vicinity of Angkor and throughout the Khmer kingdom there is extensive testimony of this king's generous patronage to temples, but not a single structure can be attributed to him in spite of his 25-year long reign. His brother, Dharanindravarman I, succeeded him in 1107 without difficulty, presumably ruling jointly with another king about whom nothing is known.

#### **Suryavarman II and Angkor Wat**

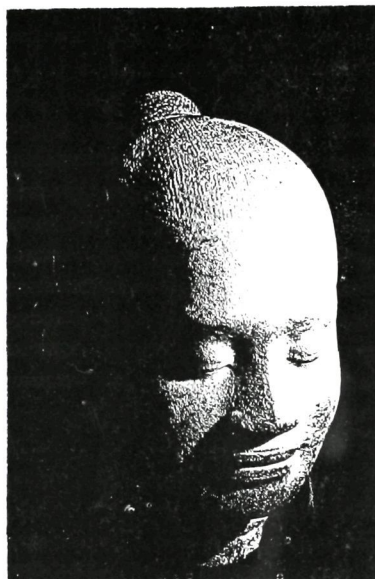
Dharanindravaman I was succeeded by the son of one of his nieces, the great Suryavarman II, who eliminated him in 1112 in the wake of a day long battle and subsequently claimed to have "unified [this] double kingdom." He installed himself at Angkor in a palace whose location is still unknown but which was probably not far from the temple mountain of Angkor Wat for which he is particularly well known. He commenced construction of this colossal undertaking towards the end of his reign, making its completion in his lifetime impossible. At the outset Suryavarman II's reign was christened by bloodshed. Subsequently relations between the Khmers and the Chams became confused and difficult to follow. The last clear trace of Suryavarman II dates to 1145, although it is possible that he may have been embroiled in an unsuccessful expedition against the Dai Viet as late as 1150.

His successor was Yasovarman II, a king whose origins are virtually unknown, since not even one inscription has been preserved from his reign. He resided at Angkor and his palace it seems was built on terrain ultimately claimed by the temple monastery of Preah Khan. The relocation of his palace suggests that he was unrelated to his predecessor. It is known that he was killed around 1165 by one of his servants who subsequently crowned himself under the name of Tribhuvanadityavarman. Little is known of this last ruler apart from his death in 1177. In the same year a Cham ruler, Jaya-Indravarman IV, ascended the Mekong as far north as the Tonlé Sap, in order to secure the Khmer capital and sack it.



## Jayavarman VI

The future Jayavarman VII, son of a certain Dharanindravarman was residing in Champa when Yasovarman II was assassinated; but his arrival to Angkor was too late to restore Khmer sovereignty. Before being consecrated king in 1181, he first had to confront the Cham forces of Jaya-Indravarman IV at Angkor. Although his rightful claim to the throne is far from clear, Jayavarman VII was undoubtedly the greatest king of the Angkor period, if not of all Khmer history. He was a frenetic builder, covering Angkor with religious monuments, possibly destroying earlier structures in his zeal. He is for example attributed with the first temple-monastery of Ta Prohm (1186), then that of Preah Khan (1191). The latter was preceded on the east by his *baray*, the Jayatataka, in the center of which is situated the beautiful sanctuary of Neak Pean and, to its east, Ta Som. Jayavarman VII installed himself within the enclosing walls of the old palace of Suryavar-



Sculpted Head of Jayavarman VII

man I and erected his temple of state, Jayavarman VII's capital is today known as the Bayon, at the center of his capital. Angkor Thom and was fortified with a powerful double wall and a wide moat in order to avoid the misfortunes of his predecessors. The temples of Banteay Kdei, Prasat Prei, Krol Ko as well as the Elephant Terrace and Terrace of the Leper King were also erected during his reign. Numerous other monuments both within and without the Angkor region, including approximately 100 hospitals and an extensive infra-structure were attributed to his architectural zeal and humanitarian concerns. Additionally, the old basin of Sras Srang was restored under his instruction together with other monuments in the general vicinity. In short, Jayavarman VII modified so profoundly the countryside of Angkor that it is now difficult to distinguish what might have existed before the advent of his rule. The perimeters of his empire were stretched to their furthest limits--as far as north as Vientiane and as far south as Vietnam.

Jayavarman VII was a fervent Buddhist and took every opportunity to affirm his faith. Less frequently discussed is his religious tolerance, which is given testimony by at least two architectural monuments which he sponsored, Preah Khan of Angkor and the Bayon, both of which contained Buddhist temples at their centers in addition to supplementary sanctuaries dedicated to Vishnu and Siva, and an additional structure reserved for honoring the ancient kings of Cambodia. Jayavarman VII's religious zeal

was further complemented by his ambitions as a ruler and a warrior; the Khmer empire reached the largest extent under the auspices of this rule.

### **The End of Angkor**

Little is known regarding the last years of Jayavarman VII's reign beyond an inscription dating to 1206 which mentions him. The date of his death is unknown, although 1220 has been proposed as a rough approximation, as it marks the apparent cessation of Khmer influence on the Champa. His demise underlines the end of an era and the end of a massive building campaign and the resultant drain on the national purse. It also marks the beginning of the ultimate decline of the Khmer empire, the dissolution of its various territories and the commencement of a period of unrest caused by intermittent raids upon the Khmer state by the Thai of Sukhothai (Syam).

Of Jayavarman VII's successor, Indravarman II and his reign, little is known; nothing indicates that the two were related. He died in 1243, and was succeeded by Jayavarman VIII. It was probably under his reign that a Saivite reaction took place which led to smashing Buddha images in the principal temples of Angkor and the transformation of the Bayon into a sanctuary of Siva. It seems likely that what was once believed to be an iconoclastic period (anti-Buddhist) was but the end of the once harmonious relationship between Mahayana Buddhists and Saivites, with the latter aggressively asserting their supremacy upon the temple of state.

Jayavarman VIII was forced to abdicate in 1295 in favor of his general, Srindravarman, about whom little is known. It was during his reign however that the famous Chinese traveller, Zhou Ta-kuan visited Angkor and recorded his observations on Khmer life. Srindravarman has left us the first Pali inscription discovered in Cambodia, clearly indicating the appearance of Hinayana Buddhism by the end of the 13th century. His successor, Srindrājavarman, while belonging to his line reigned 20 years virtually without a trace.

In 1327, another King named Jayavarma-Paramesvara ascended the throne, an event that is signaled by the last Sanskrit inscription thus far recovered from the region and marks the close of the so-called Angkorian period. The end of his reign is clouded in mystery as is also the rest of the 14th century. The traditional date cited for the termination of this period is 1432, associated with the fall of Angkor Thom to the Thais and its subsequent evacuation. The period which followed is shadowy, no definite link connecting this prince and the so-called historical kings cited in the Royal Chronicles of Cambodia. And these kings do not necessarily coincide with those cited in the Laotian and Khmer annals or Chinese histories.

## APPENDIX B

### KHMER ARCHITECTURAL DEVELOPMENT

The evolution of Khmer architectural tradition is a complex subject that has been examined by numerous scholars most of whom have developed their own descriptive analysis. To avoid an unnecessarily detailed examination of the architectural development, the following condensed descriptions are intended to highlight the significant stages of the architectural evolution in Angkor.

#### A Chart of the Angkor Period:

The following chart sets out the different periods of architectural development and identifies the key structures built in the period:

##### Pre-Classical Period:

Angkor	Ak Yum (802-921)	Roluos Group; Phnom Bakheng; Baksei Chamkrong.
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##### Transition Period:

Angkor	Koh Ker (921-968)	Phnom Bakheng; East Mebon; Pre Rup.
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##### Classical Period:

Angkor	Banteay Srei (967-1181)	Phimeanakas; Takeo Baphuon Preah Vihear; Angkor Wat.
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##### Late-Classical Period:

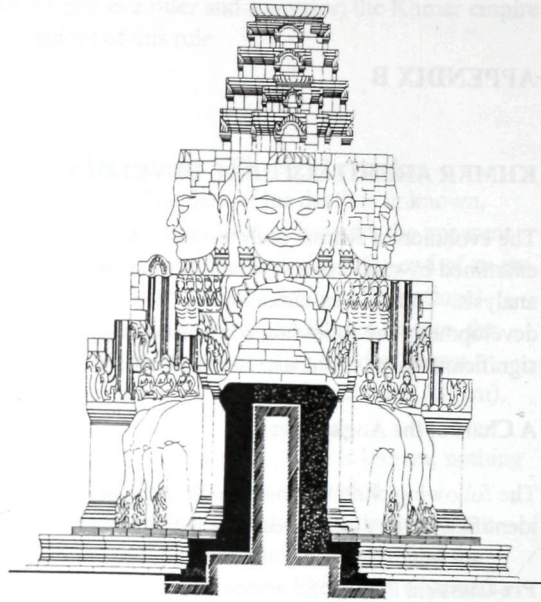
Angkor	Ta Prohm; Preah Khan (1181-1295)	Bayon; Royal Terraces; Sras Srang
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There are no visible remains of the Khmer civilization except temples and civic works such as the embankments of the towns, barays, canals, bridges and defensive walls. Dwellings, except those of the kings, have completely disappeared as they were constructed in wood and other relatively ephemeral materials. Villagers also built religious structures of wood although it is impossible to determine the number of



structures built by the faithful, as they have disappeared without a trace. This is why it is sometimes said that the Hindu religion is reserved for the aristocracy.

The ancient temples of Hinduism and Mahayana Buddhism in Cambodia, like those in India, were the residences of the gods. The gods resided in the middle of the city so that men could bring gifts. Temples did not have large assembly halls as only the priests, the servants of god, were allowed into the interiors.

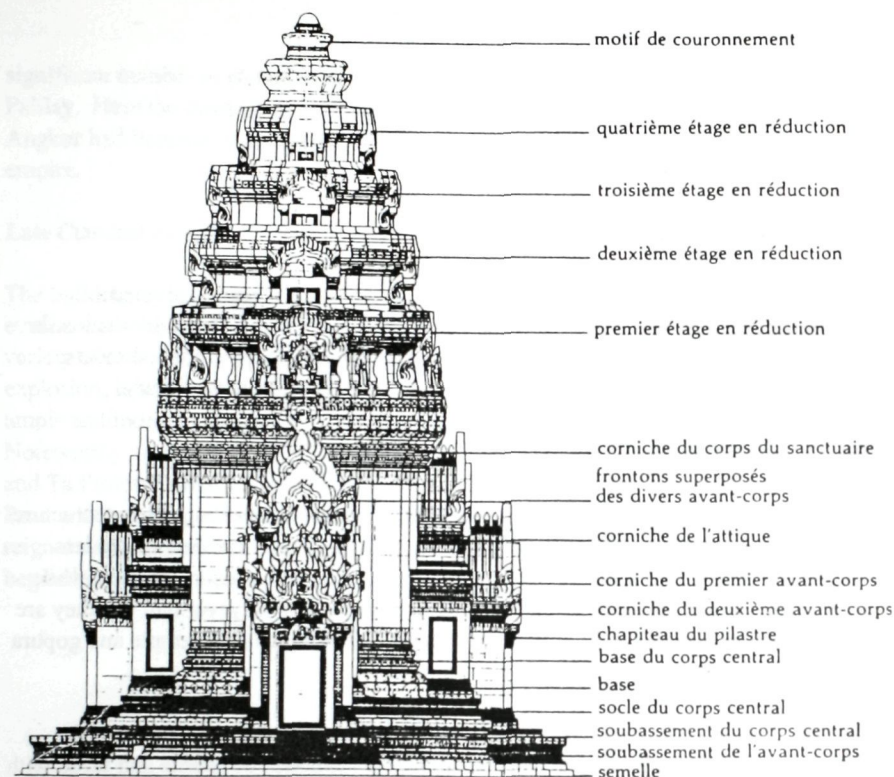


Angkor Thom. East Gate.

This type of architectural style often borrowed elements of the sacred Indian architecture. For example, the corbelled arch is used instead of the “true” arch even though the corbelled arch is more fragile and not able to span large spaces. Structures that predate the Angkor Period also reveal their Indian origins - both in the design of temples and in their decoration. Certain temples elaborated upon the simple, square plan by the addition of projections. Although, in some cases, a vestibule appears in front of the main cell, it is the superstructure of the primary cell (garbha griha) that serves as the focal point of the structure.

Most pre-Angkorian temples of this period are located on raised ground in low-lying regions, usually in valleys, and have an eastern orientation. There are exceptions which reflect either topographical considerations or the interrelationship of one structure with another. Typically each temple stands alone, however groups of two or three have been found aligned in a haphazard fashion, suggesting spontaneous expansion.

Religious structures of the Angkor period were almost always constructed with an eastern orientation. The development of the staged pyramid and axial temple forms has its roots in the early architectural innovations of this formative period. Even the rigorous attempt to plan a given temple complex, with all its attendant subsidiary structures, can be seen as a reaction to the previous, more spontaneous, architectural expressions.



Some Principal Elements of Khmer Architecture

Architects employed the corbelled vault for narrow entrances and a series of successive drums to support the superstructure. The interiors of such domed areas were typically masked by a low ceiling formed of perishable material which has long since disappeared.

The structures of this period are principally of brick. Stone was used to highlight door and window reveals. Decorative motifs are relatively simple and reflect Indian inspiration. Over time their forms and placement became increasingly sophisticated.

The brickwork was often laid with dry joints. The only mortar used was a type of vegetable-derived adhesive, the recipe of which has long since been lost. Bricks were sometimes carved *in situ*, sometimes plastered and probably polychromed.

Laterite, which is a coarse, soft stone found throughout Cambodia, was a common building material and in early construction it often replaced brickwork. In the early developmental stages, the finer quality Kulen sandstone was used solely for the architectural embellishments. Over time, its use increased to the point where some of the great temples of the Angkor group are built only of Kulen sandstone.



## **Building Periods and Locations**

### **Early Classical Period**

Significant among the developments at Roluos are the single prasats aligned systematically in groups of six and raised on a laterite platform. The individual cells were fashioned of brick and were complemented with sandstone embellishments. Noteworthy among the architectural innovations of this period is the library.

### **The Transitional Period**

The architecture of the reign of Rajendravarman II, including the magnificent structure of Banteay Srei, is largely transitional in character. The decorative aspects are less noteworthy and largely reflect an attempt to expand upon an earlier vocabulary while developing a newer, more innovative character. Later, under Jayavarman VII they are reinterpreted as frames for the Lokesvara faces which dominate the temple and gopura prasats or towers.

The use of brickwork was greatly reduced and Banteay Srei marked the end of the plastered brick prasat, these structures being largely fashioned of laterite and faced with decorative sandstone. Noteworthy among the several developments at Banteay Srei are the library designs and the triple form of the boldly arched frontons positioned over the doorways, each intricately carved either with scenes from the Ramayana or with vegetal ornamentation.

### **Classical Period**

Jayavarman V and Suryavarman I were important builders. During their reigns and the intervening years of Udayadityavarman I and Jayaviravarman, the most noteworthy of their works were thought to have been commenced by Jayavarman V and completed by Suryavarman I. Significant aspects of this period are the terraced pyramids and the development of stone vaulted galleries. The primary orientation was generally to the east and the decoration was more refined than that of its predecessors.

The Baphuon temple represents a further step in the development of the Khmer pyramid temple, with its multiple terraces, concentric galleries and their attendant gopuras and corner pavilions.

Angkor Wat was Suryavarman II's testimony to Khmer ingenuity, illustrating a



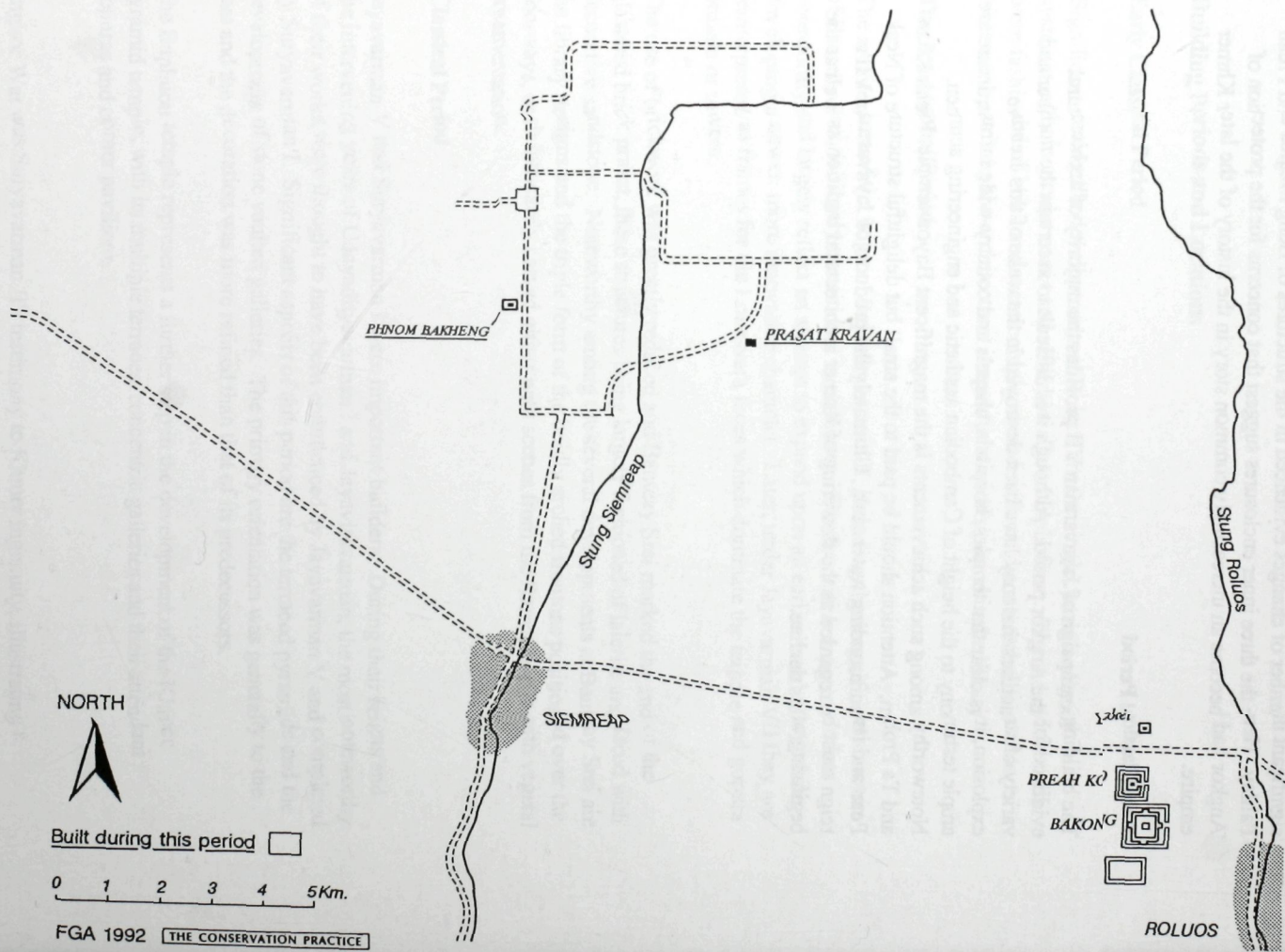
significant number of changes evidenced in the structures of Beng Mealea and Preah Palilay. Here the three inner enclosures suggest that concerns for the protection of Angkor had become an increasingly common story in the history of the later Khmer empire.

### **Late Classical Period**

The building campaign of Jayavarman VII provides the majority of architectural evidence for the Angkor period. Although it is difficult to ascertain the number and variety of structures that may have been destroyed in the wake of this creative explosion, it is clear that temples, hospitals, chapels and country-wide infrastructure are ample testimony to the height of Cambodian aesthetic and engineering acumen. Noteworthy among such achievements is the magnificent Bayon temple, Preah Khan and Ta Prohm. Attention should be paid to the small but delightful structure of Neak Pean and its surrounding water tank. Ultimately the products of Jayavarman VII's reign must be regarded as the flowering of Khmer architectural tradition as well as the beginning of its decline.

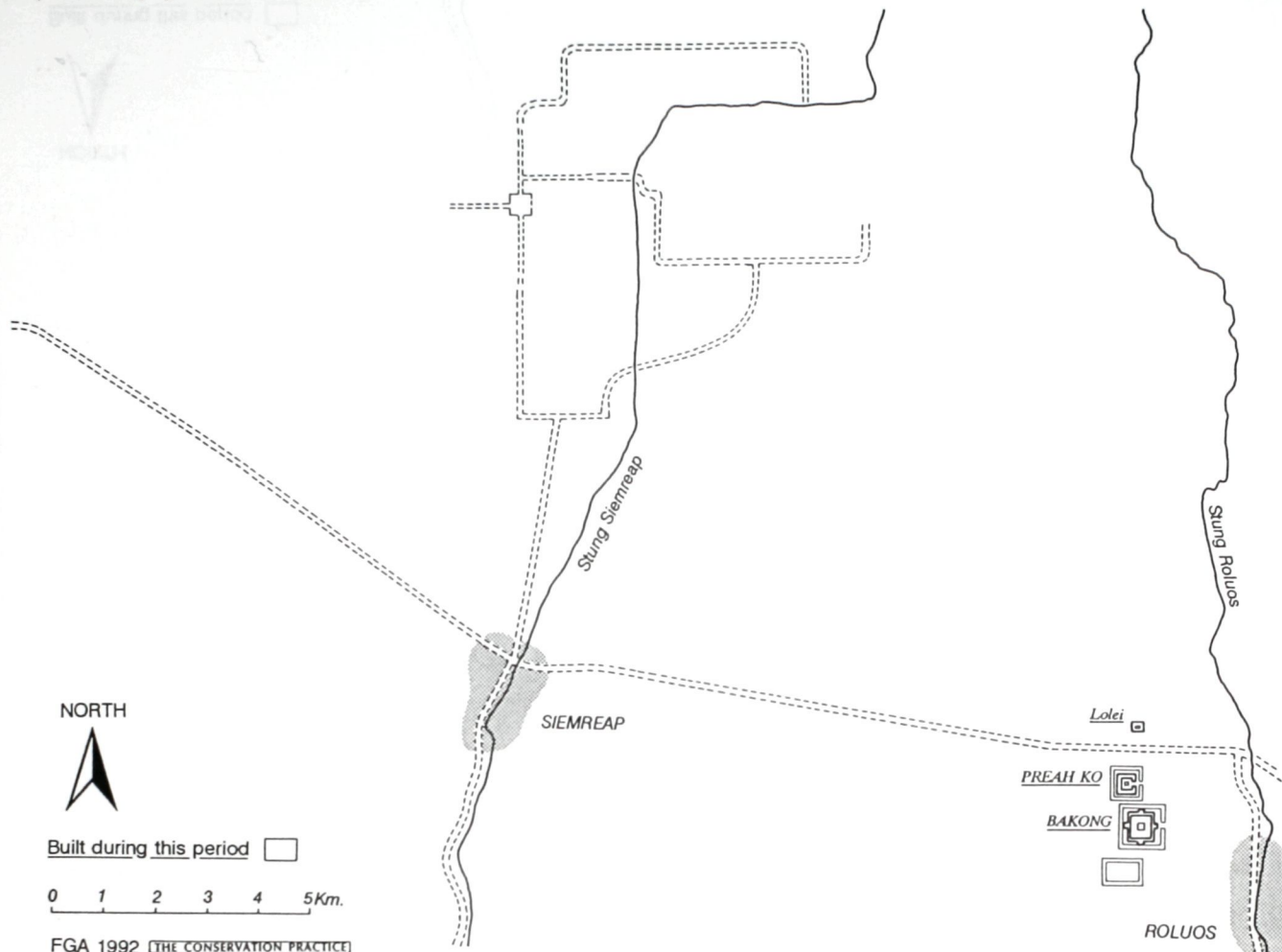
# THE STYLE OF BAKHENG

(end of the 9th. century and beginning of the tenth century)



# THE STYLE OF ROLUOS

(second half of the 9th. century)



Built during this period ☐

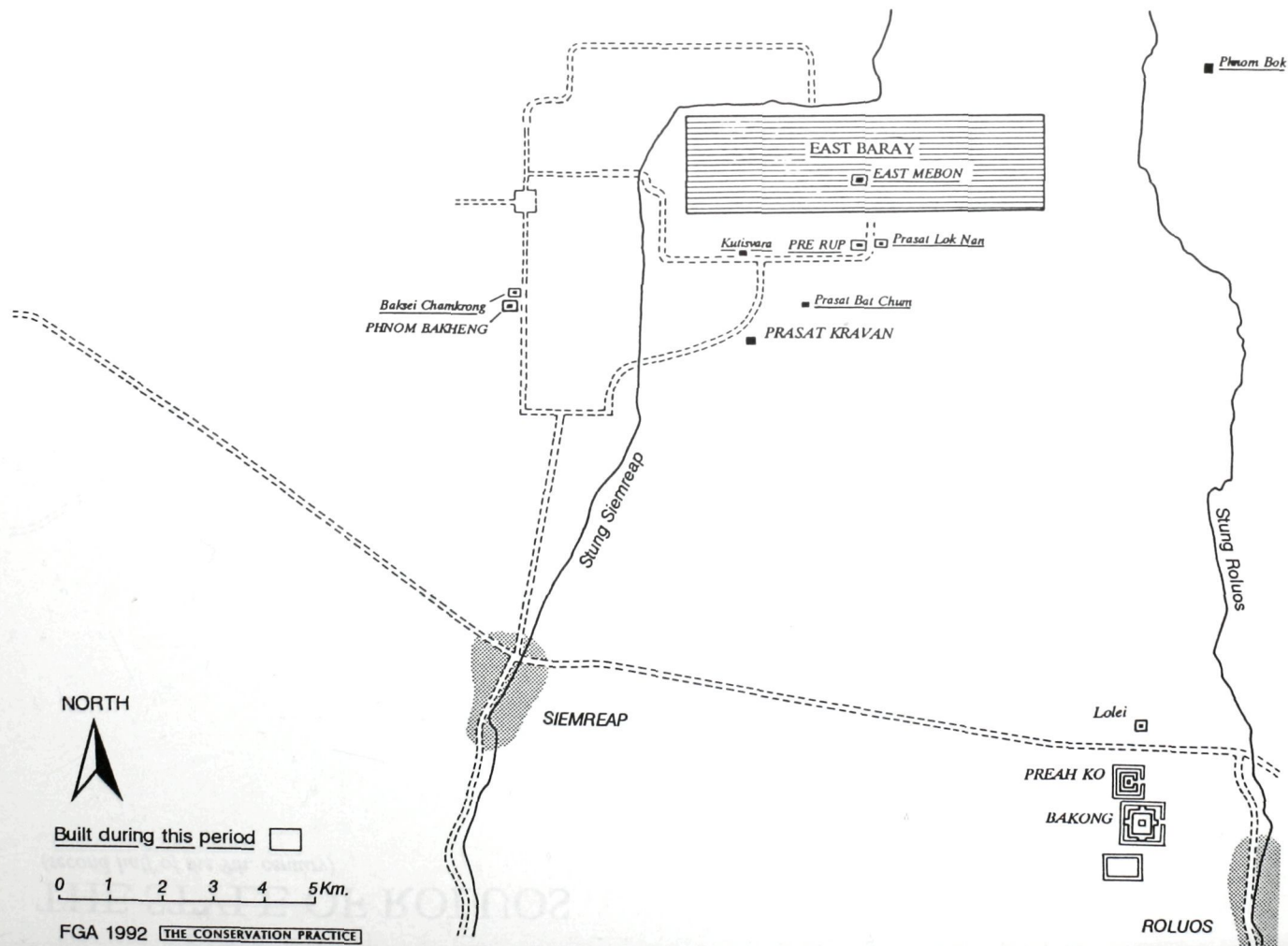
0 1 2 3 4 5 Km.

FGA 1992 THE CONSERVATION PRACTICE



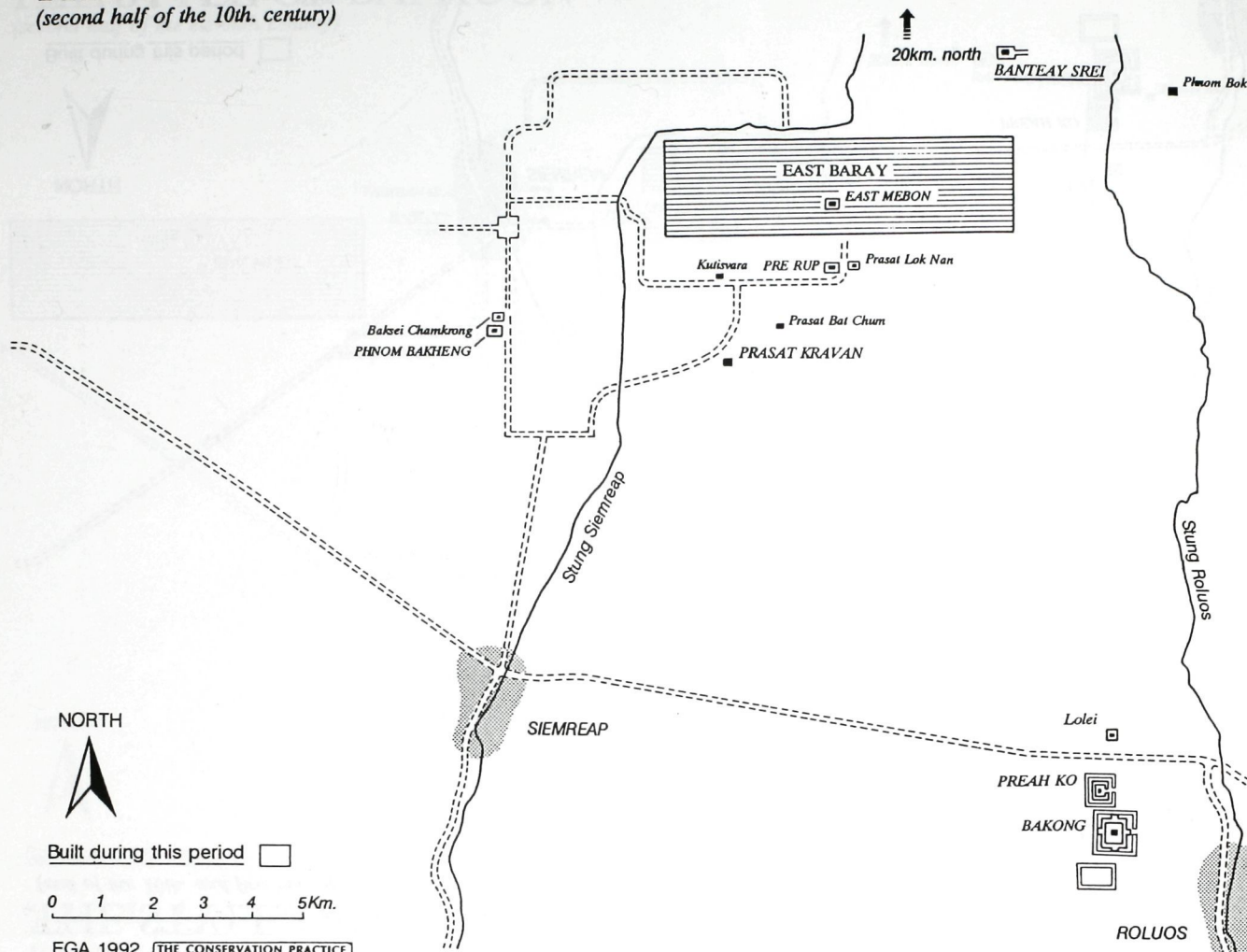
# THE STYLE OF KOH KER

(about the middle of the 10th. century)



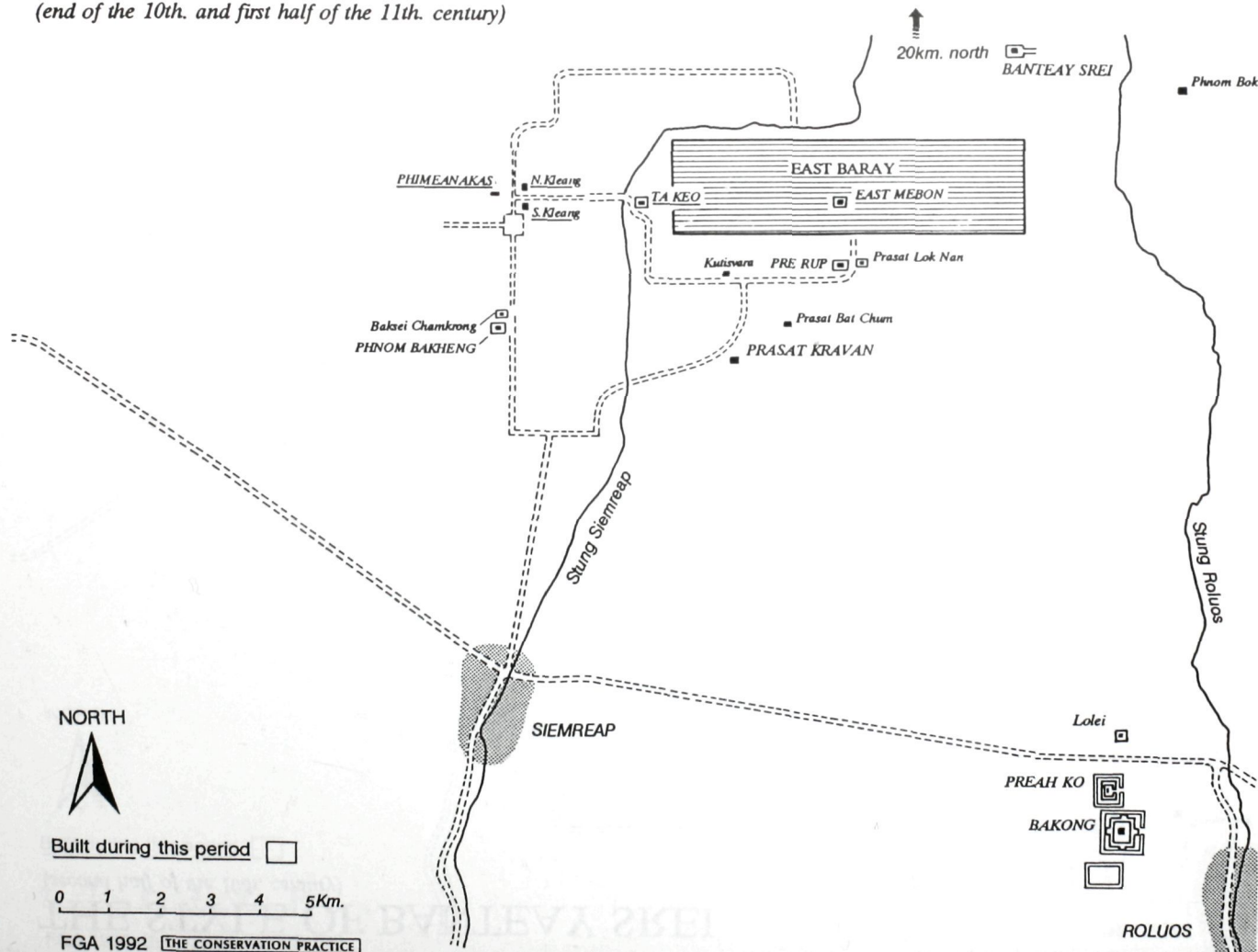
# THE STYLE OF BANTEAY SREI

(second half of the 10th. century)



# THE STYLE OF KLEANG

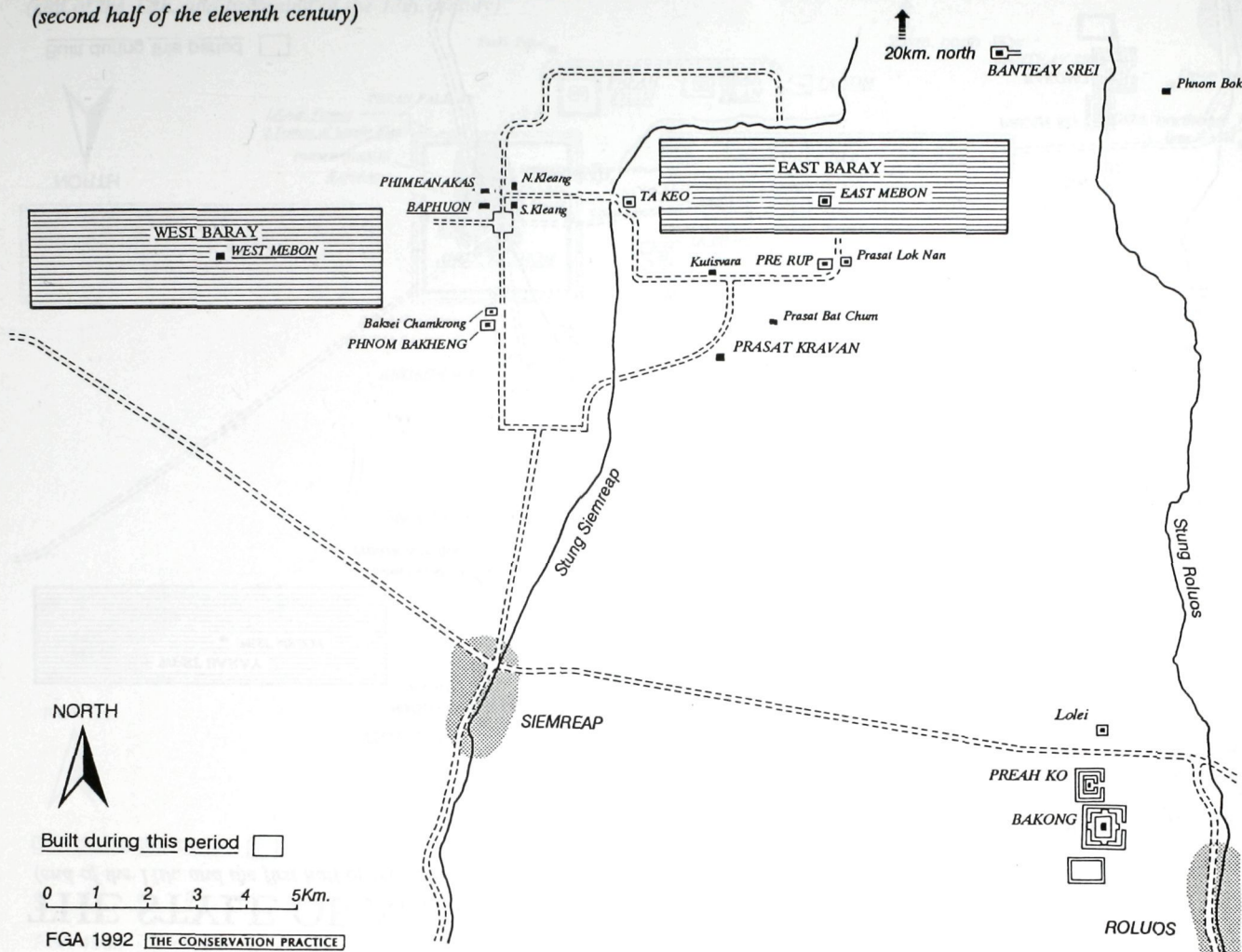
(end of the 10th. and first half of the 11th. century)





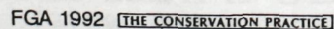
# THE STYLE OF BAPHUON

(second half of the eleventh century)



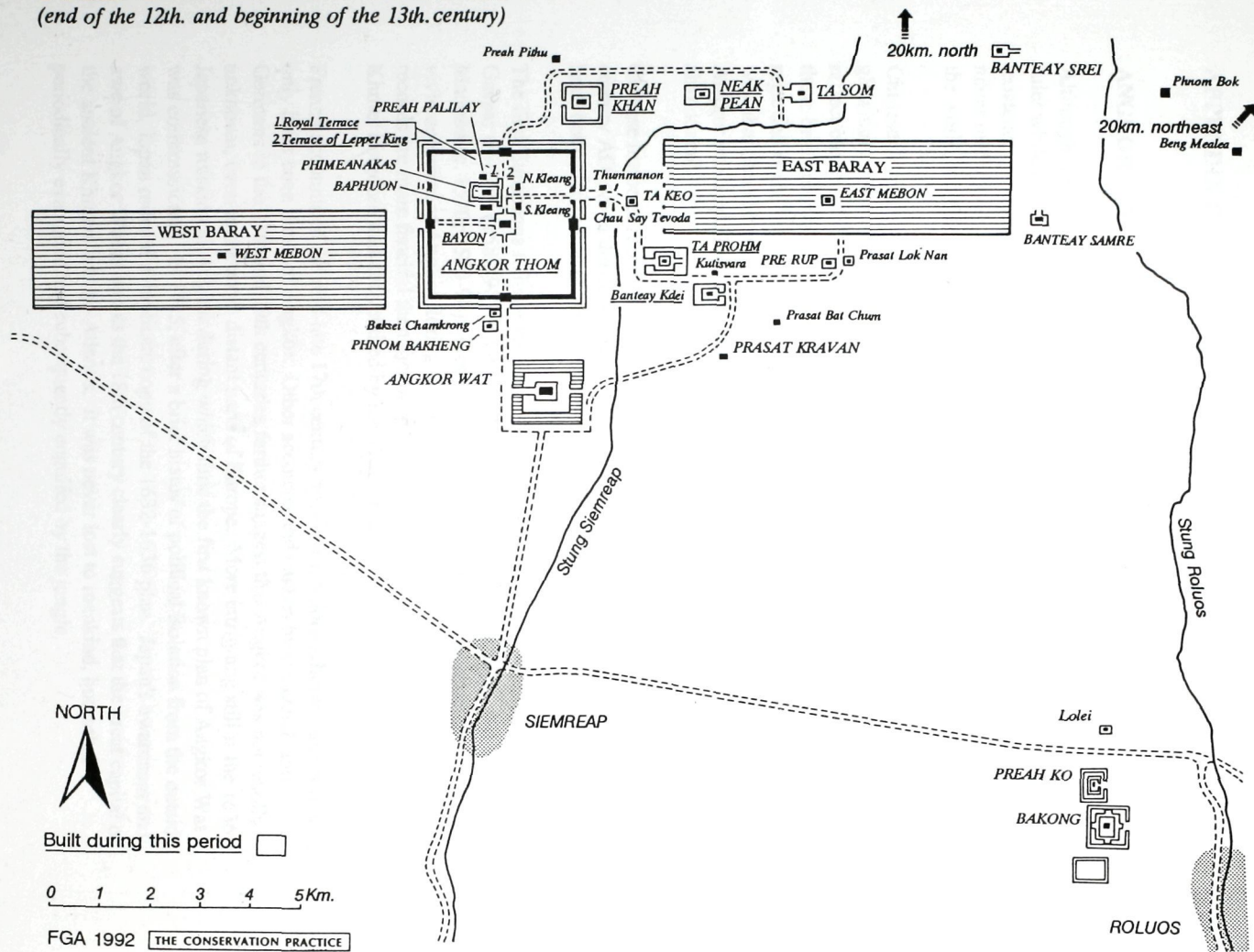
(end of the 11th. and the first half of the 12th. century)

(end of the 11th. and the first half of the 12th. century)



# THE STYLE OF BAYON

(end of the 12th. and beginning of the 13th. century)



NORTH

Built during this period ☐

0 1 2 3 4 5 Km.

FGA 1992 THE CONSERVATION PRACTICE



## APPENDIX C

### ANGKOR AFTER THE DECLINE OF THE KHMER KINGDOM

Although it has been claimed that Angkor was discovered by a 16th century Khmer ruler while on an elephant hunting expedition (implying his total ignorance of its existence), it seems, from the smattering of references to the site, that Angkor was never really "lost" to the Khmers. Nor was it ever totally unknown to the rest of the world, which is typically said to have "rediscovered" it.

Chinese descriptions of the kingdom, between the 13th and 14th centuries, speak glowingly of its wealth and prosperity. References to Thai incursions do not seem to reflect concern for the stability of the country. Nevertheless, more significant than these brief intervals of abandonment is the periodic return to Angkor which was still regarded as the "center of the universe" and the seat of political authority. If the area was abandoned it was never an act of willfulness on the part of the Khmer people. Angkor was a symbol of their cultural heritage, and this they have never voluntarily abandoned.

Chinese histories record an awareness of Cambodia's existence as early as the third century AD, when the deltaic region of the Mekong River Valley (Funan) is said to have both sent and received embassies to and from China.

The first Europeans to have visited the Angkor region were the Portuguese, Franciscan Gaspar da Cruz (1580-90) and the Dominican monks, Lopo Cardozo and Joao Madeira (c. 1570; 1580-90). From both Portuguese and Spanish travellers there are vivid accounts of Angkor during the 16th and 17th centuries. Although some of these records are more fanciful than factual, it is clear that the memory of the once great Khmer kingdom had not yet died by the 17th century.

French accounts of the mid-late 17th century speak of fabulous Khmer ruins which can only have been those of Angkor. Other accounts and studies by the Dutch and Germans in the 17th and 19th centuries further suggest that Angkor was not wholly unknown, even in the more distant parts of Europe. More intriguing still is the 1636 Japanese mission to Angkor during which time the first known plan of Angkor Wat was commissioned. In 1715, after a brief hiatus of political isolation from the outside world, Japan ordered a duplicate copy of the 1632-1636 plan. Japan's awareness and awe of Angkor Wat as late as the 18th century clearly suggests that the great capital of the ancient Khmers was no Atlantis. It was never lost to mankind, but rather periodically evacuated and subsequently engulfed by the jungle.

Beginning with the works of Pallegoix, Bouillevaux and Mouhot, it becomes clear that by the end of the 19th century Angkor was well on its way to being revitalized in the annals of history. By 1909 more than 200 European works had been produced on the subject of Khmer civilization.

Brief mention should be made of the following significant missions: Lagree-Garnier Mission (1866-67); Lunet de Lajonquiere (1902-11); Louis Delaporte (1873); Etienne Aymonier (1888). Additional mention should be made of the sudden blossoming of societies (Paris Missionary Society, Paris Geographical Society, Ecole Francaise de l'Extreme Orient (EFEO) and the development of museums featuring Khmer art both in France and then Phenom Penh.

## **APPENDIX D**

### **CONSERVATION HISTORY IN ANGKOR**

It is more than likely that the first attempts at conservation in Angkor are of Khmer instigation. The earliest known record of such attempts can be credited to Rajindravarman II (944-968) with the restoration of Yasodharapura in the mid-10th century. In the 12th century Jayavarman VII may have completed the restoration of Srah Srang and some other monuments in the vicinity. Early Portuguese missionaries, Lopo Cardoso and Joao Madeira, subtly refer to restoration projects undertaken by King Satha in 1576. According to inscriptions, he invested considerable energy in the restoration of existing hydraulic irrigation systems as well as Angkor Wat. The nine central towers of Angkor Wat were regilded in 1577 and the Bayon was restored a decade later.

The Conservation d'Angkor was established in 1908. This marked the start of the EFEO's restoration efforts undertaken by a series of directors beginning with Jean Commaille. Prior to this, in the late 19th century, activities at the site were primarily concerned with exploration. Commaille, who was killed in 1916, was succeeded by such luminaries as Henri Marchal, Maurice Glaize and Bernard Philippe Groslier. In 1907 the Conservation d'Angkor was established. From its inception until its dissolution in 1976, the direction of the Conservation d'Angkor remained in the hands of French archaeologists and restorers. Today the institution is being restored by the Cambodian government with the assistance of various international organizations working again at Angkor.

The initial projects undertaken by the EFEO and the Conservation d'Angkor were archaeological in nature, but after 1930 they focused increasingly on conservation activities in both minor and major projects.

### **CONSERVATION INTERVENTIONS**

There were major conservation interventions taking place at Angkor between the beginning of the present century and 1976. Information concerning these efforts is maintained in the archives of EFEO in Paris and is currently being catalogued. Initial research on the conservation history of Angkor carried out by members of the WMF team revealed the following incomplete, but nonetheless revealing information:



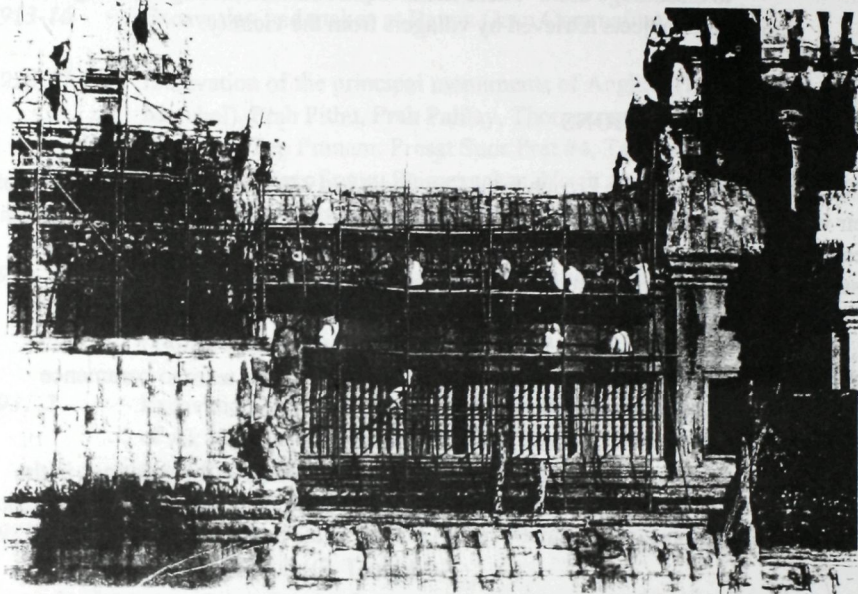
- 1908-12* Excavation and cleaning in and around Angkor Wat (Jean Commaille): North and South Kleang; Phimeanakas; Baphuon.
- 1913-16* Excavation undertaken at Bayon (Jean Commaille).
- 1916-21* Excavation of the principal monuments of Angkor Thom (Henri Marchal), Prah Pithu, Prah Palilay, Thommanon, Chausay Tevoda, Baphuon, Tep Pranam, Prasat Suor Prat #4, Ta Prohm, Krol Ko, Ta Prohm Kel, Sras Srang, Phimeanakas, North and South Kleang, Baksei Chamrong, (H. Marchal and Charles Bateur) and Banteay Kdei.
- 1921-30* Excavation of other monuments of the Angkor region (H. Marchal): Preah Khan of Angkor, Neak Pean, Phnom Bakheng, Prasat Kravanh (Parmentier and Goloubew); and Banteay Srei.
- 1931-2* Excavation and clearing of the Eastern Baray, including the temple site of Ak Yum, excavation of Pre Rup (begun by Marchal), Preah Koh of the Roluos group (George Trouve.)
- 1932-5* Anastylis of Banteay Srei (Henri Marchal); excavation of Ak Yum and Preah Koh (G. Trouve.)
- 1936-45* Restoration of Banteay Samre, Bakong (J. Lagisquet and M. Glaize); Neak Pean (M. Glaize) and certain sanctuaries at Preah Khan (M. Glaize); Prah Palilay; Phom Krom (M. Glaize); East Mebon (H. Marchal and M. Glaize); Phimeanakas (M. Glaize).
- 1948-53* Restoration of Sras Srang (Jean Boisselier.)
- 1954-9* Restoration of Neak Pean, Preah Khan, Pre Rup, Thommanon and the central causeway of Angkor Thom (Jean Laur and Rene Dumont).
- 1959-70* Continuation of work on the southern approach to Angkor Thom, the temple of Thommanon, and commencement of work on Baphuon; work on the eastern approach to Angkor Wat as far as its passage of the moat; work on the approach to Sras Srang; restoration of Prasat Kravan; excavation of small temples north of Phnom Bakheng and the southern group of temples at Sambor Prei Kuk. Work at the prehistoric site of Mimot in Kompong Cham province, excavation of the western side of Sras Srang, and the terrace of the Leper King (Bernard Philippe Groslier assisted by Guy Nafilyan until 1964 when he was replaced by Jacques Dumarcay). Removal of the Leper King in 1969 by Groslier to a more protected position in the National Museum, Phnom Penh and its

substitution of a concrete replacement. Collection and storage of many movable images in warehouses located with the Conservation d'Angkor to discourage theft. These items require further cataloging along with other objects retrieved by villagers from the vicinity.

## RECENT INTERVENTIONS

Since the withdrawal of the French from Cambodia in 1970 and the forced cessation of their work in progress, notably that at the Baphuon, the Cambodians have taken certain measures to protect their national heritage from the effects of war and the threats of destruction by the invading jungle. Conservation activities and programs include:

- 1986*            Invitation of the Archaeological Survey of India team to commence conservation work on Angkor Wat
- 1988-89*        Invitation to a Polish team (PKE) first to conserve the paintings in the Silver Pagoda of the Royal Palace of Phnom Penh and later to undertake a project at Bayon.
- 1989*            Appeal for international assistance after hurricane damage at Angkor.
- 1989*            Establishment and maintenance of a guard unit at Angkor to protect the monuments from encroachment, damage and theft.
- 1989*            Joint missions fielded by UNESCO, EFEO, WMF and Sophia University to study aspects of the conservation challenge at Angkor.
- 1990*            The UNESCO International Round Table Meeting of Experts for the Preservation of Angkor, held in Bangkok.
- 1991*            EFEO/Sophia University Joint Mission. WMF collaborative mission with Sophia University, EFEO and UNESCO. Second Round Table Meeting of Experts for the Conservation of Angkor, held in Paris.
- 1992:*            UNESCO office establishment in Phnom Penh; UNESCO Angkor Master Plan commences; various missions by EFEO, Sophia University and WMF. Cambodia Past, Present and Future Symposium held at the Asia Society in New York.



Angkor Wat, Restoration at Central Temple Complex, 1989.

## CURRENT INTERNATIONALLY SUPPORTED CONSERVATION EFFORTS

### Unesco's Contribution

For many years, UNESCO has had an active interest in becoming involved with conservation activities in Angkor. Unesco's first mission to Cambodia since the war years of the 1970s was in May of 1989 and was led by Professors Ishizawa and Jacques. UNESCO later drew up a *Plan of Action*, which was circulated to member countries in an effort to raise funds and interest in the conservation of the Historic City of Angkor. One result of this request was a generous donation from the Japanese Government towards further mobilizing an international effort to preserve and present Angkor. These funds enabled UNESCO to host a conference of international specialists in June 1990. Other activities proposed in the *Plan of Action* included the encouragement of research at centers around the world, the establishment of a research center in Angkor (Siem Reap) and the establishment of a coordinating office in Phnom Penh.

Considerable accomplishments have been achieved by UNESCO, especially since the establishment of its office in Phnom Penh in November 1991, in the areas of



conservation legislation, education, curbing the illicit traffic of antiquities, documentary films, site surveys, and the organization of a large number of intergovernmental conferences.

### **Contributions from India**

On September 29, 1983 the Government of India presented to the People's Republic of Kampuchea a Project Report outlining a proposed plan for the restoration of the temple of Angkor Wat. It included plans for extensive restoration of the four corridors of the third enclosure, repairs to the causeways, the cruciform gallery and a drainage system, and the cleaning of various parts of the structure. The proposed project plan was accepted early in 1986, after which the Archaeological Survey of India (ASI) commenced its conservation program, working in six-month campaigns each year. In the first two six-month seasons of 1986-87 numerous projects were commenced: (1) restoration and repair of the northern embankment of the moat adjacent to the main entrance; (2) restoration of the Northern Library; (3) continuation of the repairs to the moat; (4) dismantling and the reconstruction of the plinth, porches and steps of the Southern and Northern Libraries; (5) repairs to the Esplanade pavement; and (6) completion of the roof rebuilding over the Samudranatha relief of the Third Gallery after modifying the foundations and drainage systems. In conjunction with these efforts, cleaning of the structures was also undertaken.

### **Contributions from Poland**

The Polish Government was among the first to respond to the need for assistance at Angkor. After having established a support group called the Friends of Angkor Wat, the Polish team entered into a contractual agreement with Cambodia in 1988. Prior to this, they had already worked for two seasons (six months each) on the restoration of the early 20th century Ramayana paintings located in the Silver Pagoda of the Royal Palace in Phnom Penh. Their plans called for commencement of anastylosis at the Bayon in Fall 1989. A Polish group has produced a film on the Angkor region, to illustrate the historical background and significance of these monuments as a basis for new study of Khmer culture and civilization.

### **Contributions from Japan**

Among the several parties interested in assisting the Cambodians in this important and extensive undertaking, the Japanese team from Sophia University figure prominently. In the first phase of the Sophia University's *Project on the Study of Historical Sites Dating from 1985*, the temples of Angkor were but a portion of four South East Asian historical sites selected for comparative interdisciplinary study. (The other sites were Borobudur in Indonesia; Sukhothai in Thailand; and Pagan in Burma.) Problems of access to Angkor and communication were experienced by the Sophia team initially,

although subsequently, the Sophia University Team has visited Angkor several times. During the months of March 1991 and 1992, Sophia University collaborated in joint missions with the WMF.

During its first stage of research, the Sophia research team was concerned with the present state of preservation of the four study sites in South East Asia, and especially with some recent conservation efforts that were undertaken. The second stage of the Sofia study will focus on: (1) the development of a methodology for integrating the individual monuments into the lives of the local community; (2) presentation to the public in conjunction with related cultural art forms; and (3) development of the concept of "Cultural Space," which in the case of Angkor, will feature "historical site engineering."

The Japanese government has led all countries in providing financial support for training, analysis and conservation at Angkor.

### **Contributions from France**

Various French organizations are at work again in Cambodia in the current international effort to conserve Angkor. In 1988 a new organization, the Association of the Friends of Angkor (Association des Amis d'Angkor) was established. In the same year a significant exhibition of photographs by M. Nafilyan, with supplementary photographic works by Messrs. Claude Jacques, Rene Dumont and Matthieu Ravaux, again began to inform the public about Cambodia and the very significant contributions France had made to the rescue and understanding Angkor. The Friends of Angkor have organized a number of photographic exhibitions in Paris and Toulouse.

When Angkor was again accessible, the Association des Amis d'Angkor was among the first groups to revisit the site, after which a proposal was made for funding a study to complete the restoration of the Baphuon temple. This proposal was seen as a continuation of work previously undertaken by Commaillie in 1908 and resumed by Marchal in 1916. In 1950 further major work was undertaken involving the complete dismantling and rebuilding of the temple structure, but this was left unfinished when the French departed from the region in 1970.

In 1990 EFEO expressed a serious interest in the reestablishment of relations with Cambodia in a joint effort to conduct a widespread conservation survey of monuments which have suffered both as a result of recent war damage and jungle encroachment. As a result they established an office in Phnom Penh in January 1991 and began a collaborative project to study the condition of the monuments in Angkor. Since February 1992, permanent staff have been installed at Conservation d'Angkor who are working on a number of research activities and conservation plans.



## Contributions from Australia

The Australians have, through the Joint Australian Non-Governmental Organization (JANGO), shown interest in becoming involved in the Angkor conservation project. Australians residing in Cambodia have supported activities in the cultural heritage field in Cambodia. The Cultural Division of the Department of Foreign Affairs and Trade have promoted important advisory support to the Cambodian government and UNESCO. In 1990, over 140 kilograms of architectural and cultural heritage textbooks were shipped to the University of Beaux Arts. In 1992 a first major exhibition on Khmer art from the National Museum in Phnom Penh was displayed in Australia.

## World Monuments Fund's Contribution

In December 1989 at the invitation of the Cambodian Government, the World Monuments Fund sent its first mission to establish contacts and to carry out an initial assessment of the conservation challenge at Angkor in order to assist the Department of Conservation in the development of a conservation master plan for the site. A mission was fielded in March 1991 to continue this study and to consider the possibility of establishing a conservation project in Preah Khan. A subsequent mission in March 1992 resulted in a proposed plan for the preservation and presentation of Preah Khan. WMF site missions IV, V and VI occurred between November 1992 and March 1993 during the organization's first major conservation mobilization campaign involving field testing, feasibility studies and site preparation.

## GENERAL

Abel, R. L.

Geographic Names

Archaeological Survey

Hall and J. E. Wilson

Archaeological Survey

Ames, M. R. ed. 1980

Ames, M. R. "Angkor Wat" 1980

VII, in W. W. Wood, ed. 1980

Ames, M. R. "Angkor Wat" 1980

Ames, M. R. "Geography of Cambodia" 1980

Bajard, D. "The Role of Indo-Chinese Civilization in the Development of the Pre-History of South East Asia," *Indo-Chinese Civilization*, Vol. 2, No. 1 (Spring 1980) 89-114.



## APPENDIX E

### SELECTED BIBLIOGRAPHY

#### Frequently Cited Sources

AAK	Arts Asiatique Khmers
BCAI	Bulletin de la Commission Archeologique
BEFEO	Bulletin d'Ecole Francaise d'Extreme Orient
BSEI	Bulletin de la Societe des Etudes Indochinoises
BSOAS	Bulletin of the School of Oriental and African Studies
FEQ	Far Eastern Quarterly
JA	Journal Asiatique
JRAS	Journal of the Royal Asiatic Society
JSS	Journal of the Siam Society
PA	Pacific Affairs

- \* Recommended for information on the colonization of Cambodia as well as on contemporary Cambodia
- \*\* Refers specifically to pre-history and the early Angkor period.
- \*\*\* Contains with specific references to Preah Khan

#### GENERAL BIBLIOGRAPHY:

Abercrombie, Thomas J. "Cambodia: Indo-China's Neutral Corner," *National Geographic* (October 1964): pp. 514 ff. \*

Aeusrivognse, Nidhi. "The Devaraja Cult and Khmer Kingship at Angkor," in K. R. Hall and J. K. Whitmore, eds., *Explorations in Early South East Asian History* (Ann Arbor, Mich., 1976): 107-148.

Anand, Mulk Raj, ed. *Angkor* (*Marg*, vol xxiii, no. 1, 1973).

Auboyer, J. "Aspects de l'art bouddhique au pays khmer au temps de Jayavarman VII," in W. Watson, ed., *Mahayanist Art after AD 900* (London, 1977): 66-74.

Aymonier, Etienne. *Le Cambodge*. (3 Vols.) Paris: 1900, 1901, 1904.

Aymonier, E. *Geographie du Cambodge* (Paris, 1876).

Bayard, Donn. "The Roots of Indo-Chinese Civilization: Recent Developments in the Pre-History of South East Asia," *PA*, Vol. 53, No. 1 (Spring 1980): 89-114. \*\*

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### SELECTED BIBLIOGRAPHY

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\*\*\* Contains with specific references to Preah Khan

#### GENERAL BIBLIOGRAPHY:

Abercrombie, Thomas J. "Cambodia: Indo-China's Neutral Corner," *National Geographic* (October 1964): pp. 514 ff. \*

Aeusrivognse, Nidhi. "The Devaraja Cult and Khmer Kingship at Angkor," in K. R. Hall and J. K. Whitmore, eds., *Explorations in Early South East Asian History* (Ann Arbor, Mich., 1976): 107-148.

Anand, Mulk Raj, ed. *Angkor* (*Marg*, vol xxiii, no. 1, 1973).

Auboyer, J. "Aspects de l'art bouddhique au pays khmer au temps de Jayavarman VII," in W. Watson, ed., *Mahayanist Art after AD 900* (London, 1977): 66-74.

Aymonier, Etienne. *Le Cambodge*. (3 Vols.) Paris: 1900, 1901, 1904.

Aymonier, E. *Geographie du Cambodge* (Paris, 1876).

Bayard, Donn. "The Roots of Indo-Chinese Civilization: Recent Developments in the Pre-History of South East Asia," *PA*, Vol. 53, No. 1 (Spring 1980): 89-114. \*\*

Ciochon, Russell L. "Jungle Monuments of Angkor," *Natural History* (January 1990): 53-58.

Coe, Michael. "Social Typology and Tropical Forest Civilizations," *Comparative Studies in Society and History* (Vol. 4, 1961-62): 65-85.

Coedes, George. "Etude sur les bas-reliefs d'Angkor Vat" (*BEFEO*, XIII, 6. p. 1).

Coedes, G. Trois piedroits d'Angkor-Vat (*BCAI*, 1913, 2, p. 105). \*\*\*

Coedes, G. *Les etats hindouises d'Indochine et d'Indonesie* (Paris: F. de Boccard, 1948).

Coedes, G. *The Making of South East Asia* (London, 1966).

Coedes, G. "La stele de Preah Khan," *BEFEO* (Vol. 41, 1941): 256-301.

Coedes, G. *Les inscriptions du Cambodge*, 8 vols. (Hanoi and Paris, 1937-1966).

Commaillie, Jean. *Guide aux ruines d'Angkor* (Paris: 1912).

Commaillie, J. "Les ruines de Bassac" (*BEFEO*, II, 3, p. 260).

Coral Remusat, Gilberte de. *Les arts de l'Indochine* (Paris: 1938).

Coral Remusat, G. *L'Art khmer: Les grandes etapes de son evolution* (Paris: 1940, 2nd ed. 1951).

Courbin, Paul. *La Fouille du Sras-Srang* (*EFEO*, Paris 1988).

Dagens, Bruno. *Angkor, la foret de pierre* (Paris: 1989).

Delaporte, Louis. *Voyage au Cambodge. L'architecture khmere* (Paris: 1880).

Derret, J. D. M. "Rajadharma," *JAS*, Vol. 35, No. 4 (August 1976): 605.

Dobby, E. H. G. *South-East Asia* (London, 1950).

Dufour and Carpeaux. *Le Bayon d'Angkor Thom* (Paris: 1914).

Dumarcay, Jacques. *Le Bayon, Histoire architecturale du temple* (Paris, 1967) \*\*\*

Dumarcay J. *Documents Graphiques de La Conservation d'Angkor* (1963-1973) (*EFEO* Paris: 1988).

Dumarcay, J., *Ta Kev: Etude architecturale du temple* (Paris, 1971). \*\*\*

Finot, Louis. "L'archeologie en Indochine" (*BCAI*, 1913, 2): II.



- Finot, Louis. Les bas-reliefs du Baphuon (*BCAI*, 1910, 2. p. 155).
- Finot, Louis. "Sur quelques traditions indochinoises," *BCAI* (1911):20-37.
- Finot, Louis, Henri Parmentier, and Victor Goloubew. *Le temple d'Icavarapura (Bantay Srei)* (Memoires archeologiques, tome I, 1926).
- Finot, Louis, Henri Parmentier, and Victor Goloubew. *Le temple d'Angkor Vat*, 7 Vols. (Paris, 1929-32).
- Fournereau and Porcher. *Les ruines d'Angkor* (Paris: 1880).
- Frederic, Louis. *The Art of South East Asia* (New York: 1965).
- Frederic-Dupont. *Mission de la France en Asie* (Paris: n.d. ).
- Freeman & Warner. *Angkor, the Hidden Glories* (Boston 1990)
- Garnier, Francis. *Voyage d'exploration en Indochine*, 2 Vols. (Paris: 1873).
- Garrett, Wilbur. "The Temples of Angkor, Will they Survive?" *National Geographic* (May 1982): pp. 548 ff.
- Giteau, Madeleine. *Khmer Sculpture and the Angkor Civilization* (New York, 1966).
- Glaize, Maurice. *Les monuments du groupe d'Angkor* (Paris: 1963).
- Groslier, Bernard P. and Jacques Arthaud. *The Arts and Civilization of Angkor* (New York: 1957).
- Groslier, Bernard P. and Jacques Arthaud. *Indochina* (Cleveland: 1966).
- Groslier, Bernard P. and Jacques Arthaud. "Agriculture et religions dans l'empire angkorien," *Etudes rurales* (Nos. 53-56, January-December 1974): 95-117.
- Groslier, Bernard P. and Jacques Arthaud. *Angkor et le Cambodge au XVIe siecle d'apres les portugaises et espagnoles* (Paris, 1958).
- Groslier, Bernard P. and Jacques Arthaud. *Le Cambodge au XVIe siecle* (Paris, 1958).
- Groslier, Bernard P. and Jacques Arthaud. *Angkor, hommes et pierres* (Paris, 1956).
- Groslier, George. *Les recherches sur les Cambodgiens* (Paris: 1921).
- Groslier, George. *Angkor* (Paris: 1924).
- Groslier, George. "Essai sur l'architecture classique" (*AAK*, I, 3, p. 229).

Groslier, George. "Le temple de Prah Vihear" (*AAK*, I, 3, P. 275).

Hamilton, Alexander. *A New Account of the East Indies* (London, 1727).

Hansen, Erik. *Cambodge, Conservation de Sambor Prei Kuk, Phnom Kulen, Koh Ker, Beng Mealea et Preah Khan de Kompong Svay* (Paris: UNESCO, 1969). \*\*\*

Herz, Martin F. *A Short History of Cambodia from the Days of Angkor to the Present* (London: Stevens, 1958 ?). \*

Hutterer, L., ed. *Economic Exchange and Social Interaction in South East Asia: Perspectives from Prehistory, History and Ethnography* (Ann Arbor, Mich., 1977). \*\*

Jacques, Claude. "La carrière de Jayavarman II," *BEFEO* (Vol. 59, 1972: 194-220).

Jacques, Claude, et al. *Angkor: L'art khmer au Cambodge et en Thaïlande* (Dossiers Historie et Archeologie, March 1988).

Jacques, Claude, et al. "Angkor: Etat actuel et perspectives," (*Academie des Inscriptions et Belles-Lettres*, Contes Rendues, April-June 1989): 466-471.

Jacques, Claude, et al. *Angkor*, (Paris, 1990).

Jenner, P. N. *A Chronological Inventory of the Inscriptions of Cambodia* (Honolulu, 1980).

Kadt, Emanuel. *Tourism: Passing to Development? Perspectives on the Social and Cultural Effects of Tourism in Developing Countries* (Paris: World Bank and UNESCO, 1979).

Kulke, Hermann, trans. by I. W. Mabbett. *The Devaraja Cult* (Ithaca, New York, 1978).

Lancaster, Donald. *The Emancipation of French Indochina* (London, New York, Toronto: Oxford University Press, 1961). \*

Lafont, Pierre-Bernard. *Asie du sud-est continentale*, Vol. I (Paris: Actes du XXIXe congrès internationales des Orientalistes, 1973).

Leclerc, Adhemard. "Une campagne archéologique au Cambodge" (*BEFEO*, 4, pp. 737-49).

Lunet de Lajonquière, Étienne. *Inventaire descriptif des monuments du Cambodge* (Publications de l'Ecole Française d'Extrême-Orient, Nos. 4, 8, 9; Paris: 1902-1911).

Lunet de Lajonquière, Étienne. "Rapport sommaire sur une mission archéologique du Cambodge, au Siam, dans le presqu'il malaise et dans l'Inde (1907-8)" (*BEFEO*, 1908, 8, pp. 351-368).

Lunet de Lajonquiere, Etienne. "Le domain archeologique du Siam" (*BCAI*, I, pp. 188-262).

Mabbett, I. W. "The Indianization of South East Asia," *Journal of South East Asian Studies* (Vol. 8, No. 1, March 1977): 1-14; (Vol. 8. No. 2, September 1977): 143-161  
\*\*

Lunet de Lajonquiere, Etienne. "Devaraja," *JSEAH* (Vol. 10, No. 2, 1969): 202-223.

MacDonald, Malcolm. *Angkor and the Khmers* (London, 1937).

Majumdar, R. C. *Kambuja-desa or An Ancient Hindu Colony in Cambodia* (Madras: University of Madras, 1944).

Mallecot, Yves. "Angkor, un patrimoine a preserver," *Petit journal de l'exposition organize a l'Orangerie de l'hotel de Sully*, organized by the Caisse National des Monuments Historiques et des Sites and L'Association des Amis d'Angkor with participation of the Indosuez Bank (29 Sept.-Oct. 29, 1989).

Malraux, Andre, trans. Stuart Gilbert. *The Royal Way* (New York, n.d.).

Marchal, Henri. *Guide archeologique aux temples d'angkor* (Paris, 1928).

Marchal, Henri. *La construction des temples dans le groupe d'Angkor*" (*AAK*, 1921-22), I, 1, p. 21).

Marchal, Henri. "Degagement du Phimanakas" (*BEFEO*, XVI(1916), 3, p. 57). \*\*\*

Marchal, Henri. "Monuments secondaires et terrasses bouddhiques d'Angkor Thom" (*BEFEO*, XVIII(1918), p.8). \*\*\*

Marchal, Henri. "Le temple of Prah Palilay" (*BEFEO*, XXII(1922), p. 101). \*\*\*

Marchal, Henri. "Pavillons d'entree du Palais Royal" (*EA*, II, p. 57).

Marchal, Henri. "Notes sur le Palais Royal d'Angkor Thom" (*AAK*, II, 3, p. 303).

Marchal, Henri. "Les portes monumentales du groupe d'Angkor" (*AAK*, 1924), 2, pp. 1-26). \*\*\*

Maspero, Georges. *L'empire khmer* (Phnom Penh, 1904).

Mazzeo, Donatella and Chiara Antonini. *Monuments of Civilization: Ancient Cambodia* (New York, 1978).

Mecquenem, J. dE. "Les batiments de Ben Mala" (*BEFEO*, XIII, 2). \*\*\*

Mouhot, Henri. *Travels in Siam Cambodia and Laos 1858 - 1860* (London, 1864).



Meunier, Dauphine. *Histoire du Cambodge* (Paris, 1968).

Muller, H. P. N. *De Oost-Indische compagnie in Camboja en Laos* (The Hague, 1917). \*

Mus, Paul, trans. by I. W. Mabbett and D. P. Chandler, *India Seen from the East* (Clayton, Australia, 1975).

Mus, Paul. "Angkor at the Time of Jayavarman VII," *Indian Arts and Letters* (Vol. II, 1937): 65-75.

Mus, Paul "Angkor vu du Japon," *France Asie* (Nos. 175-176, 1962).

Myrdal, Jan and Gun Kessle. *Angkor: An Essay on Art and Imperialism* (New York, 1970).

Nafilyan, Guy. *Angkor Vat* (Paris, 1969). \*\*\*

Navarre, Henri. *Agonie de l'Indochine* (Paris: Plon, 1950). \*

Ng, Ronald C. "The Geographical Habitat of Historical Settlement in Mainland South East Asia" (n.d.).

Osborne, Milton. *The French Presence in Cochinchina and Cambodia; Rule and Response (1859-1905)* (Ithaca, NY, 1969). \*

Parmentier, Henri. *L'Art khmer primitif*, 2 vols. (Publications de l'Ecole Francaise d'Extreme-Orient, Nos. XXI, XXII). Paris: 1927. \*\*\*

Parmentier, Henri. "History of Khmer Architecture," *EA*, III (1931).

Parmentier, Henri, *L'art khmer classique*, 2 vols. (Publications de l'Ecole Francaise d'Extreme-Orient, Nos. XXIX, XXIX bis) Paris: 1939.

Parmentier, Henri. "Origine commune des architecture hindoues dans l'Inde et en Extreme Orient" (*EA*, II): 109.

Parmentier, Henri. *L'Art architectural Hindou dans l'Inde et en Extreme Orient* (Paris: Vanoest, 1948).

Parmentier, Henri. "Complement a l'inventaire descriptif des monuments du Cambodge" (*BEFEO*, XIII, 1).

Parmentier, Henri. "Le temple of Vat Phu" (*BEFEO*, XIII, 2).

Parmentier, Henri. "Vat Nokor" (*BEFEO*, XVI, 4).

Pelliot, P., ed. *Memoires sur les coutumes du Cambodge de Tcheou Ta Kuan* (Paris, 1951).

Phoeun, Mak. "Les chroniques royales du Cambodge," (Doctoral Thesis, University of Paris IV, 1974).

Poree-Maspero, Eveline. "Nouvelle etude sur le nagî Soma," *JA*, Vol. 283 (1955): 257-267.

Pou, Saveros. "Les inscriptions modernes d'Angkor," *JA* (Vol. 260, No. 242, 1972): 107-129.

Pym, Christopher. *The Ancient Civilization of Angkor* (New York, 1968).

Rawson, Phillip. *The Art of South East Asia* (New York 1967).

Robequain, Charles. *The Economic Development of French Indo-China* (London: Oxford University Press, 1944). \*

Seidenfaden, E. "Complement a l'inventaire descriptif des monuments du Cambodge" (Siam Oriental) (*BEFEO*, XXII): 55.

Smith, R. B. and W. Watson. *Early South East Asia* (Oxford, 1979).

Srivastaya, K. M. *Angkor Wat and Cultural Ties with India* (New Delhi: Books and Books, 1987). \*\*\*

Steinberg, David J., ed. *Cambodia: Its People, Its Society, Its Culture* (New Haven, Conn., 1957).

Stern, Philippe. *Le Bayon d'Angkor et l'evolution de l'art khmer* (Annales du Musee Guimet, Bibl. de Vulgarization, Vol. XLVII). Paris: 1927.

Stern, Philippe. *Jayavarman VII*. (Publications du Musee Guimet, Recherches et Documents d'Art et d'Archeologie, No. IX). Paris: 1965.

Stierlin, Henri. *Angkor* (Fribourg, 1970).

Taboulet, Georges. *La Geste française en Indochine*, 2 vols. (Paris: Maisonneuve, 1955) \*

Thompson, R. S. "Establishment of the French Protectorate over Cambodia," *FEQ* (Vol. 4, 1945): 393-340. \*

Thierry, Solange. *Les Khmers* (Paris, 1964).

Van Liere, W. J. "Traditional Watermanagement in the Lower Mekong Basin," *World Archaeology* (Vol. II, No. 3, Fall 1980): 265-280.

Vickery, Michael, "Angkor and the Asiatic Mode of Production," unpublished seminar paper, Monash University, November, 1981.

Vickery, Michael. *Cambodia after Angkor: The Chronicular Evidence for the Fourteenth to Sixteenth Centuries* (Ann Arbor, Mich., 1977).

Warner, Roger. "After Centuries of Neglect, Angkor's Temples Need more than a Facelift," *Smithsonian Magazine* (May 1990): 36-51.

Wheatley, Paul. "The Mount of the Immortals: A Note on Tamil Cultural Influence in Fifth Century Indo-China," *Oriens Extremus* (Vol. 21, No. 1, June 1974): 97-109.

White, Peter P. "Ancient Glory in Stone," *National Geographic* (May 1982): 552 ff.

Woodward, Hiram W., Jr. "Tantric Buddhism at Angkor Thom," *Ars Orientalis* (Vol. 12, 1981): 57-68.

Wolters, O. W. "Northwestern Cambodia in the 7th Century," *BSOAS* (Vol. 37, No. 2, 1974): 355-384.

Wolters, O. W. "Khmer 'Hinduism' in the Seventh Century," in Smith and Watson, *Early South East Asia* (see above).

Wolters, O. W. "Jayavarman II's Military Power: The Territorial Foundation of the Angkor Empire," *JRAS* (1973): 21-30.

#### TECHNICAL REPORTS:

Chihara, Daigoro. A Call for Immediate Action for the Conservation of the Angkor Monuments: Report on the Second Survey of the Angkor Monuments (Tokyo: Institute of Asian Cultures, Sophia University, n.d.)

Kono, Yasushi. Sophia Project on the Study of Historical Sites of South East Asia (Tokyo: Sophia University, n.d.)

Ishizawa, Yoshiaki, Yasushi Kono and Organizing Committee. Study on Pagan: Research Report in Culture in Asia, No. 4 (Tokyo: Institute of Asia Cultures, Sophia University, 1989), pp. 172-5.

Ishizawa, Yoshiaki and Nobuo Endo, Study on the Conservation of Monuments and Sites and Socio-Cultural Development: A New Method of Historical Site Engineering (Tokyo: Sophia University, n.d.)

Launay, Jean. Etude des Efforts dans la galleries des bas-reliefs d'Angkor Vat et mesures a prendre en vue d'une reconstruction (April-May 1966)

Soekmono and Sohiko Yamada. A General Survey and Plan for the Preservation and Presentation of Sukhothai (Paris, 1978)



Archaeological Survey of India: Report on the Structural Conservation Work Done at Angkor Vat during the First Phase of the Project (1986-87)\*\*\*

Archaeological Survey of India: Report on the Structural Conservation Work Done at Angkor Vat during the Second Phase of the Project (1987-88)

Archaeological Survey of India: Report on the Structural Conservation Work Done at Angkor Vat during the Third Phase of the Project (1988-89)

World Bank: Report of the Economic Mission to Cambodia, Vols, I-III (Paris):  
International Bank for Reconstruction and Development, International Development  
Association, and East Asia and Pacific Department, October 1970)

