

SAVING BANTEAY CHHMAR

Cambodia's forgotten temple

A magnificent Khmer temple lies crumbling in forest near the Cambodian border. **John Sanday** and the Global Heritage Fund must overcome more than just neglect to save this site for posterity.

Banteay Chhmar is one of the crowning glories of King Jayavarman VII's reign (AD 1181-c.1219). This Khmer king was a prolific builder, crisscrossing his dominion with roads, founding hospitals to care for his subjects, and creating magnificent temples to honour his family. But Banteay Chhmar, nonetheless, is something special. An architectural *tour de force*, it has the size and architectural refinement of a major metropolitan temple in the capital at Angkor. Yet Banteay Chhmar is not in the capital. It lies a considerable distance away, 170km northwest of the capital, in a remote region that has been described as 'the most desolate place in Cambodia'. Why?

PHOTOS: John Sanday unless otherwise stated

To understand this historic Buddhist monastic complex, it is important to relate it to the major Khmer sites in Angkor, as their impact on me and my team was essential to the development of the Global Heritage Fund (GHF) Banteay Chhmar Conservation Training Project. Their historical influence on Banteay Chhmar will also soon become apparent.

City of shrines

The sprawling city at Angkor covered, at its peak, an astonishing 1,000km², and formed the heart of a Khmer Empire which spread across present day Vietnam, Laos, Cambodia and Thailand.





The religious needs of its inhabitants were sated by over a thousand shrines, of which the most famous is the great temple of Angkor Wat. This aesthetic triumph – built by Suryavarman II and, reputedly, the largest place of worship on the planet – preceded Jayavarman VII's reign by about 50 years. Prior to his creation of Banteay Chhmar, Jayavarman VII built the two significant Buddhist monastic complexes of Ta Phrom and Preah Khan, and founded the walled city of Angkor Thom, which incorporated a group of 10th century monuments from a previous capital. He expanded one earlier temple there to create his new state temple – the Bayon – that is celebrated as the pinnacle of Jayavarman VII's architectural innovations.

The Bayon, which was extended at the end of the 12th century, around the same time as Banteay Chhmar was built, is famous for its enclosure wall of bas relief panels, showing mystical and historical scenes, very similar to those found in Banteay Chhmar. Another example is the famous mythological bas reliefs in Angkor Wat, which were the first to be sculpted. All of them are examples of a breathtaking architectural tradition.

Another connection between the Bayon and Banteay Chhmar is that they have similar, fine face towers, and, following exhaustive study, it appears that those sculpted in Banteay Chhmar were prototypes for those of the Bayon. The gigantic faces on all four sides

ABOVE AND RIGHT

The great temple of Angkor Wat was built by Suryavarman II, about 50 years before Banteay Chhmar.

ABOVE LEFT AND


BELOW The face towers at Banteay Chhmar (left) and the Bayon (below). Those at Banteay Chhmar are believed to have been the prototypes for the Bayon face towers.



of the tower were probably Jayavarman VII's *imprimatur* on the monuments he built. Appropriate, then, that these face towers are widely viewed as his finest architectural innovation.

The temple complex was built to commemorate the king's son, and its remote location is believed to be because he fell in battle there. Such early inaccessibility creates, today, both an opportunity and a problem.

Following the king's death, the state religion changed and the Angkorian temples were subjected to Hindu iconoclasm and subsequent alterations; but, at Banteay Chhmar there is a chance to study a site that remained untouched. This lack of modification, nevertheless, has come hand in hand with neglect, and for centuries the jungle has been encroaching, causing the towers and the bas relief arcades to collapse.

In the mid 1990s an even more destructive force arrived: looters. They knocked down a unique stretch of bas reliefs 





ABOVE One of the bas relief images of *Avalokitesvaras*. The stretch of wall directly to the right has been looted.

TOP RIGHT One of Heidelberg University's digital scans of the relief frieze, showing an *Avalokitesvara* (the *Bodhisatva* of compassion) in greater detail.

with jackhammers and spirited away four out of a set of eight *Avalokitesvaras* (the *Bodhisatva* of compassion) on flatbed trucks to Thailand. Banteay Chhmar lies 170km northwest of Siem Reap, and only about 12km as the crow flies from the Thai border. Two of the panels have subsequently been returned to Cambodia, the remainder are still at large. Such theft was not without its risks. Banteay Chhmar was one of the last strongholds of the notorious modern Khmer Rouge, and ringed by minefields.

These deadly relics of conflict were only finally cleared in 2007, leaving Banteay Chhmar more vulnerable than ever to human depredation. Because of its architectural significance, Banteay Chhmar is now on UNESCO's World Heritage 'Tentative List'. Yet if the site was to survive, a preservation programme was urgently needed, and that is what the Global Heritage Fund (see box below) has provided. But before looking at how the temple is being saved, it is important to understand what makes the site exceptional.



IMAGE: WIR University of Heidelberg

The Buddhist builder

Jayavarman VII was an oddity, as his path to power appears to have been forged in war. Chinese sources record how, in 1178, the Cham, from Vietnam, seized the Khmer capital and executed the king. The Cham had little chance to savour their victory, as that very same year a Khmer force under the command of a prince repelled the invaders. In 1181 that prince became King Jayavarman VII, and only the second Buddhist to rule over the Khmer Empire. The new king's building zeal ensured that his religion was swiftly set in stone.

Although architectural styles varied, the basic grammar of a Khmer temple proved remarkably enduring. At its heart was a wish to evoke the world of Indian mythology, with a wide moat representing the primordial sea, an outer temple enclosure wall mimicking the mountains that ring the world, and a central tower shrine symbolising Mount Meru, home to the gods. But whilst the *barays* (extensive man-made reservoirs) and moats served a powerful symbolic function, they also had a crucial practical purpose. Sophisticated water management schemes were the key to Khmer success, and vital if a sizable population was



THE GLOBAL HERITAGE FUND

The **GHF** is a private, non-profit organisation based in California, USA, and London, UK. It specialises in the conservation and long-term preservation of historic monuments of significance within developing countries. The Banteay Chhmar Conservation Training Project exemplifies the GHF's approach to historic sites through a technique known as Preservation by Design – an approach to repairing, conserving, and presenting an historic site alongside plans to develop its own revenue to ensure long-term sustainability. Demonstrating that heritage sites can provide an income to local communities helps them to value it, an important step towards ensuring its survival. The GHF also monitors the status of UNESCO World Heritage Sites, keeping tabs on those at risk and publishing their findings (see CWA 44).

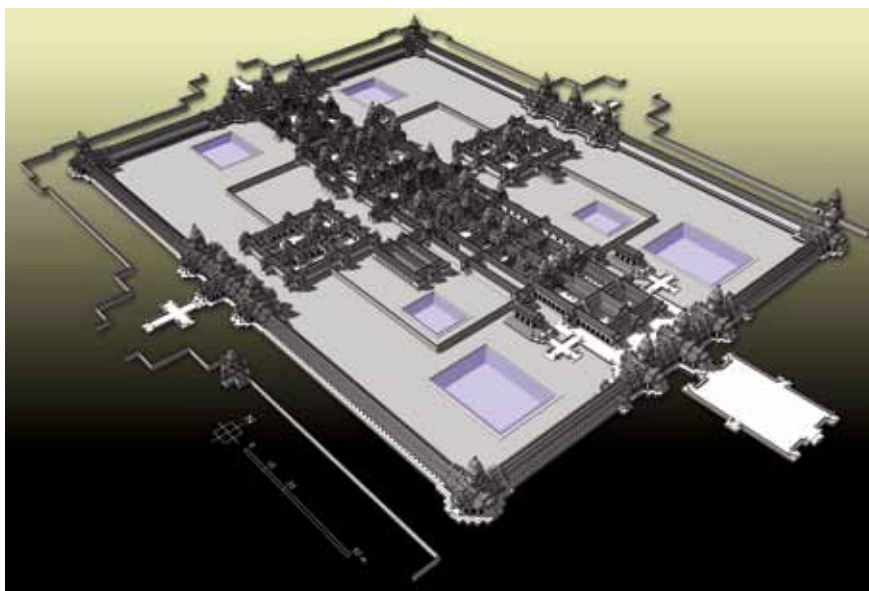
to endure the rigors of the dry season. The moats and *barays* were part of this hydraulic life support system, storing water to irrigate fields, and to support fish stocks. The additional task of supplying water would have been critical at Banteay Chhmar, in a region where even in the wet season the fields and forests are parched for weeks at a time.

Banteay Chhmar is a vast complex, with the total archaeological site covering an area of approximately 12km². At its centre is the main temple, which measures 750m by 700m, and is enclosed by a 60m-wide moat. To the east, closely associated with the temple and moat, is a large *baray*, covering an area of 1,400m by 500m. These water management features were sited with care, as there is evidence of a spring in the southeast corner of the moat in this otherwise arid zone. Various local rumours that this water source was augmented by canals coming from the hills to the northwest prompted the GHF to carry out an extensive survey of Banteay Chhmar's water supply. A similar on-going study has produced an excellent understanding of the hydrology of Angkor. The Banteay Chhmar study has, indeed, proven the existence of supplementary water sources, and is an essential tool to identify a suitable water supply for the present community.

Nothing remains the same

There is every chance that future study will decipher Banteay Chhmar's many mysteries, but this can only happen if the monument survives. The dangers facing it became apparent to me when I led a team to Banteay Chhmar in the early 1990's. What greeted me made a lasting impression. Although I marvelled at the size of the temple complex, I was equally appalled by its condition – the priceless sculptures had been brutally looted, and the jungle was desecrating its shrines and courtyards. It was a far cry from the situation at Angkor, which, by then, enjoyed extensive international support and a government body dedicated to safeguarding Cambodia's first World Heritage Site.

When, in 2007, I became Field Director for Asia at the GHF, I remembered Banteay Chhmar and, spurred by the confidence that came from 12 years working in Angkor, resolved to do



TOP The tower shrines at Banteay Chhmar.

ABOVE A 3D reconstruction of the central temple complex at Banteay Chhmar.

something about it. This earlier work meant I had an experienced team to call upon, and crucially one that had learnt the merits of conservation versus restoration and reconstruction – the predominant approach in Asia.

The key to the success of such a project is to assess its condition and potential, and to develop a philosophy that takes into consideration its present status as an historic monument, its future use as a centre of learning, and the impact that any work to conserve and repair it will have on the local community. ➔

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As with any project in a developing country, practical considerations play a significant role. It is essential to identify and build an enthusiastic team of professionals and craftsmen, and to develop a sound knowledge of conservation techniques, as well as funds to undertake the proposed activities. In its formative years the GHF has worked on a sound set of principles 'Preservation by Design', which it has developed over the years (see box on p.48). These

ABOVE The jungle has invaded Banteay Chhmar's courtyards and corridors, tumbling the architecture.

were adopted at Banteay Chhmar, and have helped the team develop a well-coordinated programme.

The process of surveying and recording the site is a major challenge. Over 75% of the arcaded structures and bas reliefs that they once covered have fallen and are buried under mounds of stone rubble. Conserving these priceless artworks was perceived as essential. As at Angkor Wat and the Bayon, there is unique historical data to be found in the images depicted. After an overall assessment of structural stability and areas of potential collapse, we identified a sector of the complex with our partners – the Ministry of Culture and Fine Arts (MCFA) – where we could begin a series of interventions. The first step was to record each and every stone in 1m² grids and then referencing them to create an archive. The stones were carefully lifted and placed in the stone graveyard, where they were identified and slowly reassembled. Each stone is unique in shape and size, which has made the puzzle somewhat easier to solve! Where sections of the structure were still standing, precise architectural drawings were prepared.

At every stage, the structures were assessed to consider ways of reassembling them and design the simplest ways of ensuring their future stability. A typical example was devising ways to provide support for the bas relief walls, once we discovered they had no proper foundations. The combination of this, and the fast growing shrubs that had taken root on the walls, was the principle reason for Banteay Chhmar's ruinous state.

The heavy monsoon rains had percolated the raised stone platform on which the bas relief walls were set, thus exacerbating their structural



LEFT AND BELOW A stretch of the bas relief decoration and the rubble collapse that makes up 75% of their course.



settlement. The platform had to be weather-proofed and the non-existent foundations were strengthened by the placement of new stone and laterite supports. Reforming the platform itself required several tons of specially selected clays mixed with slaked lime. Dug locally, the clay had to be beaten into powder. Original methods using a wooden mallet were found to be a tedious and lengthy process. Someone came up with the idea of using a traditional stone rice grinder and, with some adaptations, it did the trick – a good example of Preservation by Design!

Once the structural consolidation of the platform is complete, we can reconstruct the recently unearthed bas relief stones, and replace the sections that were threatening collapse.

All the stones have been moved by hand using a simple block and tackle and a large structural tripod. After the procedures had been established, however, we found locally a mobile crane and a skilled operator who has trained up our team of craftsmen. In one day, they managed to carefully move 60 stones – each weighing over 500kg. By hand, it would have taken the team at least eight days!


For over a decade, a group of young Khmers underwent training in stone conservation at Angkor Wat, thanks to the German Apsara Conservation Project. This team, under the guidance of its master conservator, has recently formed its own company – the South Asian Conservation and Restoration Agency

RIGHT The carefully trained team of conservators re-erect the tumbled walling, using a block and tackle.

BELOW The author leads a visit to the site.



(SACRA) – and GHF has commissioned them to provide theoretical and practical training in Banteay Chhmar. The Banteay Chhmar team, consisting of eight local workers, spent time learning basic Angkorian history, studying the different conservation methods in Angkor, as well as undergoing practical stone conservation training on site in Banteay Chhmar. Under SACRA's supervision, the team is now repairing and conserving the stones of Banteay Chhmar.

Another very exciting innovation has been collaboration with the Department of 





Scientific Computing (IWR) at Heidelberg University. Their challenge has been to help with the recording and development of a database for the thousands of fallen stones in Banteay Chhmar. The IWR has sent a team of its postgraduates along with state-of-the-art 3D digital camera technology. This team, working on site in Banteay Chhmar, as well as back in the IWR laboratories, is developing a highly sophisticated process for recording stones with the aim, as one of the senior professors aptly put it, 'of solving John's puzzle'.


They still have a huge task ahead of them and several refinements need to be made; but we hope that one day soon it will be possible to reassemble a group of disparate stones with the click of a button.

The indications that the Banteay Chhmar face towers are the proto-type for those at the Bayon of Angkor gives them a unique architectural importance. Realising their significance, the GHF has studied Face Tower 18 North with a view to its repair and structural consolidation, as it was threatening collapse. Emergency funds were found to document and dismantle 75% of it, and all the new technology and skills are being applied to repair and to rebuild it, providing added structural security and opening a new phase of research.

A topic with a much broader spectrum in Banteay Chhmar has been the ongoing hydrological research. Many theories have been proffered to date, but few of them have been based on proper research. Unlike in Angkor, there is no constant water source in Banteay Chhmar. The present supply for the local community is pumped from the moat. Due to extensive recent

deforestation around the temple complex, rain-water run-off has become excessive, causing damaging floods. An added problem has been the rapid siltation of the moat itself, reducing the amount of water stored. Recent drought conditions have meant that local farmers abandoned planting rice in favour of cassava, which is a good cash crop. As a result, the forested areas have been destroyed to plant more and more cassava, thus reducing the absorption of rainwater to top up the aquifers.

Results of flash flooding can be seen in the drastic erosion of the historic East Causeway leading to the temple itself. This causeway, together with that to the west, acts as a dam, causing the water level to differ by more than 2m between the south and the north moats. If these dams fail, as a result of further flooding, not only will the community's major water supply disappear, but also those living below the dam will lose their fields and dwellings.

While this painstaking work is gradually bringing Banteay Chhmar back from the brink, much depends on finding funds to establish a permanent Conservation Unit for the MCFA. This would be made up of trained Cambodians, and, ultimately, it is they who will determine the fate of Jayavarman VII's masterpiece, and the many other sites in the region. 

TOP LEFT Saving the past: the stone conservators at work at Banteay Chhmar.

TOP RIGHT Face Tower 18 was in imminent danger of collapse until the GHF team stepped in to conserve it.

ABOVE The fallen masonry is recorded in situ.

SOURCE

John Sanday OBE FSA is a Conservation Architect. He trained at Bristol Royal West of England Academy and at Bristol University, before joining UNESCO in 1972 to work in Kathmandu, Nepal. His architectural practice, John Sanday Associates, is now based there. JSA specialises in hospitals, hotels, seismic assessments, as well as the overall management and conservation of historic monuments and sites. John's first trip to Cambodia was in 1989, where he has masterminded conservation projects on several Khmer sites. John has been awarded the Order of the British Empire for his contribution to heritage conservation and training in Nepal and Cambodia.