English

COMITE INTERNATIONAL DE COORDINATION POUR LA SAUVEGARDE ET LE DEVELOPPEMENT DU SITE HISTORIQUE D'ANGKOR
INTERNATIONAL COORDINATING COMMITTEE FOR THE SAFEGUARDING AND DEVELOPMENT OF THE HISTORIC SITE OF ANGKOR

TECHNICAL COMMITTEE

Twenty eighth Technical Committee

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Siem Reap – June 21-22, 2017 – APSARA National Authority

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NOTICE: The languages used during the sessions of the ICC are English, French and Khmer. In the English language record of the discussions, all material spoken originally in French or Khmer is therefore a translation. Presentations and comments made originally in English are indicated by [*OrigE*] at the beginning of the contribution. The insertion [*OrigK*] shows that the original statement was in Khmer.

RECORD OF THE DISCUSSIONS

I- OPENING SESSION

I.1 Statement by the Japanese co-chairman, Mr. Takahisa Tsugawa, Minister/Deputy chief of mission, Embassy of Japan in Cambodia

[*OrigE*] "Her Excellency Dr. Phoeurng Sackona, Minister of Culture and Fine Arts and Chairperson of the APSARA National Authority,
His Excellency Dr. Say Sam Al, Minister of the Environment,
His Excellency Mr. Kol Bunly, High Representative of His Majesty, King Norodom Sihamoni,
Ms. Anne Lemaistre, Representative of the UNESCO Phnom Penh office,
Excellencies,
Colleagues,
Ladies and Gentlemen,

It is my great pleasure to be here today to preside, as a Co-chair, over the International Coordinating Committee's 28th Technical Session.

First of all, on behalf of all the attendees present here today, I would like to express my deepest condolences on the passing away of His Excellency, Dr. Sok An. Dr. Sok An took strong leadership regarding the preservation and development of the Angkor historical site and was a champion of the ICC process.

I would also like to profoundly thank Her Excellency, Dr. Phoeurng Sackona, Minister of Culture and Fine Arts and President of the APSARA National Authority, for her strong commitment to the ICC process.

Please also allow me to express my sincere gratitude to His Excellency, Mr. Sum Map, Director General of the APSARA National Authority, and all the staff at the APSARA National Authority, for the pivotal, and increasingly important, role they play in the protection, restoration and development of the Angkor heritage sites and the contribution they have made to the ICC over many years.

My heartfelt thanks go to all the teams and individuals taking part in this session, many of whom have contributed to the ICC's activities since its very inception.

I am grateful to Mr. Guillaume Narjollet, Counsellor for Cooperation and Cultural Affairs at the Embassy of France in Cambodia, for acting as my Co-chairperson. I would also like to thank the donor countries, the international organisations and the technical teams who are supporting the protection and restoration of the Angkor temples.

I am appreciative of the contributions made by the *ad hoc* group of experts that have been working on the Angkor site and thank them for all their hard work and valuable contributions.

Finally, I thank the ICC secretariat of UNESCO, including the Representative of the Phnom Penh office, Ms. Lemaistre, for assisting with all the arrangements for this session. I sincerely hope that our discussions over these next two days will be beneficial to the present and future of the Angkor site.

Thank you for your attention"

Comment from the co-chairman for Japan: "Let me now invite Her Excellency Ms. Phoeurng Sackona, Minister of Education of the Royal Government of Cambodia and Chairperson of the APSARA National Authority for her speech."

I.2 Statement by the representative of the Royal Government of Cambodia, Her Excellency Ms. Phoeurng Sackona, Minister of Culture and Fine Arts, Chairperson of the APSARA National Auhtority

"Distinguished Co-chairmen,
Your Excellency Mr. Say Sam Al, Minister of the Environment,
Honourable professors,
Heads of heritage missions,
Ad hoc experts,
Excellencies,
Colleagues,
Ladies and Gentlemen,

This 28th Technical session continues a series of sessions presenting an overwhelmingly positive outcome, but is also, on a more personal note, the start of a new experience. Initially, I would like to pay an emotional and solemn tribute to the great memory of *Samdech Vibol Panha* Sok An, the late chairman of the APSARA National Authority.

He led the delegation of the royal government during countless ICC sessions and, as you all know, even in the last moments of his life, sadly abruptly terminated, he worked tirelessly for the conservation and sustainable development of the Angkor site. His outstanding actions have not only been acclaimed in our country but also worldwide and notably at UNESCO and the World Heritage Committee, the latter of which he chaired in 2013.

Later this morning, the ICC is invited to pay tribute to the memory of our celebrated late chairman. In the meantime, I would like you to observe a minute of silence to honour His Excellency Sok An. Thank you.

I take this opportunity to mention that today and tomorrow the one-hundred day ceremonies for the passing of His Excellency *Samdech Vibol Panha* Sok An will be held. Cambodians consider this ceremony, and that of the seven days, to be very important. We believe that when one has gone to heaven he still remains among us for seven days. On the seventh day the passing away is fully acknowledged, hence the value of this ceremony.

Children make offerings during the seven-day ceremony so that the deceased may depart and find a new home, a new family — a journey that will last one hundred days. After this period, the late member of the family is considered deceased and to have found a new home and family. The one-hundred day ceremony is paramount for the family of the deceased, as it symbolises a last goodbye. According to their Karma, he/she will reborn in another family. This is why this ceremony has the utmost value for the family of *Samdech Vibol Panha* Sok An and for all of us, as he will find his new home and family and start a new life after this one-hundred day ceremony. This is a comment I wanted to make about traditions in Cambodia.

Excellencies, Ladies and Gentlemen,

I have for many years attended the ICC Angkor proceedings and become acquainted with the basis of the ICC proceedings' ins and outs.

We all know that your unity and unanimous engagement in closely co-operating with the APSARA National Authority has led to overwhelmingly positive and widely celebrated outcomes and deserved international praised. This is due to the quality of the work carried out in the field and to the wisdom and dynamism of the French and Japan Co-chairmanship, and to the dedication and high standard of the *ad hoc* experts and to the awareness and ability of the Secretariat.

I would like all to be included in our highest consideration and strong gratitude.

Ladies and Gentlemen,

I have been appointed as the chairperson of the APSARA National Authority and have taken in my responsibility to serve the flagship of our national cultural heritage, Angkor. Let me recall the milestones that have established the national and international endeavour for conservation and development.

During the first decade (1993-2003) following the inscription of Angkor on the World Heritage List, you contributed to the implementation of the recommendations from the Tokyo Conference on Angkor (12-13th of October, 1993). This was a period focused on conservation and restoration of the monuments when huge progress was recorded and several challenges curbed.

The second decade (2003-2013) commenced with the Paris conference on Angkor held on 14-15thNovember, 2003. Once again the fruitful collaboration between the APSARA National Authority and the ICC was conducive to worldwide-celebrated outstanding outcomes. During this decade, several sustainable development projects were carried out.

Finally, the third decade, 2013-2023, inaugurated by the Prime Minister of the Kingdom of Cambodia *Samdech Akka Moha Sena Padei* Techo Hun Sen. It was held in Siem Reap on the 3rd of December, 2013 and it emphasized the need for developing activities related to the environment and communities. It also took note of undertaken activities and main achievements. For the past three years, we have strived to meet challenges and face complicated situations whilst preserving as much as possible the necessary balance between conservation and development.

Co-chairs, Excellencies, Ladies and Gentlemen,

This session's agenda reflects the diversity of the projects and the increased scope of activities and shows that our assignment has not changed and that it is core to the national strategy for Angkor. For us, there is an imperious and categorical duty to safeguard the integrity of the eco-historical site of Angkor while acknowledging the question and responsibility in favour of the population of the 112 traditional villages located inside the perimeter inscribed on the World Heritage List.

We also have to continue the effort under the guidance of the Prime Minister *Samdech Techo Hun* Sen and his government in order to better the living conditions of these people and the city of Siem Reap and to make sure that they will gradually enjoy more modern forms of infrastructure.

This gives you, colleagues, ladies and gentlemen, an understanding of the scope of the challenges and difficulties. Together with the dedication of my colleagues and collaborators we will surely meet this challenge.

Co-chairs, Excellencies, Friends,

Before concluding, let me remind you of something and suggest future action. 2017 as you know marks the 25th anniversary of the inscription of the site of Angkor on the

World Heritage List. The 14th of December, 1992 is a milestone and must be celebrated. We will organise the celebration together and it is most likely that UNESCO will assist us.

In collaboration with the APSARA National Authority, I would suggest organising exhibitions, seminars or workshops to discuss essential topics on the conservation and development of Angkor. As for the Ministry of Culture and Fine Arts, it will contribute to what will be a heritage celebration, the Angkor celebration.

Excellencies, Ladies and Gentlemen,

I would like to conclude on this hopeful note and wish fruitful proceedings to this session and good luck to the Co-chairs.

I thank you for your kind attention."

Comment from the Co-chairman for Japan: "Thank you Minister. The floor is to His Excellency Say Sam Al, Minister of the Environment."

I.3 Statement by His Excellency Mr. Say Sam Al, Minister of the Environment of the Royal Government of Cambodia

[*OrigE*] "Your Excellency Minister of Culture and Fine Arts, Chairperson of the APSARA National Authority,
Excellencies Co-chairmen of the ICC-Angkor,
Distinguished heads of delegations,
Excellencies,
Ladies and Gentlemen,

I have the honour and pleasure to be here with you all for the opening session of the 28th Technical Session of the ICC-Angkor. I am also pleased to speak, on behalf of the Ministry of the Environment, on the progress of our efforts for the protection and conservation at Phnom Kulen National Park.

As you may know, Phnom Kulen National Park is well known for its historical and cultural heritage sites, and its significance as a water source for Siem Reap Province. Kulen Mountain is a popular place of pilgrimage for Khmers and the most sacred mountain in Cambodia, which is known to be the birthplace of the Cambodian Kingdom. More than 50 sacred ancient temples and sites dating back as far as the 8th and 9th centuries have been identified across the high plateau. Moreover, Phnom Kulen National Park's forest ecosystems provide critical habitat for a number of globally threatened species. The Park's significant ecosystem services include the main water source for Siem Reap town and the aquifer that maintains the stability of the Temples of Angkor.

Given the above significance, at the beginning of the fifth mandate of the Royal Government, we have taken necessary steps and measures to resolve various issues concerning deforestation, land encroachment, wildlife poaching, illegal settlement, environment pollution, overlapping jurisdictions and roles and responsibilities within the Park. More specifically, the following decisions and progress have been made:

- The Royal Government has already cancelled the tourism concession and investment of Nokor Korkthlork Company on agro-tourism inside the National Park.

- Within the framework of the Commission for the Management of Phnom Kulen National Park, a survey for relocation of the military forces and their families and illegal settlers currently living in Preah Ang Thom area has been conducted. However, further de-

tails of resettlement planning and budget, including provision of access to basic services and infrastructure need to be worked out in the near future.

- The Royal Government has already approved the proposal for road improvement and construction from Preah Ang Thom down to Svay Leu commune, Svay Leu district, by using the Angkor Conservation and Development Fund. This project should facilitate the movement of community residents and tourists as well as enhancing the protection and conservation activities. In collaboration with the APSARA National Authority and the Ministry of Culture and Fine Arts, we have already prepared the design of road rehabilitation and construction and budget plans for this project and we expect to have formal approval in the near future.

- 45,000 hectares of remaining forested areas in the western and northern parts of Phnom Kulen National Park have been designated as part of Northern Tonle Sap's Biodiversity Conservation Corridor (BCC).

- From 2015 to May 2017, we have planted around 150,000 trees (natural trees and fruit trees) in Phnom Kulen National Park.

- As proposed in the 26th Technical Session of the ICC-Angkor, with support from UNDP and other partners, we have already developed a draft Management Plan for Phnom Kulen National Park in a participatory manner. The Management Plan (2018-2022) aims to focus on the protection of the remaining forests, enhancing and sustaining alternative livelihoods, and strengthening institutional capacity and collaboration to effectively manage the Park for future generations. The draft Management Plan is expected to be finalized and submitted to the Plenary Session of the ICC-Angkor in December 2017.

- Meanwhile, concerned authorities, especially Ministry of the Environment's rangers, have been instructed to take necessary measures to end illegal logging, shifting cultivation, land encroachments and illegal settlements within the National Park.

With the above-mentioned progress, we would like to set the following ways forward:

- Continue strengthening law enforcement activities within the National Park while at the same time enhancing the capacity of both rangers and authorities in order to combat illegal logging, illegal hunting, shifting cultivation, land encroachments and illegal settlements within the National Park.

- In collaboration with concerned partners, continue to promote reforestation and forest maintenance as well as wildlife protection and conservation.

- Continue to promote community development through introduction of alternative livelihood activities and eco-tourism activities.

- Conduct study on Eco-Tourism Green Zone Development Project in Phnom Kulen Moutain.

- Continue to explore and implement sustainable financing mechanisms such as REDD+ project and Payments for Eco-system Services.

- Conduct immediate study on solid waste management for the introduction of suitable solutions, including the installation of mobile garbage incineration in the Park.

- Continue to pursue the finalization of Phnom Kulen National Park Management Plan, relocation of the remaining military forces and their families and illegal settlers, and the approval for road rehabilitation and construction, including the budget.

Once again, I would like to express our sincere thanks and appreciation to all concerned partners and stakeholders for providing the necessary co-operation and support for the protection and conservation activities in Phnom Kulen National Park. Finally, I would like to take this opportunity to call for the further collaboration and participation of the stakeholders in the protection and conservation works in our National Park.

Thank you for your attention."

Comment from the co-chairman for Japan: [*OrigE*] "Thank you Excellency Minister. Now we start with Part I of this morning's session on the follow-up of the implementation of the recommendations, starting with the technical team activity reports on restoration and conservation. Let me invite Professor Azedine Beschaouch for the introduction."

II.A- FOLLOW-UP ON IMPLEMENTATION OF THE RECOMMENDATIONS: RESTORATION AND CONSERVATION

II.A.1 Follow-up on implementation of the recommendations adopted at the 27th technical session and 23rd plenary session in January 2017, introduction by the Scientific Secretary, Professor Azedine Beschaouch

"Excellency Chairperson of the APSARA National Authority,
Your Excellency Minister of the Environment,
Excellencies,
Colleagues,
Ladies and Gentlemen,

Let me first express our satisfaction and that of our Co-chairmen, *ad hoc* experts and Secretariat. The fact is that since the reform has been engaged the recommendations and follow-up of their implementation and team reports have become smoother. I can say that the APSARA National Authority is to be credited for this improvement and notably His Excellency the Director General, Mr. Sum Map. On a regular basis he convenes his collaborators to review the different items of the recommendations before their presentation at the sessions of the ICC. We are delighted with this.

Today, you will notice that the APSARA National Authority takes the lion's share. The landscape of Angkor is dotted with impressive monuments, water features and forest, and today, you will be able to hear how the young experts of the APSARA National Authority have contributed to their maintenance. The recommendations have been made and adopted and today we are concerned with those from the 27TS (for Technical Session). You will listen to presentations on the follow-up of the recommendations; only a few are missing as the Co-chairmen, UNESCO and the Secretariat considered sufficient the request from the Director General to only submit written reports. As said earlier, we are satisfied with the bulk of the follow-up presentations being presented orally.

I thank you for your attention."

Comment from the co-chairman for Japan: [*OrigE*] "Thank you very much Professor Beschaouch. The first item is *Prasat* Sralao and Messrs Chhouk Somala and Chea Sarith will present."

Comment from Mr. Kim Sedara: [*OrigE*] "Co-chair, this is a written report."

Comment from the co-chairman for Japan: [*OrigE*] "Thank you very much. As this is already provided in written format then we move to the second item, with Ta Prohm presented by ASI and their representatives Mr. Jhanwij Sharma, Mr. Chandrakant Kulkarni, project manager and Mr. Devendar Singh Sood."

II.A.2 Ta Prohm: Follow-up on recommendation 27TS.2

a. Structural conservation and Restoration of Ta Prohm temple complex by Mr. Jahnwij Sharma, Joint Director General, ASI, New Delhi, Mr. Chandrakant Kulkarni, Project Team Leader and ASAE and Mr. Devendra Singh Sood, Consultant and Retd. Dy. S.A.E , ASI, Siem Reap, Cambodia

[*OrigE*] "Her Excellency Mrs. Phoeurng Sackona, Culture Minister to the Royal Government of Cambodia and Chairperson of the APSARA National Authority,
His Excellency Dr. Say Sam Al, Minister of the Environment,
Excellency Director General of the APSARA National Authority,
Co-Chairs,
Distinguished experts delegates,
Ladies and Gentlemen,

My team and I all join to convey our condolences after the passing away of His Excellency Dr. Sok An, former Deputy Prime Minister of the royal government of Cambodia and Chairperson of the APSARA National Authority. His contribution to the conservation movement in this country is nothing but legendary and we will all remember the enthusiasm with which he brought the conservation fraternity from across the globe to safeguard the built heritage of Cambodia, which is a true reflection of the World Heritage Convention which we are all signatory to.

The institutions and mechanisms of the ICC, APSARA and the *ad hoc* experts have been created to safeguard Angkorian built, natural and intangible heritage and to monitor the conservation works undertaken by different teams from different countries, including India. The creation of the Angkor Charter, an excellent corpus of information that has been created in the past 20 years, is one of the major contributions which was made by him, a role model followed the world over.

On a more personal front, his initiative to bring the two great nations of India and Cambodia together, which have been culturally connected for the past 1500 years, is what will be seen perhaps in the future as an attempt to continue this cultural continuum. Our presentation therefore is dedicated to him.

ASI has been present at Ta Prohm for the past 15 years and my presentation will be spanning the next ten to twelve minutes. It is a journey back in time also to share with you all some of the initiatives we are taking right now and also what we will attempt to do in the next four to five years: A glimpse that we will all show to you.

[*slide*] We have completed two of the phases that started in 2004 and the third phase which began last year in close collaboration with the APSARA National Authority and close consultation with UNESCO. Our association has been going on for the last thirty years, when we initially worked on Angkor Wat in very difficult and trying circumstances. We undertook and completed two phases in Ta Prohm and the third phase began last year and will continue until 2025. I will not go into detail, but ASI, on behalf of the government of

India, has been chosen to provide technical expertise in the field of heritage conservation and work alongside the ICC which has been there ever since.

[*slide*] The whole approach for this initiative has been quite multidisciplinary and scientific, where some of the aims were to protect the tangible and sometimes intangible and in this particular case the natural values. Because it is a World Heritage property, we have to maintain the outstanding universal values by preserving its authenticity and integrity to look at the issues related to preservation of natural and built environment ensuring sustainability and maintaining this symbiotic relation; making the site accessible and ensuring the safety of visitors and of course of skills and training to local professionals.

[*slide*] The team is multidisciplinary, so we have a range of experts' technical initiatives and inputs that have gone into the project, and specialised agencies like the Indian Institute of Technology from Chennai, the Forest Institute from Dehradun and some other institutions have also been involved from time to time to address some of the conservation issues.

[*slide*] Some of the studies that have been undertaken to understand the structural system and behaviour of the temple; the geotechnical, botanical and arboriculture studies. That was quite critical in understanding the nature of the trees, the penetration of roots into the structure, and that helped us evolve a conservation philosophy accordingly as well as GPR surveys and monitoring surveys that have been put in place.

This slide shows the places and structures where intervention has been done in the past ten years. Here in the third phase are the five critical issues we will be working on: We will be completing conservation work of the Hall of Dancers; we will be looking at three more Gopuras, the middle and entrance Gopuras on the eastern side and there are twelve more critical locations that have been identified for conservation and intervention within the complex.

[*slide*] Just to give you an idea, this slides shows the works completed so far and these twelve locations that we have identified where input for consolidation are needed. A quick look at the time line that we are proposing for the next ten years is shown here. One thing is the monitoring that will take place all the time but the Gopuras and Hall of Dancers will be done concurrently until 2025 -2026.

[*slide*] With regard to the Hall of Dancers, it will be the focus of this presentation. This is the type of condition that this structure was in and this is the *in situ* documentation that was done. This methodology was adopted with the support of the ICC and the *ad hoc* experts: very comprehensive documentation, partial dismantling, strengthening of the foundation and the floor and repairing and joining of the column and the restoration part. The work that we have accomplished so far apart from this documentation that we have done and of course this is an ongoing process.

[*slide*] With regard to plinth and floor strengthening there are two original drains that have been opened up, nearly 15,500 stones have been repaired and joined together and are going back. They followed the principles of anastylosis to a much greater extent. Forty pillars of different dimensions and smaller pillars have all been restored and put back in place. Semi vaults and roofs have been restored and the remaining half of course will be done over the next two to three years. This is how the whole work has proceeded and it is expected to be finished by March of 2020.

[*slide*] Another glimpse of the stone mending that the ASI has been undertaking. Each member has been thoroughly documented, as has the process of repair that has been undertaken. Perhaps this is a bit technical. It remains as part of the presentation that illustrates the kind of technology that has been adopted for the broken members, stones and how we are repairing them. Though, I think it would be more useful if we could all go the site and give an *in situ* demonstration.

[*slide*] After mending, the structural members are tested and it is only after ensuring that they have regained sufficient strength that they will be put back in place. This is an image which shows how the pilasters and the columns were all joined together and of course the documentation. A pediment and panel reconstruction carried out by the ASI team and its eventual return to its original place.

[*slide*] This is the work we have been undertaking for the past three to four years. This is the semi-vaulted portion in the Hall of Dancers. The first slide shows the condition that it was in and the present condition. In fact, when worked started the whole place was full of these old stones which had fallen and reached a height of seven to eight feet.

[*slide*] So, some of the images indicate the type of work we have undertaken. Each of the work processes has been thoroughly documented by the ASI team. This gives you a comparison on how the structure was before it was conserved and after consolidation of the foundation and the underpinning that was necessary, then rebuilding.

[*slide*] Glimpses of some of the work undertaken by the ASI team in the last three to four years: This also shows the western entrance and how it was restored. I am saying this because from time to time, *ad hoc* experts came to the site and discussions with them have resulted in evolving the conservation methodology or the approach to which the ASI team work at the site.

[*slide*] More pictures of the work, as it continues. You can see the conservation conditions from the beginning to now. In this picture, the portion in red indicates the works completed by the ASI team in the last three years and in blue the work remaining that we will undertake in the next three to four years. The technical challenges are these three green spots that you can see. There are full-grown trees on the structure and the challenge as it has been in other cases is how we conserve the structure with the trees which are part of the structure themselves.

[*slide*] Some examples of a portion of the wall which is the south side elevation, where the ASI team is working at the moment. Obviously this has been thoroughly documented and this is an inside view of the same portion and full documentation has been undertaken by the ASI team. These are the trees that we were talking about. Now, obviously the methodology worked out by the ASI team is to keep these trees together and the rest of the portion is to be restored following the principal of anastylosis.

[*slide*] My colleague from the APSARA National Authority will be perhaps talking in greater detail on the excavations that she has undertaken. This is informing us on the original levels that we have now achieved as the result of this excavation. This is the type of plinth protection that we will be working on around the Hall of Dancers, on the basis of the levels that have been recovered.

[*slide*] As I mentioned in the beginning, we have started working on this complex new discoveries are being made. The way it is informing conservation decisions is something that is a remarkable lesson that we have all learnt from. My colleague will talk about this more in detail, but these are the kinds of level that we have found, based on which the restoration work will be attempted.

[*slide*] Just to end my slides with some of the structures that will be taken up in the third phase. The documentation work has already been completed and the conservation methodology, which follows the same methodology we have adopted so far, will be used in this particular case. Here, we have been asked to do a conjectural elevation, which the ASI team has attempted and shared with the *ad hoc* experts.

[*slide*] This is another Gopura that will be taken out in the next five to six years. Again, extensive documentation of all these structures: The walls that have been undertaken by the ASI team. I am sure as we work, we will share our experiences with you.

[*slide*] The last slide shows the work of the Forest Institute of Dehradun, which has worked with the APSARA National Authority in documenting and treating trees, and more than 25 trees have been treated within the complex so far.

Thank you very much for your patient listening."

b. Scientific clearance along the external southern plinth of Hall of Dancers by Ms. Net Simon, Archaeologist APSARA National Authority Siem Reap, Cambodia

[*OrigK*] "My name is Net Simon, an archaeologist from the Department of Conservation of the Monuments in the Angkor Park and Preventive Archaeology.

"Excellencies Co-chairs,
Minister of Culture and Fine Arts,
Ladies and gentlemen,

Today, I have the honour to present to you the findings of the excavation that we carried out at Ta Prohm temple. Under the leadership of the Apsara National Authority and in co-operation with Archaeological Survey of India, the Department of Conservation of the Monuments in the Angkor Park and Rescue Archaeology conducted the excavation within the framework of the restoration and conservation of the temple programme. Ta Prohm temple is located about twelve kilometres from Siem Reap provincial town, to the east of the Greater Angkor City and southeast of Ta Keo temple. It also borders the north-western wall of Banteay Kdei temple. Ta Prohm is one of the biggest temples that were built under the reign of King Jayavarman VII and dedicated to Buddhism. It was built in 1186 to house the statue of Prajnaparamita, which represents Buddha's mother.

The excavation was carried out on a 3 x 35 metres area along the external southern plinth of the Hall of Dancers. The purposes were to survey the structures surrounding the Hall and look for buried stones to reuse for the restoration and conservation. Through this work we were able to determine four types of soil layers: a laterite layer beneath the plinth; a layer of condensed backfill of mud and crushed laterite; condensed soil on top of the second layer; and the current soil surface.

[*slide*] This is the laterite layer that we found right under the sandstone plinth of the Hall of Dancers. Based on these findings we were able to conclude that this layer has a close relationship to the plinth. It is a firm layer and supports the temple structure and protects its foundation against water penetration.

[*slide*] Next is the second layer, which is a compacted soil made up of mud and laterite gravel. This layer continues right from the first foundation stone, which led us to conclude that it is also part of the foundation structure. This layer was compacted and raised to form the ground level of the temple.

[*slide*] The third layer is the condensed soil on top of the second layer. Our assumption is that this layer was part of the larger backfill that was implemented across the temple ground. [*slide*] And here we have the fourth layer, which is contemporary soil.

In addition to these findings, the excavation also unearthed several ancient artefacts. They include broken lintel and pediment pieces that resulted from the collapse of the top structure of the Hall. We will put these pieces back in their respective locations during the restoration work on the Hall. We also found three types of ceramic fragments – earthen-

ware, stoneware and porcelain – which led us to conclude that the original objects that these fragments belonged to were imported from foreign countries.

That concludes my presentation, but before finishing I would like to thank the ASI for its support for the restoration and conservation of our temple over the past decade. Thank you for your attention."

Comment from the co-chairman for Japan: [*OrigE*] "Thank you Ms. Net Simon. The next item is Preah Khan and we will listen to a presentation by Mr. Chea Sarith."

II.A.3 Preah Khan: Follow-up on recommendation 27ST.3

a. Southern Library, Eastern Section: Follow-up on recommendation 27TS.3.1 by Mr. Chea Sarith, Archaeologists, Department of Conservation of the Monuments in the Angkor Park and Rescue Archaeology, APSARA National Authority

[*OrigE*] "Co-chairs,
Excellencies,
Ladies and Gentlemen,
Colleagues,

[*slide*] Today, it is a great honour to present the progress of DCMA's work at the southern library, eastern section.

[*slide*] The southern library is located at the eastern section of Preah Khan, west of the Hall of Dancers. [*slide*] Let me review the structural conditions of this library. As you can see, the structure has been heavily damaged by the presence of a sponge tree. The root has caused the displacement of the sandstone units and the weight of the tree has caused subsidence and impacted on the stability of the structure. In recent years, large portions of tree roots have fallen.

[*slide*] The structural assessment, conducted by DCMA and WMF project engineer, Mr. Chiv Phirum, highlighted that the southern wall leans southward by 14 degrees, with the presence of large gaps and fallen stone fragments.

[*slide*] This is an image of the northern elevation. [*slide*] The drawing of its structural conditions shows that the western part of the wall is leaning to the west by seven degrees, due to the weakness of the underlying laterite foundation.

[*slide*] DCMA's work at this location includes: preserving the original aspect, removing the dead tree, partial dismantlement of stone members, partial reconsolidation of foundations, stone conservation and treatment, stone inventory, reassembling, monitoring and long term maintenance. In May 2017, the DCMA team began the restoration work at the Library. The crew is comprised of 20 site workers and three technicians.

[*slide*] In order to prepare the worksite for the restoration work, we started by clearing the vegetation from the surroundings of the library. [*slide*] We continued with the removal of tree roots in the ground.

[*slide*] The team surveyed the area and looked for stone members, with a large amount of them missing from the structure. [*slide*] At this point, we conducted the inventory of the scattered stones, which were catalogued according to their location on the ground.

[*slide*] A team of site workers was specifically selected to be trained as draftsmen and now works on the graphic documentation of the scattered stones and the library sections.

[*slide*] In response to the *ad hoc* experts' recommendations from the 27th Technical Session, we have installed metal scaffolding both around and inside the library, which will reinforce the structure before we remove the tree.

[*slide*] In the future, we will dismantle the unsound portions of the structure and re-consolidate the foundation by inserting new laterite at the west side, keeping in mind the principle of minimal intervention.

[*slide*] As also suggested by the *ad hoc* experts, we will remove the old concrete props [*slide*] and old wooden supports.

[*slide*] The project will respect the schedule already submitted to the ICC Angkor *ad hoc* experts for conservation.

[*slide*] Thank you for your attention."

b. South Entrance of Shiva Complex: Follow-up on recommendation 27TS.3.2, by Dr. Ginevra Boatto, Representative in South East Asia, World Monuments Fund.

[*OrigE*] "Excellencies,
Esteemed colleagues,

[*slide*] I am going to present an update of WMF's project at Preah Khan temple, which is conducted in partnership with the APSARA National Authority. WMF has worked at this temple since the early 1990s. Recently, we have focused on stabilising the temple structures and maintaining site management efforts. Preah Khan requires constant attention towards maintenance, in particular due to ongoing structural movements, and the failure of existing shoring and props, as they age and weather.

[*slide*] Since 2014, WMF has conducted an extensive structural assessment of Preah Khan, using a standardized approach. This procedure allows field notes, photographs and sketches, and other data to be collected on site in a systematic way. When an intervention at a specific location is necessary, then the type of intervention and the priority level are determined.

[*slide*] The structural assessment has been conducted at about 50 per cent of the temple extension and has led to the creation of risk maps, such as the one here shown. The structural survey highlights future needs.

[*slide*] When there is no immediate plan for a permanent intervention, temporary shoring is utilised. Existing shoring is eventually replaced with new wood when necessary. Concrete shorings are reviewed and replaced with newer material when decayed. According to this review process, six more projects are now scheduled to be undertaken in 2017 and 2018.

[*slide*] These include, as WMF's first priority, the east section of the north portico of east Gopura III, where we plan to dismantle and reassemble the lintel and column, and repair the foundation underneath.

[*slide*] The next priority intervention relates to the south entrance of the Shiva complex, which was briefly presented at the last ICC-Angkor site visit. We agree with the recommended structural intervention, including the partial dismantling and reassembling of the stone pediment, the resetting in place of the original lintel, now lying on the ground, and

finally the installation of two new stone columns to function as a support for this lintel. However, we would like to discuss the details of this intervention with the *ad hoc* experts, together with the other priority projects for Preah Khan, at a future site visit.

[*slide*] Any data generated from the structural survey is stored in a database, which is regularly updated. It allows both a diachronic and a synchronic reading of the structural conditions of Preah Khan temple.

[*slide*] Since 2011, World Monuments Fund has monitored the Two- Storey Pavilion for periodic movement or displacement, using crack monitors, tilt meters, water level and auto-level surveys. The goal is to design an intervention to address structural issues and repairs that were carried out in the early 1950s which have now reached the end of their utility.

Thank you for your attention."

II.A.4 Angkor Thom: Naga balustrade on the Dai Chhnang Gate: Follow-up on recommendation 27TS.4 by Ms. Han Sochary and Mr. Khiem Mony, architects, Department of Conservation of the Monuments in the Angkor Park and Rescue Archaeology, APSARA National Authority

Mr. Kheim Mony:

[*OrigK*] "Greetings to all participants,

I would like to begin by recalling the recommendation of the 27th session of the ICC-Angkor, taken on the 24th of January 2017, to conduct a study on the balustrade of Angkor Thom. As we know, Angkor Thom has five gates, and the approach to each gate features Naga or demon balustrades on both sides of the road. For the study, we decided to start with the northern gate.

[*slide*] This picture shows Angkor Thom city in 1936, by which time all demon and Devata figures had already fallen off the balustrades to the ground. In 1939, a team from the EFEO carried out excavations to look for the missing parts for the restoration and the project was completed in 1946.

The total length of the balustrades is 112 metres. [*slide*] The collapse of the demon and Devata statues was the result of a number of factors, namely human action, vibration from passing traffic, natural forces, and techniques used in previous restoration work. [*slide*] In this picture, the collapsed statues had sustained almost complete damage. Their fall was apparently caused by the lack of stability in the base, which was made up of partly foundation stone and partly compacted rocks. There are 54 demon and Devata statues, among which twelve sport their heads, 35 are headless, and seven have collapsed to the ground. We have used the twelve statues with heads to try to compare their current features with what was restored by the French experts in 1939 and 1949, and we found that they remained pretty much intact; nothing was lost or damaged.

[*slide*] This is the plan that we have for the excavation: to look for missing heads or broken pieces that we could use to restore the statues. Our technical plan for this purpose is set in four different colours: Brown means stones that we found buried during the excavation; blue represents the floor beneath Devata statues; red represents Devata statues holding lengths of naga body, which we call balustrades; and yellow means the backfilled rocks that were apparently applied in order to strengthen the Devata statues holding the Naga body.

[*slide*] This is the current state before the excavation and [*slide*] here is what it looked like once the excavation was initiated.

[*slide*] This is the architectural plan that was drawn by hand and using photogrammetrical techniques. Among the 54 statues, we took out one – statue number 54 – to demonstrate the state of danger it is facing. The use of steel rods and cement in repairing the broken parts endangered the statue. The red colour indicates traces where cement was applied on the missing parts. Blue indicates areas where stones from different origins were used to fill up gaps on the statues.

[*slide*] This is the second detail. It shows that the whole body of the statue is made up of replacement stones to replace missing original stones. The replacement stones came from different sources; they may have belonged to a roof or a foundation. They were inserted where they would fit. Wood was also used. For example, the head in this picture in wood was inserted into the detached part, and cement was applied in order to seal it, as seen in the slide.

[*slide*] Here we want to show the disassembly techniques. Numbering was given to each disassembled segment of every statue from the head down to the base. [*slide*] This is another detail of our study on the 54 statues where in the past steel rods and cement were used as techniques to strengthen their structures.

[*slide*] This is detail of the heads of the twelve statues. The features on these heads are not very welcoming. Steel belts strap some of them and others have been plastered with cement to repair damage.

[*slide*] This shows our team conducting topography on the balustrade to determine the level of each statue. [*slide*] The results of the topography shows there is 0.5 metre difference in ground level from one end of the balustrade to the other.

[*slide*] Here, we visited the site on a rainy day to check whether water penetrates into the foundation of the balustrade or not. [*slide*] This is the technique applied by the SCU team, with whom we have worked closely all along.

[*slide*] This shows the stages where we carried out our work according to the plan drawn up by the SCU. [*slide*] Here the picture shows us working with the SCU, engineers, archaeologists, and field surveyors in preparation of the project.

Now we arrive at the conclusion of this presentation, and let me say a few more words. By following the adequate recommendations of the ICC, we were able to improve the conditions of the balustrades strengthening their foundations and structure and reducing vibration from the passing traffic so that they can last forever. Thank you."

II.A.5 Bantey Srey: Follow-up on recommendation 27TS.5 by Her Excellency Ms. Chau Sun Kérya, project leader and advisor, APSARA National Authority

"Chairperson,
Excellencies,
Ladies and Gentlemen,

I will briefly present the follow-up on recommendation 27TS5 for Banteay Srei. This project concerns different departments, that of Conservation, of Inter-sectoral Projects, of Culture and finally the Tourism Management Plan Group. [*slide*] The recommendations included four items: signage, two restoration works and the lapidarium.

[*slide*] Let me start with that first, on the signs designed by a working group and on

screen you can see the sign selected by the experts at the last ICC session. We made a polystyrene sample so that it could be tested on site. We designed two sizes, big and small, and the experts requested us to make a medium sized one so that, depending on the temple, sign size could be adapted. On the sign made of stone is inscribed the name of the temple.

[*slide*] The second point on the eastern Gopura heeded the recommendation and the teams of the Rescue Archaeology and Restoration Department took the necessary corrective measures as requested and these pictures show you before and after intervention.

[*slide*] Thirdly, still on conservation: The southeast corner of the enclosure wall, where the restoration did not follow the natural curvature of the wall, which has been corrected.

The last recommendation was on the construction of a lapidarium in order to store scattered stones as presented on screen. During their last visit, the experts made some slight modifications. They advised to select first the stones exposed to weathering. This will help in selecting the fragments that can be use for the restoration of the temple. Massive carved blocks can then be exhibited on site and will be protected from weathering under a roof.

Finally, the experts suggest exhibiting some beautiful fragments by placing them along the gallery of the visitors' centre hall. This will allow people when arriving at the information centre and before they enter the temple to marvel at these beautiful sculptures. Small precious stones must be exhibited in a small lockable room to be constructed on site or should be sent to the Angkor Conservancy or stored by the APSARA National Authority, as per decision of the management. A specialist should be appointed to sort these fragments before choosing the location and size of the lapidarium.

I thank you for your attention."

II.A.6 Angkor Wat, West Embankment: Follow-up on recommendation 27TS.6, by Mr. Mao Sokny, architect, Department of Conservation of the Monuments in the Angkor Park and Rescue Archaeology, APSARA National Authority

"Excellencies,
Ladies and Gentlemen,

[*slide*] I am delighted to make this presentation on Angkor Wat's West Embankment. My name is Mao Sokny and I work for the DCMA at the APSARA National Authority.

[*slide*] First, I would like to show a general layout of Angkor Wat and the intervention area, where the steps will be worked to improve the drainage system flowing to Trapeang Ses and the Angkor Wat moat. [*slide*] This is the location site for restoration and reinforcement of the embankment.

[*slide*] This is where the drainage system and water from Trapeang Ses flow into the moat passing the north west embankment of Angkor Wat. [*slide*] Exsiting plan and plan of the drainage for reassembly before installation of the stone blocks.

[*slide*] This is the plan at the north of the drainage we are expecting once work is completed. It is made up of eight steps of laterite stones and four steps of sandstone. The drawing shows how it should look after the work is completed.

[*slide*] Existing conditions: The picture at the centre shows a perspective from east to west where we will connect with the south and north side and install drainage. We will use existing concrete pipes and new, recently installed, concrete pipes. [*slide*] Pictures of the

south side and north side of the drainage.

[*slide*] This follows up the recommendation. As for the concrete pipes of the embankments, we study, with the Department of Water Management, reinforcement works so that they can support the heavy layers of laterite and sandstone steps. This drawing shows the existing concrete pipes.

[*slide*] This structure supports the concrete pipe. It will support the heavy stone layers from the embankment steps. [*slide*] These are plans with cross sections from east to west and section B from the front of the concrete pipe north to south. [*slide*] Dismantling work of the south side laterite and sandstone steps will take place to realign them with the northern and southern sides. [*slide*] You can see the drawings and some pictures show the conditions of the steps.

[*slide*] This is the technique for installation. This is the method to reassemble the embankment steps; as the original soil layer was destroyed there, we will remove the weak soil and will replicate the IGeS team's technique and insert geotextile layers.

[*slide*] At the north side the original layer is in good condition and we will use the traditional method. [*slide*] We will complete the first phase of 40 metres' length and will continue so that the drainage system is done and submit another project for the 14 metres left.

[*slide*] Thank you for your attention."

II.A.7 Angkor Wat, Causeway: Follow-up on recommendation 27TS.7, by Mr. An Sopheap and Mr. Chun Sambor, archaeologists, Department of Conservation of the Monuments in the Angkor Park and Rescue Archaeology, APSARA National Authority and Mr. Satoru Miwa, architect, University of Sophia, Japan

Mr. An Sopheap:

[*OrigE*] "Her Excellency Phoeurng Sakona, Minister of Culture and Fine Arts, and Chairperson of the APSARA National Authority.
His Excellency Say Sam Al, Minister of the Environment,
Excellency,
Ladies and Gentlemen,

[*slide*] It is a great honour for my partner, Mr. Satoru Miwa, from Sophia University and myself to present our response to the recommendations from the last technical session of the ICC regarding the restoration project of Angkor Wat's Western Causeway Dike.

[*slide*] Recommendation point 1: To clarify and identify on the entire length of the façade the different historical stages of the construction and reconstructions of the structure. After our observation on site, we divided the entire length of the façade into five different sections. Section A located at the eastern and western parts is the original laterite wall. Sections B1, B2 and B3, length of 54 meters, are historical restoration before the French period.

[*slide*] Recommendation point 2: To complete test-pit excavation on the inner backfills of the causeway in order to have one test-pit per corresponding section of the differences in the composition of the soil and state of decay. Right now we have completed four test trench excavations: First trench, Trench N.1, located between the eastern original section A and restored section B1. Second trench, Trench N.2, located to the west of the restored section B2. Third trench, Trench N.3, located between restored sections B1 and B2. Fourth trench, Trench N.5, located between the western original section A and restored section B3.

[*slide*] Here are the results from our archaeological excavation, section by section. The original section A: Even the laterite wall has a slight degree of inclination, but there is almost no gap between stones. The internal parts of the laterite wall are in good condition, except only the first laterite layer of the eastern original section A, which is severly decayed, although it is not the case on the western original section A.

[*slide*] The internal backfill of the original section A is in a good condition; it is made up of a layer of compact sandy soil about one meter thick on the upper part to support the pavement of laterite and sandstone and then the compacted sandy clay continues until the bottom layer of the laterite wall.

[*slide*] The restored sections B2 and B3: Some blocks of the first and second restored laterite layers are in dire condition and there are big gaps showing between stones, which allow the backfill to runoff.

[*slide*] The internal backfills of the restored sections B2 and B3: We found that the compact sandy soil had totally disappeared and some part of the compact sandy clay near the laterite wall was unusable. During the post-Angkorian restoration period, this part was filled up by blocks of laterite and sandstone of different sizes, including carved stones. The laterite pavement below the sandstone pavement of the platform totally disappeared.

[*slide*] The restored section B1: According to test trench N.3, to the west of this section, we found the inner laterite wall, which seems to have been set to reinforce the outer wall, was built with small laterite blocks, which differs from other sections. It can help stop internal sediment runoff. We did not find this type of wall at test trench N.1 because the excavation trench covered the eastern original section, which is different to the western part. In the future, we will organise one more test trench in the central part of section B1 in order to clarify whether there is an inner laterite wall along the entire length of the outer laterite wall or not.

By comparing this section to sections B2 and B3, we found that the bottom backfill of the compacted sandy clay is in good condition and that the upper backfill of the compacted sandy soil disappeared and was replaced by small laterite blocks arranged over five courses and covered by sandstone pavement.

[*slide*] Regarding recommendation 4: In order to save on the costs of pumping water out, we are required to divide the present cofferdam into smaller sections corresponding to the different sections identified on the causeway dike and subsequently to segment the progress of the work on site by completing one section after the other.

After clarifying the entire length of the façade the different historical stages of the construction and reconstructions of the structure, we decided to divide the present cofferdam into five parts.

[*slide*] Right now we have just finished the construction work, as you can see on the slide. Before giving the floor to Mr Satoru Miwa to continue, I would like to invite Professor Shimizu, a Sophia University expert, for a short presentation."

Dr. Goro Shimizu:

[*OrigE*] "My Name is Goro Shimizu, representative of the Chairperson of Sophia University's restoration Committee. I appreciate having the opportunity to report on the restoration work concerning the Angkor Wat Causeway. This report was compiled by the joint forces of the APSARA National Authority and Sophia University. As a general rule we pay attention to the following three points: Restoration of world cultural heritage, preserving the current state of historical appearance and to keep a stable and durable structure. We strongly hope that historical remains can be enjoyed by everyone. Thank you."

Mr. Satoru MIWA:

[*OrigE*] "I am Satoru Miwa, an architect at the Sophia University Angkor International Mission.

[*slide*] Regarding Recommendation Phase III: Initially, I will talk about the first phase. Sophia University accepted a request by the Cambodian Government in 1993 to restore the Western Causeway. Our philosophy for monument conservation is symbolised in the words: "The conservation of Angkor monuments should be carried out by Cambodians for Cambodians". The APSARA National Authority and Sophia University carried out the restoration of Phase 1 from 1996 until 2007, using traditional construction methods and also offering continuous capacity building (human development). Based on the restoration experience of this phase, we are preparing to start restoration Phase II.

[*slide*] The façade wall preservation (92 metres): In Zone II of 92 metres to be restored from now on, it is known that 54 metres at the centre of the wall have been repaired before the French period. Moreover, this restoration can be divided into three stages through observation.

[*slide*] Structural Engineering: This table is a list of Japanese experts for the western causeway project. We have made structural studies with various experts. Considering the current state of the western causeway, the construction technique in Cambodia, etc., we have studied a feasible construction method. This is a list of the experts of the APSARA Authority that we work together with. We often have meetings to exchange ideas.

[*slide*] Decay caused by water in the lower part of the retaining wall: As a result of observation, excavation and structural calculation, we have concluded that the wall can barely stand.

[*slide*] Construction method: We would like to strongly propose a method of preserving the present retaining wall without dismantling it, by establishing an L-shape wall in concrete to reinforce the laterite retaining wall. Among several methods which we have studied so far, we think that this method is the easiest to realise. The method is applicable to the restoration of retaining walls with different damaged conditions. The soil on the back of the retaining wall will be dug by hand. Moreover, concrete is now a proven material.

[*slide*] This is a construction image. This method is particularly good for the following two points: to preserve the original condition of the façade-wall and structural durability.

[*slide*] Expected effect: By establishing an L-shape reinforced concrete wall, the following effects can be expected: 1) Preventing slippage and turnover at the bottom of the retaining wall; 2) Reducing the horizontal force by earth pressure to the retaining wall; 3)Preventing the penetration of water from the moat, as well as the discharge of soil from the back of the retaining wall; 4) Easy replacement of deteriorated laterite blocks due to erosion by water at the bottom layers of the retaining wall; 5) Durable long-term stability of the concrete can be expected; 6) Chemical reaction at the contact surface between laterite blocks and concrete is negligible;7) Layout and design guidelines of reinforced concrete wall for each section.

[*slide*] This is a layout of the reinforced concrete wall for each section in Zone II. The dimensions of the wall for each section are determined by the elements of this table. In area B, which has been repaired in the past, the condition of the inner soil is bad, and there are many gaps in the stone of the wall. Also in area A where the original remains, there is an inclination of the wall and the corrosion of the lower part of the wall is progressing. Both A and B are in bad condition. In conclusion, it is necessary to reinforce the structure of the entire wall, 90 metres in Zone II.

[*slide*] Study on the possibility of adopting precast concrete: As a possibility for concrete, we examined the method of adopting precast concrete. After examining all the points, such as ease of installation, safety, reliability, feasibility, characteristics of the construction site, which is long, in a straight line and located in the water, we concluded that it is rather difficult to adopt this method. This is a conclusion obtained from a technical point of view.

[*slide*] Our proposal as a conclusion: In order to preserve the current state of historical appearance on the façade wall as it is, to be structurally stable and durable, to adopt the construction method to reinforce the structure entirely using L-shaped concrete structures inside the causeway. To use concrete cast on site.

[*slide*] Work plan for the next six months: Conduct training in the use of machinery at the site; Training for masons to improve their skill (continuing); to consider more detailed construction methods between the APSARA DCMA team and Sophia University (continuing). We will conduct some more archaeological and architectural research to clarify the understanding of the internal structure; expansion of the bank to install a small-crane and stop water; archaeological and architectural surveys including the foundation structures around the central terrace in dry conditions.

Thank you for your attention."

Comment from the co-chairman for Japan: [*OrigE*] "Thank you very much. According to the schedule, I suggest that we take a coffee break for 15 minutes and resume at 10:20 a.m."

Comment from the co-chairman for Japan: [*OrigE*] "We resume with item II.A.8, WMF and the Department of Conservation of Monuments of the APSARA National Authority."

II.A.8 World Monuments Fund and Department of Conservation of Monuments in the Angkor Park and Rescue Archaeology, APSARA National Authority

a. Angkor Wat, Ceiling of the Churning Gallery project: Follow-up on recommendation 27TS.8, by Dr. Ly Vanna, Director of the Department of Conservation of the Monuments in the Angkor Park and Rescue Archaeology, APSARA National Authority and by Dr. Ginevra Boatto, Representative in South East Asia, World Monuments Fund

Mr. Ly Vanna:

[*OrigE*] "Excellencies,
Ladies and Gentlemen,

We are going to present the latest progress approved by the *ad hoc* experts with regard to the replica of the wooden ceiling in the Churning of the Sea of Milk Gallery at Angkor Wat. Briefly, I would like to start by recounting the history of the relationship with WMF for this very difficult work. We first had to agree on the motif and then the technical work that aims at harmonising the carving surface of the stone. Additional extension of the plank with the Angkor Wat decorative pattern was also agreed on. Our colleague from WMF Dr. Boatto will present this topic."

Ms. Ginevra Boatto:

[*OrigE*] "Since 2012, [*slide*] World Monuments Fund has collaborated with the APSARA Authority's DCMA department towards the creation and installation of a wooden ceiling, presenting the decorative detail and method of construction as close as possible to the ceiling in place at the Churning of the Sea of Milk Gallery in Angkor Wat.

[*slide*] As we have seen at the last Technical Session, major efforts focused on defining the decorative detail, under the close guidance of Professor Pierre André Lablaude, through site visits and subsequent correspondence with project team members.

[*slide*] A Cambodian artist based in Phnom Penh who studied the original fragment, MG 23513, as a reference, executed the carving. At the last site visit in January 2017, the design and execution were approved. Slight alterations were suggested regarding the depth of carving and the profile, which were successfully presented to the *ad hoc* experts at the site visit last week.

[*slide*] We have also worked with the carver to make the execution rougher, as you can see in these images. [*slide*] WMF installed a finished sample of three carved wooden beams at the gallery for the *ad hoc* experts to evaluate at the site visit. The sample triggered discussions about a possible rescaling of the decorative detail.

[*slide*] For the structural study of the stone supporting ledges, we are conducting a survey with the intent of defining the quality of the existing stone along the gallery, while we keep looking for the timber needed.

[*slide*] In response to ICC-Angkor's recommendations, in our mock-up test we have used wooden beams of varied width (25, 30 and 35 centimetres). [*slide*] In early June, we have extended the sandblasting test to one whole plank and the results were presented at the site visit.

[*slide*] A dark patina is naturally occurring with time, as we can see in the wooden beam which was carved first among those installed in the gallery.

[*slide*] Other aspects of this work remain to be discussed, such as ways to guarantee adequate ventilation and to allow for maintenance and monitoring of the wooden beams once they are installed in the ceiling. We hope to present more updates on these matters at the next ICC Angkor Technical Session. We also hope that by the next time we meet, we will have been able to install more wooden beams on the gallery and continue with the implementation of this project.

Thank you."

b. Phnom Bakheng: Follow-up on recommendation 27TS.9 by Ms. Cheam Phally, Senior Architect and Project Coordinator, World Monuments Fund

[*OrigE*] "Excellencies,
Esteemed colleagues,

[*slide*] I am now going to present an update of WMF's project at Phnom Bakheng temple, which is conducted in partnership with the APSARA National Authority.

[*slide*] After preliminary studies and the assessment of the site, in 2008, thanks to a major grant from the US State Department, we launched Phase II of the Phnom Bakheng Conservation Project, a long-term intervention focused on the restoration of the eastern part of the central pyramid of Phnom Bakheng. Today, the worksite consists of three working areas, which include the south façade and the southeast corner, started in 2012 and now employing most of our workforce on site, the east façade with the areas adjacent to

the eastern staircase, where we began intervening in 2015 and finally the north façade, started at approximately the same time, close to the northern stairs. The conservation project aims at reinstating the structural stability of the temple and at waterproofing its terraces, as you have seen in great detail in past WMF presentations. Thanks to the EFEO for taking the drone photographs used in this presentation.

[*slide*] At the south façade and southeast corner of Phnom Bakheng, our team advanced in particular at level C, the fourth tier from the ground. [*slide*] The sandstone veneer at the southeast corner was dismantled in order to intervene on the underlying decayed bedrock foundation, which we have kept as much as possible: where this was not possible, it was then replaced with new laterite or sandstone blocks. The reassembly of the wall, in progress, is scheduled to be completed in the next few weeks.

[*slide*] Units of cut bedrock were originally used underneath the sandstone wall at this section of the terrace and they proved to be in sound condition. Instead, the underlying bedrock was in dire condition. For this reason, we decided to replace it with new sandstone. The bedrock was cut to a depth depending on the actual conditions. The original bedrock units, after being documented, were then reassembled in place.

[*slide*] At the previous ICC Angkor site visit in January, we discussed with the *ad hoc* experts and APSARA representatives the possibility of reusing anonymous stone blocks from the hill slope for the replacement of missing units in the stone shrines, specifically C3, an approach which we agreed upon.

[*slide*] The reassembly of shrine C3 was thus started in February of 2017, and includes a total of six reused anonymous stones of small scale. As recommended, these were selected and inserted in the masonry in a way to limit as much as possible the cutting and reshaping of the block; in fact we plan to keep the original historical surfaces of these blocks as much as possible. Architectural features on these reused blocks are being tooled in a way that imitates the original blocks.

As for the minimal tooling marks to identify these reused stones, we hope to present our idea to the *ad hoc* experts at a future visit to Phnom Bakheng.

[*slide*] New laterite blocks were used as infill material where the natural rock was eroded at the south façade of level C. The surface of this new foundation was consequently sloped between 2 and 3 per cent, with the aim of naturally facilitating water discharge from the terrace. We then installed a PVC membrane on top of these new foundations, while a lead flashing was inserted underneath the wall of level B, to protect the terrace from the water potentially infiltrating from the upper tier. The same activities were conducted at lower level D, at the south façade and near the south stairs.

At level E too, the waterproofing was accomplished in 2016 and the installation of the pavers was brought to completion in March of this year: here, only a few of the original pavers could be retrieved.

[*slide*] WMF's intervention at the east façade is facilitated by the scaffold structure erected alongside this section of the temple and is progressing at a steady pace. In February 2017, the intervention was started at level C.

[*slide*] There, the unsound portions of the sandstone wall were dismantled where necessary in the upper stone courses. The activity of bedrock repair included the removal of soil originated from the erosion of the original rock and its replacement with new laterite or sandstone units. Shrine C1 was also disassembled in March. The activities of wall reassembling and bedrock repair will be continuing for the next few months.

[*slide*] At level E, after the completion of the repair and the waterproofing of the foundation underneath stone shrine E1, the original blocks belonging to this small tower are

now being reset in place. Once this task has been brought to completion, [*slide*] we plan to remove the portion of the scaffold structure on level E and F as it won't be necessary anymore. This will allow us to extensively waterproof the two levels from the limit of the northeast corner to the beginning of the working area at the southeast.

[*slide*] At level D, the new foundation underneath stone shrine D1 was given a slight slope, while new pavers are now being added before the actual reassembly of shrine D1 commences.

[*slide*] Starting from February 2017, a small crew started working on the structural stabilisation of the buttresses adjacent to the east staircase. The two transverse walls at levels F and E were dismantled, keeping in mind the principle of minimal dismantling. The blocks disassembled were conserved and new sandstone units were added where missing.

[*slide*] At the North façade, WMF's intervention continued as planned on the two lowermost terraces, E and F, with bedrock repair and wall reassembly, using both original sandstone units and scattered stone blocks retrieved from the hill slope. Since the need for scattered stone units at this section has been fulfilled, the stone survey and retrieval of blocks at the northern side of the hill was temporarily suspended.

[*slide*] The reassembly of the wall at level F was brought to completion in April 2017 and we started adjusting the slope of the historical foundation in the area where stone shrine F10 will be reassembled in the next months. About 50% of the wall at level E has been reassembled.

[*slide*] Looking at the whole site of Phnom Bakheng, our concerns for the poor structural conditions of brick shrine G13 have brought us to design temporary wooden supports for this tower, which have already been installed.

[*slide*] Beside the actual conservation work, I also wanted to mention that in February, two of our employees, who received specific training in the installation of the waterproofing membrane, became trainers for EFEO workers at the West Mebon worksite, where the team is now using a PVC membrane very similar to ours. WMF also participated in EFEO's research project "*Fondre pour le roi*", focusing on Angkorean bronze, by contributing a few bronze artefacts recovered at Phnom Bakheng, Preah Khan and Ta Som. The research aims at better defining the production and usage of this alloy in Angkor.

Thank you for your attention."

II.A.9 Preah Pithu: Follow-up on recommendation 27TS.11 by Mr. Srun Tech, architect, Department of Conservation of Monuments in the Angkor Park and Rescue Archaeology, APSARA National Authority and by Mr. Jeon Bumhwan, international co-operation team leader, Korea Cultural Heritage Foundation (KOCHEF)

Mr. Jeon Bumhwan:

[*OrigE*] "Excellency,
Ladies and Gentlemen,

[*slide*] I would like to thank you for the honour to present our project for Preah Pithu. The presentation will focus on the cruciform terrace in temple T and the previous recommendations received.

[*slide*] I would like to start our presentation with a short introduction of the project, archaeological research, which will be presented by Mr. Srun Tech, and finally I will wrap up with the follow up on the ICC-Angkor recommendations on three points.

[*slide*] The first phase of the Preah Pithu project started in September of 2015 for lasted for three years. The site is in the Angkor Thom area, on the north-east side. The objective of the project is to establish the foundation for the development of the cultural heritage of Angkor.

[*slide*] Now I would like to give the floor to Mr. Srun Tech to report about the archaeological research at the cruciform terrace. As the Preah Pithu project is a joint project with the APSARA authority, the APSARA staff has joined the research with our team members. Mr. Srun Tech is our archaeologist and co-ordinator for the project."

Mr. Srun Tech:

"Excellencies,
Ladies and Gentlemen,

I am reporting on the excavation project of the Korea Culture Foundation in collaboration with the APSARA National Authority.

[*slide*] The purpose of this excavation project is to identify the chronology between the cruciform terrace and the west wall (including the Gopura). To confirm and investigate the soil layer and infrastructure form of the terrace, Gopura, wall and moat area and to analyse the current condition of the cruciform terrace structure for the implementation of conservation and restoration work.

[*slide*] Trenches were set up in places where we thought we would get information. This is the natural soil. [*slide*] The sandy layers represented the foundation of the tiered moat. A very compacted layer made of laterite gravel is found at an angle. It is probably used as a protective layer for the foundation. There were deposit layers during construction, as we found traces of laterite and ceramics - *lide*] Deposit layers from ancient times or occupation.

[*slide*] On the cruciform terrace: there are two phases: First phase: Compacted soil. Second phase: The foundation was made with laterite gravel, sandstone fragments and sand.

For the cruciform terrace, there are two phases. First phase: Compacted soil. Second phase: Foundation of sandy soil and sandstone fragments.

[*slide*] Cruciform terrace structure: For the wall, there are two phases: First phase: Compacted soil. Second phase: Foundation and wall structure

[*slide*] From our observations, we can deduct some special features that we interpret as such: The terrace and gate were constructed on compacted soils. The terrace and gate were probably constructed in two separate stages. The structural characteristics reveal that the foundation was made in sand compacted with sandstone chips and the foundation of the terrace made by sandy soil and compacted sandstone chips. Basement is at a slight depression. [*slide*] The connection between the terrace and the gate looks like this. On the terrace structure there are almost completed decors but none on the gate.

[*slide*] During excavations we found earthenware, stoneware and porcelain. They were made using the pedal and wheel technique. These decorations, according to Dr Ly Vanna, present designs slightly similar to decoration from Java in Indonesia. Local ceramic and imported ceramics were found. [*slide*] These pots come from different places, here from Buriram (Thailand), and these from Torp Chay and Boeng Chheng Ek. The imported ceramic came from Thailand (Sovanolok), Vietnam and China. This broken grinding stone was found.

[*slide*] This image symbolises the very good co-operation project between Korea Culture Heritage Foundation and the APSARA Authority, sharing research, information and observations.

Thank you very much for your attention."

Mr. Jeon Bumhwan:

[*OrigE*] "Thank you Mr. Srun Tech. [*slide*] Now I would like to continue our presentation on the follow up of the ICC-Angkor recommendations. First, the ICC recommended improving the surrounding environment of Preah Pithu with the co-operation of the APSARA National Authority.

[*slide*] This is an old map of Angkor Thom and the Royal Palace area. As you can see, our site is north-east of the Palace.

[*slide*] The current situation of the site is that there are many stores located near the site which could have negative impacts on the monuments. There are generators operating in close proximity to the temples which could contaminate the ground when leaking oil and have other negative effects like noise or pollution.

[*slide*] The matter was once mentioned during the researchers' meeting with the APSARA. Until this problem is solved, we will try to manage our project in order to secure the safety of both stall vendors and visitors. Maintenance and monitoring around the monument and surrounding areas will be done on a regular basis.

[*slide*] The second recommendation was to submit our restoration plan before the ICC meeting to inform the *ad hoc* experts. The report was sent in May.

[*slide*] As for the restoration of the cruciform terrace, we have done various types of studies, such as surveys for topography, 3D scanning and actual surveys, ground surveys to look into the condition of the ground, research and investigation for archaeology, architecture, lithology, biology and etc.

[*slide*] The architectural style of the cruciform terrace is Angkor Wat style which dates from the 12th century. For documentation, 3D scanning and actual survey were conducted. Though ground survey, we have verified the condition of the ground which is good. We have dug four trenches and Mr. Srun Tech has previously presented the contents. About 80 per cent of the form of the original structure is left according to the volume. Structural analysis indicates that the structure is safe.

[*slide*] This is an ideal drawing of the complete state. The red colour indicates the missing and collapsed areas of the terrace. We can see a high percentage of Naga heads and balustrade missing or damaged.

[*slide*] The basic principle for restoration is to maximize the use of old material and use a minimal amount of new material. New carvings should be avoided; minimum dismantling is required to keep the authenticity of the monument. The collapsed areas of the first storey will be repaired. There will be limited repair on the second storey, only to secure safety for visitors and locals. We will try to preserve past interventions and check their durability for safety. Relocation of materials will be done. A selected conservation treatment will be done according to the state of biological growth and conditions. There will be no carvings but we will try to harmonise new material with the old.

[*slide*] We will conduct temporary conservation treatment during the construction. [*slide*] We divided the terrace into nine sectors: The upper storey and eight sectors on the lower floor according to the eight directions.

[*slide*] This is the plan for restoration. Firstly, collection of the elements will be done around the terrace. The red colour indicates the scope of dismantling and restoration. [*slide*] The schedule for restoration: We will firstly restore sector nine and will have a site inspection from the *ad hoc* experts and the APSARA for work verification. [*slide*] Hopefully, after the site visit from the experts, we will expand the restoration to the other sectors, 1 to 8.

[*slide*] This is an example of the adhesive glue and titanium bars which are used in Korea. Epoxy resin is widely used in heritage sites in Korea. We will try to adopt these materials and methodology to our project.

[*slide*] The third recommendation was to review with KOICA for the stabilization of Temple U and repair the drainage system. [*slide*] This is a picture of Temple U. At present the current condition of Temple U is not so good. [*slide*] The main structural problems are on the structure itself, with issues with the ground stability. We noticed past interventions using concrete bars in order to maintain the current state. There are load concentrations on the structure which impact heavily on the structure. Minor cracks are showing on the stairs. The top part of the structure is unstable.

[*slide*] This is an aerial view. Investigation on the trees should also be done. [*slide*] Thank you very much for your kind attention."

II.A.10 Chinese Academy of Cultural Heritage by Ms. Yuan Mengxi, archaeologist: Ta Keo: Follow-up on recommendation 27TS.12 and Plan of Management and Exhibition Center of Ta Keo Temple and Chau Srey Tevada Temple

[*OrigE*] "Excellencies,
Ladies and Gentlemen,

[*slide*] It is my honour to stand here on behalf of the Chinese Government team for Safeguarding Angkor to present the restoration and conservation projects of Ta Keo Temple.

[*slide*] My presentation contains two major parts. First is the follow-up on the last ICC Technical and Plenary session recommendations; the second will report on the conservation and restoration project at Ta Keo.

[*slide*] I will start from the follow-up on recommendation. The first recommendation mentioned the absence of stone conservation specialists during the site visit. I would like to explain that the last ICC Ta Keo site visit was organised during the period of Chinese New Year, a statutory holiday, therefore stone carving conservation experts could not arrive in Siem Reap.

[*slide*] The second recommendation mentioned that there is a discrepancy between the prescriptions and the implementation of the stone carving conservation work. In order to eliminate the misunderstandings between the *ad hoc* experts and us, we held a Ta Keo workshop on June the 19th. Our experts explained detailed methodology, techniques and implementation for stone carving conservation.

[*slide*] Another recommendation mentioned establishing close contact with the APSARA Stone Conservation Unit (SCU). Actually, Chinese experts have communicated with the ex-

perts from the APSARA National Authority SCU. We are willing to improve communication between both sides in the future.

[*slide*] The recommendations mentioned the lesser quality of the general work on new stone and invited the project managers to train for specialised capacity in the team on site. I would like to explain that all the stones we have used are from the quarries identified by the APSARA National Authority. The stones we used have been tested and the quality is guaranteed. Here is the detail of the physical properties of the stones we have used.

[*slide*] Staff and experts, according to our work plan of Ta Keo project, are first class technicians, conservators, archaeologists and engineers working on site during the different phases of the project. The *ad hoc* experts mentioned holding a meeting at the next technical session between the *ad hoc* experts and the senior staff of the Chinese team to share information and exchange.

[*slide*] The Ta Keo workshop was held at the CACH research centre on June the 19th, with the *ad hoc* group of experts and other experts from other international team participating. During the workshop we had in-depth conversations on conservation theory, methodology and also application of the conservation materials.

[*slide*] The ICC *ad hoc* experts mentioned that they invited the Chinese team for planning and detailing the different set of specialist staff that will be embarked. Details of the operation and plans for the year to come were submitted. CACH always follows the recommendation of the APSARA National Authority to submit our implementation scheme; for example, for the restoration of the five towers on the pyramid of Ta Keo, the general scheme and work plan was submitted to the APSARA National Authority before the start of the project.

[*slide*] I now focus on the report of restoration and conservation work of Ta Keo. This is a general layout of the temple. The right side is after restoration at the beginning of the project, when we listed 24 places in danger in the general plan and according to our safety track we added three inner Gopuras and also the five towers on top of the pyramid.

[*slide*] Our general orientation of the project aims at reinforcing and eliminating danger and at carrying out reinforcement restoration. Our general principal respects minimal intervention to preserve the cultural heritage and historical information to the greatest extent and to conduct reversible restoration when possible. [*slide*] This is before and after restoration of the inner Gopura that we just added within our project.

[*slide*] Now I would like to show the five towers on the top of pyramid. We are going to do structural reinforcement and danger elimination of the five towers on the top of Ta Keo. CACH has set wooden supports at the very beginning of the project. During the safety monitoring we realised that the five towers are still at risk. To guarantee the safety of visitors and of the architecture, rescuing the monument is both mandatory and urgent. In November of 2016, a Chinese expert team conducted a field survey and based on the study of the current situation and structural features we have made structural consolidation and reinforcement and danger elimination works schemes and plans.

[*slide*] The main problems in the five towers are tilting of the structures and broken stone members. For our restoration plan we envisage, on dangerous areas, to apply reversible steel structural reinforcement. A layer to insulate the steel from the wood has been added to guarantee the steel will not cause any damage to the stone and this layer has been tested. [*slide*] The loose stone components on the five towers will be put back in their original locations.

[*slide*] To conclude, the restoration and conservation project of Ta Keo started in 2011 and will be completed in 2018. Before completion of the project, we intend to finish the following work: First to conduct structural reinforcement and eliminate any danger in the

five towers; analyse and study the restored part of Ta Keo, and we are going to check the monitoring data of the areas we have restored to guarantee their quality. We are going to manage the drainage system of the general platform and manage the surrounding environment. We are also going to do the research report and documentation.

We are willing to exchange ideas and experiences with other teams. We are going to launch the Beng Mealea project in close co-operation with the APSARA National Authority in the near future. We welcome international experts to take part in the technical discussion and we wish to exchange more with other international teams to contribute to the World Heritage, which belongs to all human beings.

[*slide*] Thank you for your attention."

General Discussion

Comment from the Co-chairman for Japan: [*OrigE*] "Thank you very much to all the speakers of this morning's session. We now have some time for a general discussion for those who wish to make observations or comments on the subjects we heard this morning. The floor is open. Mr. Lablaude, please."

Comment from Mr. Pierre-André Lablaude: "I think that, compared to previous sessions of the ICC, today has shown great improvement and I would like to congratulate the APSARA National Authority on this matter. Remember two or three sessions ago, the recently created reports on the follow-up of the recommendations were mostly presented by international teams in the room and the APSARA National Authority teams sent written reports. As we are all colleagues, the modality of presentation should be the same for the national and international teams.

Today, we have seen that almost all the recommendations's follow-up reports have been presented on screen by national and international teams and I am sure that very soon, I hope at the next ICC, there will be no more written reports but only screen presentations. Once again, congratulations to the APSARA National Authority for the effort it put into the presentation of the reports."

Comment from Mr. Mounir Bouchenaki: "Thank you Co-chair. I would like to concur with what was said by my colleague and friend, Professor Pierre-André Lablaude, and suggest that the Secretariat colleagues set up a database that would compile the different results of the international and national teams. I believe the time has come for this. We have mentioned it during different meetings and notably with professor Claude Jacques on archaeology and its findings and on the data gathered by teams, either national or international, that have enriched the knowledge on stratigraphy and consequently on the history of the Angkor site. Thank you."

Comment from the Co-chairman for Japan: [*OrigE*] "Thank you. Professor Nakagawa, you have the floor."

Comment from Professor Nakagawa: [*OrigE*] "Thank you Co-chair. I would like to talk about the restoration of the ceiling of the Churning of the Sea of Milk Gallery. In the past, in Japan, we carried out restoration of a very ancient temple, first based on restoration plans using modern carpentry tools. But when the areas to be restored where in higher positions the final result was not satisfying, so they tried restoring using ancient carpentry tools and traditional techniques. They redid the work and the result of this process was successful. The restoration of the wooden ceiling of the Churning of the Sea of Milk Gallery is extremely important for the history of Khmer architecture. I hope that we can study ancient carpentry tools and their use. Thank you very much."

Comment from the Co-chairman for Japan: [*OrigE*] "Thank you. Professor Beschaouch, please, take the floor."

Comment from Mr. Azedine Beschaouch: "Thank you Co-chair. I rebound on what Mr. Bouchenaki suggested, as it is very important. In 2018, it will be four years since the last periodic report was sent by the APSARA National Authority to the World Heritage Committee. These periodic reports are produced every four years. They must highlight what happened on the conservation aspect and its ethic and also mention the main achievements and successes. We are in this arena familiar with the latter but internationally it remains confined. Let me take an example, on the presentation of the ceiling of the Gallery of the Churning of the Sea of Milk. It is an exemplary enterprise that respects the restoration principles and I think that it should be informed to the World Heritage Committee.

If you allow me Co-chair, I would like to express our satisfaction to welcome back Dr. Sharma and to have listened to his presentation on plans and works at Ta Prohm. May I speak on behalf of myself, although it is shared by the APSARA National Authority and all the experts? From the onset, we recommended something that the Indian team technically implemented perfectly. Nevertheless, on a broader perception, this temple must not be fully restored or it would overlook its history and the cultural landscape, elements belonging to the authenticity of Angkor. This leads me to tell our Indian friends that in the future they should reflect on their proposals for the restoration of the entire temple.

Thank you."

Comment from the Co-chairman for Japan: [*OrigE*] "Thank you. Are there any other interventions? Please, the floor is yours. You can either proceed to the podium or wait for a microphone"

Comment from the president of the Royal University of Fine Arts: [*OrigE*] "Thank you. I am the president of the Royal University of Fine Arts in Phnom Penh and by listening to the presentation of our Indian experts and other experts who excavated to understand the conditions of the temples of Ta Prohm and Ta Keo, I was wondering — knowing that you showed some of the artefacts found in the excavations — whether there were organic samples that could be used for analysis to get knowledge of the stratigraphy of the site and also whether there were any archaeological analyses beyond the understanding of the plinths of the temples, as I know that many ceramics were unearthed?

The second point is about the multidisciplinary research. The Japanese have researched the causeway of Angkor Wat and it is interesting to understand the problem and the dyke. Are there any considerations to conduct a pollen analysis to understand the environment of Angkor at the time?

With regard to Ta Prohm, you showed us many decors from the bas-reliefs. Is there any integration from students of the University of Fine Arts to draw these motifs, as we believe that in the future these decors will gradually disappear? Thank you."

Comment from the Co-chairman for Japan: [*OrigE*] "Thank you very much. Madame, you have the floor."

Comment from Ms. Francine d'Orgeval: "Co-chair, thank you for giving me the floor. I would like to point out two things. Initially, to congratulate the international and Cambodian teams on the follow-up of recommendations with rich and documented reports, and let me make a suggestion. I believe that a quick browse of the outcomes of the recommendations (knowing that they are rich and documented) could be done with each team providing in their report on the follow-up on recommendations to the left hand side, for example a table including the recommendations and two columns — that first to inform whether the recommendations have been completely or partially followed up. This table could be added

at the end of the team reports on follow-up on recommendations so that we could immediately know the progress of each team.

Let me bounce back on Mr. Bouhcenaki's suggestion on the establishment of a database provided for by each international and national team. I believe that at the next session it would be very interesting to summarise the findings so that we could organise a general debate on archaeology at the session after or next in order to determine the areas to be prioritised for intervention.

Thank you very much."

Comment from the Co-chairman for Japan: [*OrigE*] "Thank you. Our colleague from India would like the floor."

Comment from Mr. Sharma: [*OrigE*] "Thank you very much for giving us the floor again. Half of the comment I could not hear properly. I will try to respond to the things that I could understand. To respond: The philosophy that ASI has adopted for the conservation of Ta Prohm; I would like to stress that at no point in time has there been any attempt for complete restoration. This matter has been debated fiercely between ASI and the *ad hoc* experts in which it has been felt that we should do the minimum necessary intervention from the point of view that we can see what the temple looked like, but we must keep some evidence from the past, particularly the natural forms (trees and etc.) that have grown over the site. That is the philosophy that ASI has followed not only at the Hall of Dancers but on other structures that have been restored to that extent.

In fact, I forgot to mention in the presentation that there was also a discussion that took place on replicating or not some intricacies of the carving onto restored surfaces. Even though we did some experimentation that we shared with the *ad hoc* experts, we believe that we should not be doing it completely because in times to come, the history, the originality and later intervention tells too much and we will not be in a position to show future generations what is exactly original and what is not. That differentiation between original and later interventions is very thoughtfully and meticulously executed.

The second point was raised on the archaeology and how it is informing us on restoration decisions. I would like to inform this august gathering that it has been for us a continuous process, learning and evolving the conservation process, which I spoke of earlier as well, in which this ongoing process of archaeology and the way it is revealing certain archaeological truths to us, is what we are now envisaging and incorporating into our decisions. I mentioned the floor which my colleague from the APSARA talked about; this is now leading us to a completely differed solution, and looking at the hydrology of the area the plinth that we have to develop. It is an ongoing process for all of us. I am sure in the next three to four years when we are completing the work, this is something we will be doing as a constant endeavour.

This is what I had to respond with. Thank you very much."

Comment from the Co-chairman for Japan: [*OrigE*] "Thank you. Madame Lemaistre, please take the floor."

Comment from Ms. Anne Lemaistre: "Thank you Co-chair. Just quickly to rebound on the suggestions made by Mr Bouchenaki and Ms. Francine d'Orgeval. I hope that the Secretariat will at least partly meet their requests. Tomorrow will be presented the database on the recommendations and projects at Angkor since 1993. It is a search tool on the recommendations since their creation and it also compiles different topics (conservation, archaeology, research and sustainable development). We hope that it will give us an ordered classification of what has been implemented at Angkor for the past twenty years. Of course, any suggestions are welcome. Thank you."

Comment from the Co-chairman for Japan: [OrigE] "Thank you very much. Are there any other remarks? I see none. This is the end of the first half of this session. Thank you very much. We now begin with the second part of this session on sustainable development and with follow-up on recommendations on sustainable development, introduced by Mr. Azedine Beschaouch."

II.B- FOLLOW-UP ON IMPLEMENTATION OF THE RECOMMENDATIONS: SUSTAINABLE DEVELOPMENT

II.B.1 Follow-up on implementation of the recommendations adopted at the 27th technical session and 23rd plenary session in January 2017, introduction by the Scientific Secretary, Professor Azedine Beschaouch

"Thank you Co-chair. I will be very short although we once again express our satisfaction on the reforms' smooth implementation and that the Secretariat works in perfect understanding with the APSARA National Authority, noting that our recommendations are followed to the letter. What matters is that for sustainable development we adopted the same methodology and, as was the case in the previous session, the reports are on the follow-up of recommendations 27TS. In the past, the follow-up may have also concerned a previous recommendation that was linked with another more recent when the issue is of importance. This is not going to be the case today but I wanted to recall this point of order. Thank you and if you agree let us move on to the first item."

II.B.2 WAPCOS Project: Follow-up on recommendation 27TS.15, points of information by Professor Azedine Beschaouch, Scientific Secretary of the ICC-Angkor

"I continue on a point that raised concerns when a project was presented here. The presentation showed the construction of a dam. The Royal Government, fulfilling its duty, took a holistic approach with regard to the issue of water in the Siem Reap region. The government decided to study the matter through its ministry in charge of Water Resources, but also additional ministries including that of the Environment. This global approach has led us to raise the alarm on what was presented.

A specialist in hydrology at the APSARA National Authority and also Deputy Director General, Dr Hang Peou asked for the dossier that had never been submitted to him previously. As for the Director General of the APSARA National Authority, His Excellency Sum Map, he never had access to the entire dossier. I was tasked by the Committee to explain the matter and our concern to the chairperson of the APSARA National Authority and Minister of Culture and Fine Arts.

To be honest she reacted immediately, in front of me. She contacted her colleagues and found out the following information: the Ministry of the Environment was never contacted on this project and has positioned itself against any construction of a dam (although this is not what the government intended, as it simply followed a holistic approach on water). The second point is that when the Ministry talked to her colleague at the Ministry of Water Resources she was told that he never heard nor commissioned any study on a dam and that this study was for the water supply in the province and notably for the city in conjunction with booming demographic and tourism development.

We are reassured that the government is not studying the possibility of building a dam. This is not on the agenda. We are comforted and satisfied with this and allow me, on behalf of all, to thank her Excellency, as this is a vital topic.

Let me finish on a subject that my friend Mounir Bouchenaki is also familiar with at the World Heritage Committee. We have listened to countless dam projects threatening sites. This time there was not even a dam, as on paper the project was immediately rejected. This does not mean that we oppose development, but simply that we are against disturbing a cultural and eco-historical area, especially when the site is inscribed on the World Heritage List for its cultural landscape values.

Thank you."

Comment from the Co-chairman for Japan: "The floor is to the Minister."

Comment from Ms. Phoeurng Sackona: "Thank you Co-chair. Just to add to the matter at hand. It is correct that when the ICC raised the alarm we contacted the Ministry of the Environment which confirmed that it was not aware of this project. Both ministries then agreed to stop the project in case it existed. I called the Ministry of Water Resources and after a meeting they also said that they never heard of this matter. The project aimed basically at studying the potential of resources to supply water to the increasing population of Siem Reap. Maybe it includes using barays, the Tonle Sap or to use and restore existing ancient reservoirs as was done in ancient times.

The Indian government subsidised the project through WAPCOS and the Ministry of Water Resources never requested the construction of a dam. The Minister twice confirmed that any developments taking place in this area would be subjected to a discussion between the concerned ministries (Culture, Environment and Water Resources) and I can assure you that this was not commissioned by the Ministry of Water Resources."

Comment from the Co-chairman for Japan: [*OrigE*] "Thank you. We now move on to the ceremony to honour the memory of His Excellency *Samdech Panha Vibol* Sok An. I would like to ask the Secretariat how we proceed."

Comment from the Moderator: [*OrigE*] "Thank you Excellency Co-chairman. As you just said, we will now proceed to the main building of the APSARA National Authority compound located outside to the left. It is only a few minute's walk. But before, could you please go in front of the screen for the group photo? Thank you."

Comment from the Moderator: [*OrigE*] "Excellencies, Ladies and Gentlemen, we hope you enjoyed the lunch and that you will not take a nap in this afternoon's session. Please be kindly seated and we will resume our session. The president of the APSARA National Authority will arrive soon and we have been informed that we can start this afternoon's session. Excellency Co-chair, please, you have the floor."

Comment from the Co-chairman for France: "Thank you. Minister, Excellencies, Experts, Ladies and Gentlemen, before moving on to the next item continuing this morning's proceedings on the Follow-up of Recommendations on Sustainable Development, I would like to touch upon some technical organisational matters and also make a short reminder. First, let me inform you that professors Beschaouch and Bouchenaki have left for Phnom Penh to pay tribute to the memory of *Samdech* Sok An, where the one hundred-day ceremony is being held. The Minister reminded us this morning how important this ceremony is for Cambodians. I would also suggest that in the future we could shorten the lunch break, as we already have breaks in the morning and afternoon and this could help end the session earlier. Obviously, this is just a proposal and we can discuss it.

We can also be satisfied with the fact that the presentations at the ICC are now harmonised, as was duly noted by professors Bouchenaki, Lablaude and Beschaouch. The national teams have presented using video and audio media which is great and satisfies us. In agreement with the Japanese Co-chair and as Co-chair myself, the recommendations taken by the experts must be the base during the session on the follow-up of recommendations; this is one of the foundations of the ICC. It is very important therefore that the teams, when presenting on the follow-up, base their presentations on the experts' recommendations and follow them to the letter, as they must meet the different items raised by the experts – the latter, according to the ICC rules, have the authority to make observations and ask for further information.

As the rules provide for, the teams must also submit to the experts any documentation related to their presentations and the ICC Secretariat must be the recipient of the projects' documentation to be implemented in Angkor. I thank you for your attention. I think it was important to recall these points.

Let us resume the proceedings with our next item, the follow-up on recommendations on sustainable development. The floor is now to the Deputy Director General of the Department of Local Communities at the Ministry of the Environment for the follow-up on Recommendation 27TS14 on Phnom Kulen National Park. I thank you for your attention."

II.B.3 Phnom Kulen National Park: Follow-up on recommendation 27TS.14, by Mr. Seng Soth, Deputy Director General, General Directorate of Local Community, Ministry of the Environment

"Excellency Ms. Phoeurng Sackona, Minister of Culture and Fine Arts, Chairperson of the APSARA National Authority,
Excellency Mr. Say Sam Al, Minister of the Environment,
Co-chairs,
Excellencies,
Ladies and Gentlemen,
Colleagues,

[*slide*] Today, I have the honour and privilege to have been asked by His Excellency Say Sam Al, Minister of the Environment, to present the implementation process of the Management Plan of Phnom Kulen National Park within the framework of the Follow-up on Recommendation 31 from the 26th Technical Session of the ICC, held on 22nd-23rd of June, 2016.

[*slide*] Let me take this opportunity to inform the assembly that, following the aforementioned recommendation, a working group made up of members from different institutions was officially formed on the 11th of October, 2016, spearheaded by the Ministry of the Environment. It includes 31 members from different ministers (Environment, Culture and Fine Arts, Tourism, Rural Development) the APSARA National Authority, the local authorities and national and international NGOs.

[*slide*] An initial meeting was organised the following month after the working group was formed. Chaired by His Excellency Mr. Say Sam Al, Minister of the Environment, the meeting aimed at: highlighting the present situation of Phnom Kulen National Park, with issues such as deforestation, unbridled residential and commercial developments inside the protected archaeological and cultural areas, solid waste management, tourism management, the lack of institutional co-operation with regard to the overall management of the Park and etc. The meeting also looked into finding concrete solutions that would meet a global and sustainable management approach in protected natural areas in Cambodia and especially for the protection and conservation of natural and cultural resources and sustainable development of the local communities in Phnom Kulen National Park.

[*slide*] All these issues have led the Ministry of the Environment to take charge of the development of a Management Plan for Phnom Kulen National Park. This project was drawn up in collaboration with our national and non-governmental partners to meet the need to protect fauna and flora; rare and endangered species, to preserve and develop the archaeological and cultural site, to efficiently manage tourism flow and finally to raise awareness on sustainable development in the daily life of villagers living in the Park.

[*slide*] To this end, seminars, meetings and field investigations were co-ordinated and organised step by step with a view to collecting necessary data, information, materials and recommendations to design the Park Management Plan. Three working groups were established: Protection of Natural Resources, Conservation of Cultural Properties and Sustainable Development of Local Communities. They worked in close collaboration with two experts outsourced by UNDP to collect data and develop the Park Management Plan.

The draft of the Managment Plan on Phnom Kulen National Park started in November, 2016, is in its final stages of drafting and highlights the vision, the action plan and the strategy to see to the smooth implementation of the Management Plan of the Park, heeding the conservation and protection of natural and cultural resources with a view to facilitating sustainable local economical development for local communities.

Excellencies, Ladies and Gentlemen,

[*slide*] I am delighted to inform you, as said this morning by His Excellency the Ministry of the Environment, that the Management Plan of Phnom Kulen National Park is now at the review stage and will be submitted to the ICC-Angkor by the end of this year.

[*slide*] Finally, on behalf of the Ministry of the Environment, let me express my sincere gratitude to the Ministry of Culture and Fine Arts, the Ministry of Tourism and that of Rural Development, the APSARA National Authority, the local authorities and local and international NGOs for their priceless contribution towards the drafting of this Management Plan. I do not overlook and sincerely thank UNDP for their technical and financial support to the Ministry of the Environment for the Management Plan Project of Phnom Kulen National Park and also all concerned stakeholders that actively have taken part in elaborating a strategy for conservation and protection of the natural resources and cultural heritage of Cambodia.

I thank you for your attention."

II.B.4 Overall work of UNDP (United Nations Development Program) at Kulen Mountain by Mr. Nick Beresford, Country Director, UNDP

[*OrigE*] "Excellencies,
Ladies and Gentlemen,

[*slide*] Thank you very much for inviting me to this conference. I will complement the previous presentation we have just seen from Mr. Seng Soth talking about the work UNDP is doing on Phnom Kulen. We are working under the leadership of the Ministry of the Environment and the National Council for Sustainable Development. I would also like to acknowledge the support of USAID, the Government of Japan, the European Union and others.

On Phnom Kulen we have both an ecological and environmental presence and an archaeological and religious site and this is also a tremendously important centre of culture and we would like it to come together in this one area and to prosper.

[*slide*] I think that this is the beauty of this area and by way of contrast these are some of the threats we are seeing. Excellency Say Sam Al mentioned the problem with solid waste management that we see up there. Although we have good demarcation on the archaeological and environmentally protected area we still see encroachment and deforestation, as we see now that sometimes in the concession commercial activity is actually happening in some of the temples there. These are some of the issues that we have to come together to address.

[*slide*] I would like to explain about three programmes we are working on with the government and take you through some of that work. The first one is through GEF (Global Environment Facilities); it is a small grant programme and has a special focus this year on Phnom Kulen. It gives small grants to local community associations. I think it is important that we remember in our work that we should put those communities at the face of this. We are working in areas five and six up in Phnom Kulen National Park.

[*slide*] The second of the three programmes I wanted to make you aware of is the Forest Carbon Partnership Facility that is part of the REDD programme. We had two test sites under the REDD programme and they continue under the new Forest Carbon Partnership Facility and one of them is Phnom Kulen. This project has helped us better define some of the conservation forest. It has also helped us work with the communities where we had community forest management that we tried to improve the capacity there. Excellency Say Sam Al mentioned tree planting this morning; I believe he said 150,000 trees planted through the Ministry and this programme has also been part of that.

[*slide*] The third of the three programmes relevant to Phnom Kulen is the Environmental Governance reform. This is a programme we carry out with USAID and the government of Japan under the leadership of the Ministry of the Environment. Some part looks into strengthening the Ministry's capacities, but the part that is of interest for us here is Forest Mapping and looking at the Management Plan for Phnom Kulen. This same Management Plan that Mr. Seng Soth described in his presentation. At the moment it is still a draft and we expect it to be finalised towards the end of the year. I think it is important, as if we can make it work as a pilot on this particular site, it is something we can model for other sites of environmental or archaeological importance.

[*slide*] It brings together the ecological environment but also the protection of sacred and ancient monuments. It is an opportunity to work closer with our sister agency UNESCO, to work with the APSARA and the Ministry of Culture and to try to bring the government together. This is part of the work of the National Council for Development to bring partners and government together to focus on important issues such as these.

I would also underline the importance of the water table. It comes from Phnom Kulen and is extremely important to Angkor Wat itself and to the temples in the Park. It is also the water that supplies the city of Siem Reap and the Tonle Sap River. Part of the work we are looking at in the programme is to look at a biodiversity and watershed assessment to give us a better understanding of how to tackle these issues.

[*slide*] One of the things that was mentioned this morning by the Minister and is attached to the plan is the payment for ecosystem services. One of the opportunity we have there is that there is a strong revenue coming from tourism and the many visitors coming to the site. We have concessionaires, other people, and water bottling firms; there are a lot of commercial activities there. We should be able to find some ways to model so that we can have payment for ecological services. To seek private resources also helps to sustain the resources from which they profit. This would mean looking at a pilot but also looking at the regulatory and environmental background for Payments for Ecosystem Services to see how to make it work.

Finally, we have the programme BIOFIN which looks at the financial resources available for biodiversity. There is a mapping exercise which looks at where there are gaps and

opportunities and again with special focus on private sector financing.

That's a brief overview of the programmes we are implementing with UNDP. We are keen to reach out to other people and thank you for your time."

II.B.5 Angkor ticketing: Follow-up on recommendation 27TS.16, by Mr. Ly Se, Executive Director of Angkor Enterprise

[*OrigE*] "Excellencies,
Ladies and Gentlemen,

[*slide*] Thank you very much for inviting me to follow up a request on asking permission to set up a ticket booth at Banteay Srei. We have requests from tour guides and operators that we need to have a ticket booth in Banteay Srei for several reasons: First, the sheer numbers of tourists visiting the temple; about 700,000 last year, [*slide*] among them more than 15 per cent come from Thailand, through Along Veng, to visit the temple. This is the reason the tour operators asked the Ministry of Tourism to set up a booth in Banteay Srei to facilitate a service for them.

[*slide*] The idea would be to use a plot of land available near the parking area which is within walking distance of the temple. It would be a small building and, as it would be near the car park of Banteay Srei, there would be no need to develop a new parking area. The structure of the booth would be small, with three counters and as said we would use the current car park. We would like to ask the ICC to consider our request. [*slide*] In this picture the shape of the building, small and adjusted to the size of the land available, a structure that would have no impact on the conservation area. This is the principle of our request that we would like you to consider.

Thank you for kindly letting us present our request for the construction of a ticketing booth at Banteay Srei. Thank you for your attention."

Comment from the Co-chairman for France: "Thank you for this presentation. Let us move on to the Follow-up on Recommendation 27TS18 on the Tourism Management Plan, presented by Ms. Marady of the APSARA National Authority."

II.B.6 Tourism Management Plan: Follow-up on Recommendation 27TS.18 by Ms. Oum Marady, TMP Unit, APSARA National Authority

"Ladies and Gentlemen,

[*slide*] I am presenting the report on the follow-up on recommendation on behalf of His Excellency Sok Sangvar who cannot be among us today, as he is attending the one-hundred day ceremony for *Samdech Vibol Panha* Sok An. Recommendation 18 mentioned four items, starting with lighting the ascent to the Phnom Bakheng hill. We went on site with the experts and discussed this. They recommended drawing up a detailed plan before fitting the lights on both sides of the ascent to make sure that there will be no negative impacts on the monument and hill. They also recommend studying the possibility of using solar energy, which was done, notably looking at what type of equipment is needed and on the installation procedures. We will then submit the relevant documents to the experts.

[*slide*] The second point was on the extension of Phnom Bakheng car park. Due to the large number of vehicles parking at the site and especially for sunset the present car park is overwhelmed and we requested to extend the car park to the east. We changed the pro-

ject's block plan and asked the Department of Conservation and that of Water to carry out a study on potential impacts. Unfortunately, our proposal would impact part of the Phnom Bakheng moat. We need to rethink with the concerned departments and to study other possibilities.

[*slide*] There are three ideas that came to us: To leave the car park as it is and to only open it to moto taxis, cars and tuk tuks. The buses will only be able to drop off passengers and park at the Angkor Wat car park. The second solution would be to extend the existing car park to the north, but this would mean cutting down trees, which would be regrettable. The third solution would consist in backfilling part of the moat, which is also not the best.

[*slide*] For the TMP team and the Tourism Department, we deem the first possibility as the most likely compared to the others. Simultaneously, additional studies will be conducted on traffic flow and the counting of vehicles opposite Phnom Bakheng to better understand the maximum carrying capacity of the site.

[*slide*] The third item at hand concerned protecting the statues located along the Angkor Thom causeway dike. A budget has been allocated and soon we will install the ropes to cordon off the area. This will be done by installing thin posts of 1.5 centimetres diameter, with only five of them on the entire causeway to minimise any impact on the authenticity and aesthetic of the site. With 45 centimetres' height, they will deter visitors from climbing over them and on the statues.

[*slide*] The last item was on the establishment of a Public Observatory. The recommendation asked us to work on major monuments. We will start at Angkor Wat, Ta Prohm and Bayon. The working methodology has been adopted and is the following: to get to know the impact of visits to the monuments to understand visitors' experience; to know visitors' profiles and put forth and tailor solutions to manage flows based on the clientele and finally to continue collecting data to establish comparisons on the changes over the coming years.

[*slide*] These are the working methodologies to collect data. That first consists in taking pictures and counting visitors. It will enable us to know the distribution of the visitors inside the monument and their numbers. We count the people that come in and out for one week. Simultaneously, pictures are taken in strategic locations. For example, at Angkor Wat we selected five locations where pictures are taken in the same spot and angle so that the carrying capacity and the visitors' experiences can be assessed. The same procedure will be put in place at the Bayon, with counting in two locations of people coming in and out and in Ta Prohm it will be in five locations.

[*slide*] The second methodology is that of tailing and surveying. We will tail an individual or group of visitors entering a site to note down their behaviour. We list their nationality, age group, time of arrival and departure, gender and whether they are individual visitors or part of a group, with a guide or not, and whether it is during a ceremony or bank holiday.

[*slide*] We will also note all the places they stop at and measure the duration of their halts. This will help us gather data on different profiles of visitors and different itineraries and their points of interest depending on their profiles. Once all this data has been compiled, we will fill in a form that will help us understand the places or locations that are the most interesting for the visitors. As for the survey, we will try to select a representative sample that is as accurate as possible. The survey will last five to ten minutes and will inform on the visitors' profile (age, nationality, gender and etc.). All this data will then be cross-referenced with the ticketing data. This information will then give us a basic picture of the clientele so that we can better suggest and decide within the framework of the Conservation Risks Map.

[*slide*] We have trained a team to survey. The fact is you can have the right method-

ology but without trained staff to implement it, it would fall flat. Once the survey has been completed, we will analyse the data and propose the necessary solutions to improve services at Angkor and flow in the temples and hopefully scale it up throughout the Park. Similar studies will then be undertaken to analyse and set up itineraries inside the monuments. Finally, we will also study how other sites have undertaken public observatory analyses and how we can learn from them.

[*slide*] We would also like to suggest something. In order to better manage and work on site, we ask for the best possible collaboration with Angkor Enterprise to collect daily data and consequently have a solid base and indicators telling us the nationality, gender and age of visitors, type of tickets purchased, group or individual visitors and any children, although the latter enter free of charge.

[*slide*] To conclude, I would like to thank our trainees, who put a great deal of effort into this study. I thank you for your attention."

General Discussion

Comment from the Co-chairman for France: "Thank you for this presentation on the Angkor Tourism Management Plan. We now move on to the general discussion. Would anyone like to take the floor, make a comment, a suggestion? The floor is to Ms. Lemaistre for UNESCO."

Comment from Ms. Anne Lemaistre: "Thank you very much Co-chair. Let me once again congratulate the Ministry of the Environment for their initiative to have drafted with all involved stakeholders a Management Plan for Phnom Kulen. I am delighted with this, especially with the involvement of a UN agency which supports this work. I would like to know more about the schedule although this may have been mentioned or suggested. When will the Management Plan be finalised; before the end of the year? Will we be able at the next ICC meeting to listen to a presentation on the global Management Plan?

The second item concerns the public observatory. UNESCO welcomes it, as it is a vital tool to manage flows, as was repeated many times in the past years by our *ad hoc* expert Jean-Marie Furt. It enables us to frame the flow of tourism in Angkor. We would like to support and foster this endeavour in collaboration with Angkor Enterprise. I would like to know whether this Public Observatory would also survey the Cambodian visitors, as this was not mentioned. Thank you very much."

Comment from the Co-chairman for France: "Thank you Director. With regard to the Cambodian and foreign public observatory and Kulen Management Plan, could we get some answers? Yes, please take the floor."

Reply from Ms. Oum Marady: "I am sorry Ms. Lemaistre could you please repeat the question on the Pubic Observatory? We also count the Cambodians in the temples and will also question them for the survey."

Comment from the Co-chairman for France: "Thank you. Can we get a microphone please?"

Answer from Mr. Seng Soth: "Thank you for your question Ms. Lemaistre. I will answer on the Management Plan for Phnom Kulen. The plan has been drafted and once revised will be submitted to the ICC and presented in December during the ICC Plenary Session."

Comment from Mr. Jean-Marie Furt: "Let me rebound on the Public Observatory. If I correctly understood, the idea is not to remake the existing Public Observatory. The fact is that observation of the public is nowadays made by using the ticketing system. It is the

easiest and most efficient way to carry out a proper observation of the public and to draw conclusions and analyse potential developments. The fact is that in this case the public will be randomly observed on three main temples and some data can be drawn in terms of clientele infrastructure and flow management. Later on, further analyses may be deducted from the observations. This means that it is an important objective prioritised that requires adequate training of staff and sufficient resources allocated to carry it out properly."

Comment from the Co-chairman for France: "Thank you Professor. The floor is yours."

Comment from Mr. Ros Borath: "Thank you Co-chair. My name is Ros Borath; I am the Deputy Director General of the Department of Monuments and Archaeology. I would like to react on the last two items; ticketing and the presentation that enabled us to locate the building. What was missing is a block or location plan so that we could understand the itinerary to reach the building. The latter is aesthetically important, as the site of Banteay Srei is very sensitive. This building must be properly located and the architectural look improved as there is already a balance between the architecture and the landscape there and the building should not be ordinary.

The second point is on Phnom Bakheng and the request to extend the *parvis*. I believe that it should be considered from a different perspective. A *parvis* project cannot be sort of developed every time there is an increase in tourism pressure. This is nonsense. It will never end. Let me remind you of an idea that was floated some 15 years ago, when the Park was established. The underlying idea was to limit the number of vehicles entering the Park and there was even a project prohibiting access to vehicles inside Angkor Thom. This was in order to minimise pollution, as it is expensive to clean the monuments, and the vehicles would have been parked in three different locations: Angkor Wat, another car park near Preah Khan and one near Banteay Kdei. Vehicles arriving could park in these car parks and there would be alternative transportation to circulate throughout Angkor. Otherwise it is not possible to manage traffic, and sustainable development also depends on this.

Phnom Bakheng is also a very sensitive site. The proposed location for the extension of the car park has been extensively studied. It is an area that protects the heritage area, the view and the site's sensitivity. If we were to extend by one or a couple of meters everything that has been done to protect this site, it will be destroyed. Thank you."

Comment from the Co-chairman for France: "Thank you for these well-argued and relevant observations. I am sure that this will be reflected in the recommendations adopted at the end of this ICC. You have the floor professor."

Question from Mr. Bernard Hubert: "Thank you Co-chair. I have two questions. In the agenda it was mentioned that there would be a presentation on Run Ta Ek following our visit in January. There was no presentation and a written report was mentioned but we have not received it."

Comment from the Co-chairman for France: "Personally, I have no knowledge of it."

Comment from Mr. Bernard Hubert: "Well, we have neither. It was not included in the documents circulated. If we agree on the principle of having interaction with the experts that draft the recommendations and present what has been done, this would be good for us to be kept informed. The second question regards a field that I am familiar with, on the ticketing booth to be set up at Banteay Srei, if I understood correctly. Does this mean that there will be several points of entry to access the Angkor site? I was under the impression that there was rather a tendency to centralise the entrance to the site and after people would then decide what to visit. If this is not the case, why don't we set up ticketing booth on all access roads? Does this mean that something that I thought was a general principle will be questioned? The fact that there is one entrance brings consistency to the overall arrangement of the site."

Comment from the Co-chairman for France: "Thank you Professor for these observations. With regard to the first item, we should have been submitted a written report, but we have not received it, which is problematic. I think that your observation reflects the fact that we need better co-ordination between the teams in the field and the work of the experts. The experts need to be better informed so that they can work properly, not only on the follow up of recommendations, but also on the drafting of new recommendations. The fact is that the experts go in the field and spend a few days there. The ICC dates are known well in advance and the experts only have limited time. In the field they are as committed as possible. I think that everything should be done to facilitate their work. I hope that the report will be circulated, which now seems to be the case.

With regard to the second item, Angkor Enterprise or the APSARA National Authority may answer on the ticketing issue. I am no specialist, but I know that Banteay Srei is located north and far from the heart of Angkor and I will leave Angkor Enterprise or the APSARA National Authority to answer this issue on a single or multiple ticketing booth system.

Thank you. Professor Lablaude, please take the floor."

Comment from Mr. Pierre-André Lablaude: "Let me rebound on the points you mentioned. On the written reports there is one more report on *Prasat* Sralao that was not circulated to us, although it is on the agenda. It seems that a written report is an excuse for not reporting on the previous recommendations. I believe that more effort should be made so that at the next ICC all presentations on the implementation of the follow-up of the recommendations are presented during the meeting.

The second item is on the ticketing booth at Banteay Srei. I fully agree with what my colleague Ros Borath said. The plaza at Banteay Srei has been acclaimed for its practicality and architectural aesthetic. It is also a lively and functional place, in harmony with nature and of great architectural quality. The architectural programme must be adjusted to copy this architectural style and aesthetic using the same materials and colours so that people feel that this is part of the original *parvis* project and not a makeshift addition. When we present the recommendations tomorrow on Banteay Srei, we will review with my *ad hoc* expert colleagues the potential locations and one can figure out on plan a place in harmony and adapted to the architectural context."

Comment from the Co-chairman for France: "Thank you Professor for these observations. Personally, after several visits to the site I can only concur with what you said with regard the success of Banteay Srei's development. Professor Furt, you have the floor."

Comment from Mr. Jean-Marie Furt: "Let me come back briefly to Banteay Srei. To abound with what my colleague Bernard Hubert said, I would like to make sure that a decision taken purely on economic grounds at a given time is avoided. This question relates to tourism strategy and whether the efforts will focus on one ticketing booth that will be modernised and quickly accessed online or whether there will be several ticketing booths distributed in the Park, a more traditional approach, if I can say so. It matters greatly with regard to economic development, the knowledge of the public and also for the development strategy."

Comment from the Co-chairman for France: "Thank you Professor. Are there any more comments or questions? If this is not the case, we will move on to the technical team reports for conservation, research and archaeology. We will start with the report of Messrs. An Sopheap and Tomoda Masahiko, an architect at the Tokyo National Institute for Cultural Property on the work plan for conservation and sustainable development at Ta Nei."

III.1 Conservation and Sustainable Development Plan of Ta Nei by Mr. An Sopheap, archaeologist, APSARA National Authority and Mr. Tomoda Masahiko, architect, Tokyo National Research Institute for Cultural Properties

Mr. An Sopheap

[*OrigE*] "Excellency Minister,
Co-chairmen,
Excellencies,
Ladies and Gentlemen,

[*slide*] Mr Tomada and I are going to present a co-operation project between the APSARA and the Tokyo National Research Institute for Cultural Properties on the Conservation and Development Plan at Ta Nei.

[*slide*] Ta Nei is a 12th century Buddhist temple built during the reign of Jayavarman VII. It is located approximately 200 metres to the west of the north-western corner of the East Baray. The Siem Reap River flows from the north to the west side of the site. To the south, Ta Keo lies within walking distance and is connected to Ta Nei by a dirt road that goes through a forested area.

[*slide*] Current condition: The temple was built using sandstone and laterite blocks. It consists of two towers and of a library surrounded by three enclosures: a gallery, a wall, and traces of an outer laterite wall. Remains of the north and south moats can be seen around the second enclosure. The whole site is currently in a half collapsed condition, and covered with vegetation. There have been no major interventions except for shoring unstable parts.

[*slide*] Significance: The cultural significance of the site is related to its architectural and artistic value. Rich carvings and mythological sculpture can be seen all over the building. Moreover, inscriptions can also be found on the temple, adding to its historical and archaeological value.

In addition, the current ruined condition of the site in its natural forest setting bears a visual or landscape value. Ta Nei is one of the few temples in Angkor that has not undergone any major intervention, and gives us a good idea of how most temples looked before restoration. However, in order to preserve these values, it is urgently necessary to design and implement a comprehensive Conservation, Management and Enhancement Plan for the site.

[*slide*] Background of the project: Since 2001, several training programmes and workshops for the APSARA DCMA staff have been conducted at Ta Nei, with the co-operation of Japanese experts from the Tokyo National Research Institute for Cultural Properties. The topic of such programmes covered the bio-deterioration of stone monuments, architectural surveys and CAD drawing of Ta Nei. Employing structures from motion photogrammetry, detailed models and drawings have been produced. These data have formed the base for designing the Conservation, Management and Enhancement Plan of Ta Nei.

[*slide*] Project for the Conservation, Management and Enhancement Plan of Ta Nei Temple: Within the co-operation framework, APSARA, with technical assistance from the Tokyo National Research Institute for Cultural Properties, is currently developing the Con-

servation, Management and Enhancement Plan of Ta Nei Temple. A seven-step workflow has been designed to complete the plan and its implementation. At present, several surveys and research projects are being carried out within steps one to three, including a survey of bibliographic material and the already mentioned measuring surveys and CAD drawings.

[*slide*] Workshop in January 2017: In order to identify issues, discuss the general conservation policy and prioritise the following necessary tasks, a joint workshop was held between APSARA and Tokyo National Research Institute for Cultural Properties last January. The participants included members from the Departments of Monument Conservation, Forest Management, Water Management, and Tourism Management from the APSARA as well as Japanese experts.

A general agreement was reached regarding the main objectives of the conservation and management plan, issues and required urgent actions. It was agreed that the main policy of the Conservation and Management Plan should be to preserve the site in its current condition and to keep, as far as is possible, its historical, architectural and landscape values. At the same time, visitor safety should be ensured, and the site should be put in its larger archaeological context in order to improve its interpretation and legibility.

The decayed condition of the props was identified as one of the issues needing urgent action. In addition, it was agreed that current access to the site is inadequate, and it should be redesigned according to the original access from the east side. Archaeological excavations will be needed in order to clarify the original access path.

[*slide*] Renovation of props: The first issue concerns shoring. The current timber supports have decayed in several points and are no longer effective. In addition, their design is inadequate and in some cases, like at the east gate, they obstruct the view of carvings. It is necessary to rethink the design of the supports completely, and to set effective propping according to the features and requirements of this particular site. I now give the floor to Mr. Tomada to continue the presentation."

Mr. Tomoda Masahiko:

[*OrigE*] "My name is Masahiko Tomada from the Tokyo National Research Institute for Cultural Properties. [*slide*] The next major issue of the site that needs urgent action is the access. The current approach is from the west side, which is the original rear access of the temple. This makes it difficult for visitors to interpret the architectural layout of the site and appreciate its cultural value. In addition, the current access road crosses the outer enclosure wall next to its south-western corner, damaging the remains of the laterite wall.

[*slide*] It was agreed that the ideal access to the site would be from the east, approaching the front of the temple from the dike of the east Baray. It is highly possible that an original access causeway existed there. Recovering the original approach would significantly improve the legibility of the site, and it would help visitors to position Ta Nei within the larger archaeological context of Angkor by networking with walking trails the neighbouring monuments, such as Ta Prohm, Ta Keo and Preah Khan. [*slide*] They are the surrounding monuments of Ta Nei.

[*slide*] However, there are several issues that need to be clarified in order to implement this plan. First, the original configuration of the eastern approach causeway is unknown. Second, the configuration of the outer enclosure wall is not clear. It is necessary to study its remains to gather information about its state of conservation as well as its original height and structure, including questions such as knowing whether there were entrance gates also in the north and south sides of this outer enclosure wall.

The third point is that the original total extent of the site is uncertain. According to the LiDAR image and our observations, it is possible that an enclosure-like alignment of earthworks surrounded the outside of the site's outer enclosure. In order to clarify these issues, a joint archaeological survey project will be carried out by the APSARA with the co-operation of the Tokyo National Research Institute for Cultural Properties and Nara National Research Institute for Cultural Properties. The survey project is planned to last three years and will include surveys of the original approach, enclosure wall, boundaries, and inside of the main complex of the temple.

[*slide*] The first archaeological excavation campaign is scheduled for the second half of July of 2017, which is next month. It will include excavation of trenches outside the eastern gate of the outer enclosure, aimed at determining the existence of an approach causeway in the eastern side of the temple. In addition, the east side of the outer enclosure wall will be surveyed.

Thank you very much for your kind attention."

III.2 Standards of Conservation Practice and ongoing GACP projects by Professor Dr. Hans Leisen, project director, Mr. Luy Sophors, site manager and Dr. Esther Von Plehwe-Leisen, conservation scientist, German APSARA Conservation Project (GACP)

Dr. Hans Leisen:

[*OrigE*] "Excellency Minister of Culture,
Excellencies,
Colleagues and friends,

[*slide*] Today I will mainly focus on the standard of conservation and at the end I will present a brief overview of our projects. [*slide*] In a workshop held on Monday at the CSA compound, we discussed the singularity of each monument and therefore their need for individual treatments. This sounds normal but it is the key point of modern conservation philosophy. We have been talking about these methods for the past 20 years, but we have the feeling that they have not been respected everywhere.

[*slide*] A simple example, with two graphs measuring the water absorption and strength parameters from different temples of Angkor: They show big variations in these parameters, which means that the materials at these temples have decayed in different ways and have different requirements for their conservation treatment.

[*slide*] In this slide it is obvious that something went wrong. It is sure that the wrong material was applied, which caused damage and also that the skills of the workers were poor. The picture shows two points. Before any intervention, an intensive research has to be carried out; recipes cannot just be transferred from one monument to the other or one country to the other. Without skilled conservators, every intervention will become a disaster. We are convinced that skilled conservators are as important as a good and relevant conservation method and in this occasion I would like to thank our GACP conservators for their excellent work; they are really dedicated to their jobs.

[*slide*] This next example, which I presented a couple of years ago, shows other types of problems. New stones were glued with very strong epoxy mortar in the balustrade. The old Khmer interlocking system of this balustrade enabling space for movement of the blocks was stopped. The results are breakages that you can see everywhere, luckily only in the new blocks, as the long balustrade is now under high tension due to thermal and hydric expansion and shrinkage.

[*slide*] This picture shows the consolidation of stucco before intervention in the first picture (in high resolution) and the next picture after intervention. In this case too much ethyl silicate was applied and therefore the stucco became very dense and rigid. Actually, when we did our work at Bakong, Preah Ko and other places we recognized that the quality of the stucco was excellent and only in a few places did it need small conservation interventions.

[*slide*] Recently we found a lot of fallen pieces in Preah Ko, on the floor. We do not know whether this is a consequence of the interventions or other reasons, such as detachment of the stucco from the wall. Unfortunately, we do not have any mapping of where the material was applied at the time. This shows clearly that we have to follow a systematic approach in the process of restoration of monuments.

[*slide*] We have to start with the anamnesis and the diagnosis, like a doctor for humans, before we carry out any interventions, the therapy. The first step must be a detailed object documentation and examination.

[*slide*] This is an example from Angkor Wat's first enclosure to the northeast, showing the pediment in a very, very good condition. If you have a closer look and do deterioration mapping, you can see that a big portion was highly endangered. We carried out the conservation and restoration process and it is now safe for the forthcoming future. For mapping we use international standards. We use the ICOMOS-ISCS illustrated glossary on stone deterioration patterns to describe the damage. We use deterioration pattern as is now internationally agreed. We also need standardized mapping keys, signatures, symbols and patterns so that we can understand each other much better.

[*slide*] Through mapping we can get detailed knowledge of the state of preservation of the object and first information on weathering mechanisms and we can prepare a risk map and a map of priorities. I do not think I need to talk at length about having these included in the conservation process.

[*slide*] It is very important to understand the process that led to the endangerment. This actually looks very simple. We have three categories and in each subcategories and influences. Weathering is extremely complex, as there are multiple weathering influences which all interact in an interlaced way with each other. It is not enough to say that weathering is due to sulphuric acid as there can be other parameters interlaced.

[*slide*] When we talk about stone conservation, we need different skills to analyse the stone. Here, thin section analyses, two different stone materials that significantly show different stone behaviour and will show different sustainability to the weathering processes.

[*slide*] What we could not see is revealed in the electronic microscope scanning, small elements, clay minerals or the binder in the sandstone. These binders, the clay minerals, are causing formation of scale. Due to expansion in contact with water, which is penetrating in the layer structure of the clay minerals and shrinks it after drying, we receive expansion and shrinkage and high stress in the connection between the grains and the binders.

[*slide*] This is not just a simple model; it is a very complex model. I do not want to explain this graph, but if you look to the multiple or individual formations of clay minerals, it is an extremely complicated process that you have to understand.

[*slide*] The next slide shows us a very different process. In the lower part there is a dark part which is inside the stone and on the other part you see a yellowish area close to the outside of the picture. This is due to the dilution of calcite, something we talked about during the workshop. Water penetrates from the back and dilutes the calcite minerals of the block and on the surface they are precipitating. They form an extremely dense and rigid zone and you can see that everywhere the stone block is perforated with cracks (the scale is 0.5 millimetre), [*slide*] and if you look in more detail even the very stable quartz minerals

are broken because of the stress due to this specific weathering process of the stone. This shows clearly that before any intervention, we have to study the object thoroughly.

[*slide*] Finally, the measurements and parameters from the site: There are a lot needed. I show you some tables of parameters that have to be measured and interpreted and the conclusion in terms of requirements for the material and process for conservation treatment have to be drawn. It is not just a lot of parameters but you have to know why and what they tell you.

[*slide*] The next slide is the common test method. In the middle left column you have the requirements, which help us take decisions on specific materials. For example, in this case repair mortars that are needed for cleaning and treatment. We have to follow these, otherwise we cannot control whether our material will be sustainable or not. [*slide*] The next step is the same value, the measurements of the original material, weathered and not.

[*slide*] We get the results and from them we have the requirements, we refer to them and after a long testing phase of many samples we receive the results of the repair mortars. Some are green, which is good, yellow, acceptable and red is not good. This is always the problem, to adapt the water absorption or transport parameters to the requirements of the stone. After the development of the conservation materials, we can then draft a conservation plan and select the appropriate materials for the conservation steps, depending on the different types of damage we find at the monument. Once again the use of compatible and well-adapted conservation materials are preconditioned for successful conservation interventions. This you can read in the Angkor Charter and other international papers. We showed very often that our treatment is based on ethyl silicate for limestone, for stucco, lime-stucco. You can see this modular system that we use; there are many components that we mix to follow the requirements.

[*slide*] The system is extremely complex; this slide shows you the formula with reaction of ethyl silicate. For tetraethyl orthosilicate, the reaction is complex; the requirements and knowledge for understanding the process are very high and many parameters have to be taken into account and controlled in order to use this material successfully. We don't just go to the shop and buy it. This would be the worst approach.

[*slide*] Two more examples of how this material behaves, either as a buffer in the sandstone or in protecting the clay minerals in the binder, in the sandstone. If you prepare the conservation properly in full, you can expect to preserve the monument for the future. One example of how this material was applied, but this is not the end of the treatment.

[*slide*] We have to continue the work with long-term monitoring programmes. It is necessary for a successful preservation programme. I just showed the picture from Preah Ko. Maybe with a lack of maintenance and monitoring some pieces were lost, so we will start in August with regular monitoring and mapping of the situation.

[*slide*] This was the first part and now quickly the worksites we are working on. As before in Angkor Wat, in Bakong on the stucco and sandstone elements we have another project. Another one at Trapeang Phong to the south and smaller programmes: Naga heads from *Prasat* Krohom in Koh Ker, the top stone from Lolei and, as I just mentioned, monitoring the stucco decoration at Preah Ko. In Angkor Wat we still have three worksites. This is the main project for which we presented the terrible damage. We did mapping and found new issues, although we knew about them a long time ago. They consist in very hard iron-rich crusts located in the corner of the temple, which are very resistant and cannot be removed easily. They have to be removed because below them are large deposits of damaging salt.

[*slide*] The other programme is finished here; the problem is the lack of scaffolding, as it still sits at the Bakong where the APSARA team works and later we will move the scaffolding to the south-east tower's second level and work on the central east Gopura on the

first level where this has been finished and we move the scaffolding to the north side where we will start very soon.

[*slide*] Bakong: The two western towers' stone elements have been preserved and on some occasions we have consolidated the stairs to the tower. Very soon, the southwest tower will be finished. The stone elements have been preserved as has most of the stucco. Here, on this corner, we collected, in 2014, a huge heap of fallen stucco. Up to now we could bring back about 2 m^2 and they are now fixed back on the façade. The main work is at the northeast tower and at the end there we will restore the west side of the north tower.

[*slide*] Two pictures of the situation at Trapeang Phong: This was before on this badly damaged corner in stucco. It is now preserved at the southwest, southeast and northeast towers. We have to wait for the next dry season, as this temple cannot be approached in the monsoon, as we have to walk through paddy fields and a moat which is full of water.

[*slide*] At the West Mebon, in co-operation with the EFEO, we have done the northern part (about 80 per cent) and will finish this part in autumn. Then we will continue in the south part where we have completed the inventory and risk map. Two pictures from the top stone still in place. It is now in our work site in the APSARA compound where we have started with the preparation of the conservation intervention, which will be very complex.

[*slide*] This is the Naga head from Koh Ker, in co-operation with EFEO and Eric Bourdonneau, which is finished and can be reattached to the other pieces.

[*slide*] From January until March, we have done a full documentation of all pediments at Angkor Wat, which is the basis for the monitoring of our work. One hundred pediments have been preserved already. We use a UAV or a drone, which is a great tool for this work, being specific for monitoring areas that cannot be reached easily. We have done documentation of the existing decoration of most of the brick shrines in Angkor, Koh Ker, Kulen and some in Sambor Prei Kuk. The data is being processed

[*slide*] Now, the monitoring of the stucco at Preah Ko, which is a new project undertaken by our team. This is all I wanted to present.

Thank you very much for your attention."

III.3 Laboratory and Science in Applied Conservation Training / Activity Report at Banteay Samre by Ms. Federica Grifi, technical advisor, and Mr. Khaim Lay, senior conservator, GIZ/APSARA, Stone Conservation Unit

Ms. Federica Grifi:

[*OrigE*] "Excellencies,
Co-Chairmen,
Ladies and Gentlemen,

[*slide*] It is a pleasure today to present the Progress Report of the Apsara Stone Conservation Unit with my colleague Mr. Khaim Lay, senior conservator, in the framework of the co-operation between the APSARA Authority and GIZ.

[*slide*] First, I would briefly like to introduce myself; second, I will present on the new Laboratory Training. Then, my colleague will present the 2017 activity report focusing on the achievement of the Stone Conservation Unit in Banteay Samre Temple and outlining upcoming projects in the site.

[*slide*] My name is Federica Grifi and I joined the SCU in July last year as technical advisor. I have accumulated my experience on heritage conservation worldwide during the last 15 years. My major educational background is in Italy, where I received a university degree in Heritage Conservation and later a professional qualification as a Cultural System Developer. Throughout my career, I have worked mostly for governmental institutions and universities, getting involved in different conservation fields: from conservation treatments and project development to first-aid in excavation, preventive conservation and monitoring systems.

In 2001, I moved to Mexico where I worked for ten years as a project conservator, mainly co-ordinating and directing conservation interventions in the archaeological field. In 2010, I decided to go back to university and focused my attention on the science applied to conservation. My first time in Asia was in 2014, when I had the pleasure of working as technical advisor at the National Museum of Afghanistan in Kabul. I am glad now to be here to join the APSARA's efforts in safeguarding the Angkor Park.

[*slide*] Since I arrived, I have been asked by my predecessor, Thomas Becker, to develop training on chemistry in the SCU laboratory, following-up his effort to establish a laboratory. Notwithstanding the language barrier, chemistry is not an easy subject for the majority of people, wherever they come from. After a quick survey between friends and colleagues, I realised that even if chemistry is included in school curricula, most students ignore it.

So, I realized it would be a big challenge; moreover, I am not a chemist and I would have to find a completely different approach. That's why instead of providing chemical knowledge in the form of information, I decided to build up the training as a long-term workshop which provides tools to work in a laboratory and to develop research.

[*slide*] I decided to use the experimental approach as a method which stimulates the use of our senses and our ability to reason (to gather information and to interpret it, we use mainly this two mechanisms). Specifically, the experimental approach allows conservators and professionals working in the field to observe processes leading to deterioration, to measure their consequences and the effects of conservation treatments through scientific tests close at hand. It is a systematic and scientific approach to research in which the researcher modifies one or more variables, controls and measures any change in other variables/factors of influence.

[*slide*] As we can see in this graphic representation of the experimental method, it is at the same time a process for exploring observations, developing and answering questions to discover cause and effect. As we can see from the yellow arrows, various steps lead to stimulating new observations and new inquiries.

[*slide*] The training approach focuses on samples taken from new local sandstone which undergo accelerated aging process following the UNE-EN 12370 2001. [*slide*] A consistent part of the programme will be developed in the laboratory with material tests and gathering of data, which later will be interpreted, allowing the participants to draw conclusions.

[*slide*] Participants will gain first-hand experience on experimental methods and analytical techniques and will have access to the equipment and facilities present in the SCU laboratory. The training will start in October and is for senior conservators from the SCU and APSARA employees working in the stone conservation field. Participants will be selected with the support of the director of DCMA.

[*slide*] Thank you for your attention. I hand over the floor to my colleague."

Mr. Khaim Lay:

[*OrigE*] "Excellencies,
Co-Chairmen,
Ladies and Gentlemen

[*slide*] It is a pleasure to present the progress report of the APSARA Stone Conservation Unit. Here is a list of on-going projects for which our team has worked during the last six months. Today I would like to focus my attention on Banteay Samre.

[*slide*] Since 2015, the SCU has worked almost permanently in Banteay Samre, focusing on the east side Gopura I and the central tower, but the most relevant project at this site has been the intervention on the Naga balustrade.

[*slide*] The Naga balustrade is a long term project for the SCU: we have worked on the balustrade since 2015. [*slide*] Let's look at a plan of Banteay Samre Temple: Green defines the area where we have already realised conservation treatments; red outlines the area of intervention of the upcoming projects.

[*slide*] Several portions of the Naga balustrade were not stable. Some were unstable and others were missing. After mapping the Naga balustrade, it has been dismantled and preserved. Existing items like iron bars were removed and replaced by sandstone and inserts of fibre clamp dowels. The original fragments have been reassembled. Cracks and scales were filled with ethyl silicate and pointing mortar. This is an ongoing project.

[*slide*] The north west section, where some fragments were not in place and have been rescued by the team on the ground surrounding the structure. Many pillars and fragments of the body as well as of the head of the Naga were missing and needed to be replaced. Replacements were realized again in co-operation with the Stone Carving Unit.

[*slide*] Here are the two lintels located inside the north and south porch in the central tower. They are heavily damaged. They present multiple scales; networks of thin and thick cracks that from the surface penetrate deeply in the substrate; areas where the surface is partially lost and the degree of sanding is very high; the risk of detachment of carving details; salt crusts and missing fragments and insect nests.

[*slide*] Before starting the treatment, a net has been applied on the surface to secure the carving at risk of detachment, as a preventive measure. After cleaning, cracks and scales were secured by glue bridges and fibreglass dowels inserted with epoxy glue (Sikadur). The sanding areas were consolidated with Ethyl Silicate. Finally, Ethyl Silicate mortar was applied into cracks.

[*slide*] The second project focused on the outer east side of Gopura I. It was realized as an emergency intervention. The main problem is due to structural strain and some surfaces are at risk of detachment.

[*slide*] SCU's next steps at the Banteay Samre Temple will be on pediments and lintels (east Side Gopura I), the Naga balustrade's north-east corner and the west porch lintel of the central tower.

[*slide*] The lintel and pediment are heavily damaged. At the moment the team is carrying out the photographic and graphic documentation to start the conservation treatment at the end of this month.

[*slide*] This section of the Naga balustrade will be worked on following the same procedure, starting by dismantling it and removing previous interventions. As we can see from the photo, some parts of the body are supported by blocks of new sandstone and tied by rope to prevent further loss.

[*slide*] At last, we will intervene on a lintel located inside the west porch of the main tower.

[*slide*] Thank you for your attention."

III.4 Progress Report on the Research and Restoration of the Western Prasat Top by Mr. Ros Visoth, archaeologist, APSARA National Authority and Dr. Sugiyama Hiroshi, Nara Institute, Japan

Mr. Ros Visoth :

[*OrigK*] "Excellencies,
Ladies and Gentlemen,

As a staff member of the Apsara National Authority, I have been assigned to work with the Nara Institute on the Research and Restoration of the Western Prasat Top Project. Today, I have the honour to present the reassembly test of the monument's northern structure. The work on this monument involves the following stages: disassembling the stone blocks, inventory, repairing damaged blocks, excavating, making reassembly tests and re-setting the stones blocks.

[*slide*] The reassembling test is in two parts: 1) the foundation and the plinth, and 2) the entire northern structure.

[*slide*] We began by levelling and compacting the soil beneath the foundation before proceeding to perform reassembly test for the foundation and the plinth. Next, we examined a number of damaged stone blocks in order to determine their actual fitting positions at each layer of the structure.

[*slide*] This is what the scene looked like before the structure was disassembled. Only two of the structure's four sides remained standing, with just about 40 per cent of the stone blocks left of the original structure. The remaining stone blocks were unstable with the southern corner leaning as if it was about to collapse, as you can see in this picture. [*slide*] Here is how the reassembly test was done.

[*slide*] Here comes the dismantling stage, which was a crucial one. On the left, the south side is on the verge of collapse. The picture on the right shows our team working to reset the stone blocks to form the monument's northern structure, which we have just seen in the previous picture.

[*slide*] Here, the west side of the structure. On the right is an old picture of the same structure that was taken when Mr. Marchal tried to clear the site. This picture has been preserved at the Angkor Conservation office. On this occasion, we would also like to thank the Ministry of Culture and Fine Arts for allowing us to use, in the future, a Buddha statue to install at the false door of this monument.

[*slide*] Now, we are looking at the northern side of the structure. In the picture on the left, a team from EFEO was working to clear the site and to shore up the monument's northern structure. As we can see, the northern wall had totally collapsed and the collapsed stones had been moved to be stored at a location north of the monument. Our team, later on, found them and used them to rebuild the wall. Recently, we also found the mid section of the Buddha sculpture that we will put back together with the remaining piece, in the near future.

[*slide*] This picture shows the state of the eastern wall, which had also totally col-

lapsed. We have managed to rebuild this wall, but it remains incomplete because we were unable to locate more missing stone blocks. But we will keep looking. Thank you for your attention."

Dr. Hiroshi Sugiyama:

[*OrigE*] "Excellencies,
Ladies and Gentlemenn,

[*slide*] My name is Hiroshi Sugiyama; I am the project manager of this project. I will make an appendix on this research and talk about the schedule. When we started the restoration work, we found these brick structures in the summer of 2016. After dismantling the basement we found this pit structure made of bricks of about 2 x 2 metres and 1.5 to 1.6 metres' depth.

[*slide*] From this structure we recovered many objects, 180 artefacts of pottery, gold, bronze, glass, stone and bones. [*slide*] This is a gold object and here again, [*slide*] and one more. [*slide*] These are glass objects on the left of the picture and quartz on the right.

[*slide*] This table gives you an idea of our activities, the report today is very succinct and in 2017 we would like to produce a more detailed report about this brick structure and I would like at the end of the year to present more in-depth information about this brick structure. In the near future we plan the following activities: completion of the dismantlement of the northern sanctuary in August and in September and October preparation for the dismantling of the central sanctuary.

By the time of the next ICC meeting, we hope we will have started dismantling the central sanctuary. I am very happy to have presented this update on our project and to listen to any advice.

Thank you very much for your attention."

Comment from the Co-chairman for France: "Thank you for your presentation. Before the break we will listen to the last presentation. It is on the Bayon project and technical issues, a UNESCO Japan Funds-in-trust project presented by Mr. Soeur Sothy, JASA director in Siem Reap and Professor Takeshi Nakagawa, co-director, JASA."

III.5 Technical Issues of Phase V of the Bayon project, UNESCO (Paris) / Japanese Funds-in-Trust project by Mr. Soeur Sothy, Director of JASA, Siem Reap Office and Professor Takeshi Nakagawa, Co-director of JASA

Mr. Takeshi Nakagawa:

[*OrigE*] "Excellency Minister of Culture and Fine Arts,
Co-chairs,

My name is Takeshi Nakagawa from JASA. I am delighted to have this opportunity to present our project. The primary aim since the JSA/ JASA team started the Project of Safeguarding Angkor by UNESCO / JAPAN Trust fund in 1994 was to achieve permanent conservation of the Bayon Temple. In the last ten years, I have focused on research, experiments and trials of technical issues for formulating conservation and restoration methods.

In particular, what is necessary to ensure that no more elements of the Bayon central tower collapse and how to preserve the bas-reliefs of the inner gallery with its complex deterioration factors; these two tasks are of the greatest concern.

In response to our efforts, we have published annual reports in every year, reports at ICC-Angkor, and presentations and debates at the Bayon Symposium.

Today, I will disclose the manuscripts and reports from JASA's experts on issues we are emphasising. You will hear these reports from the JASA Cambodian experts. The report of the 5th phase of JASA is based on current results. It focuses on the task of identifying unsolved problems, formulating definitive conservation rules and implementing restoration work only after test restoration.

To these aims JASA has been very successful."

Mr. Soeur Sothy:

[*OrigE*] "Excellencies,
Ladies and Gentlemen,

[*slide*] Thank you very much for giving us the time to present our activities. Today, I would like to present on behalf of the Professor and the Japanese team on soil statistics at the Bayon and the issues with structure and water stagnation. It is not my work, I just present on behalf of the experts.

[*slide*] JASA had implemented archaeological survey beneath the base stone of the Bayon central tower, geotechnical boring to study the platform mound of the main tower of Bayon and an electric survey. No special foundation system was found beneath the base stone of the central tower of Bayon. The tower basically stands directly on shallow foundation located on the top surface of a manmade mound, although the shallow laterite blocks seem to be installed as surrounding the main tower except on the east side. Usually, any heavy structure constructed on backfilled soil is designed using foundation stabilisers such as piles or a caisson-like system; however, the Bayon does not appear to have these structural amenities. When boring was carried out from the surface of the foundation mound with standard penetration testing, we found unusually large SPT values.

[*slide*]This slide shows the results of SPT N-values and soil profiles and grain size distribution. The soils are rather uniform across the whole depth of the mound. Common N-values for compacted sandfill without gravel lie within a range of N= 20–30. An N-value larger than 50 is very rare for sandy filled soil.

[*slide*] This slide shows the relationship of the N values and water contents of the soils. N-values increases from N=20 at water content = 17 per cent to N=100 at water content = 10 per cent. [*slide*] The durability against water was observed by submersion test. The stiff sand was surrounded by water in a basin, as shown.

[*slide*] The X-ray diffraction shows two kinds of mineral components: quartz and halloysite (aluminosilicate clay mineral). Halloysite belongs to the kaolin group of clay minerals. When water decreases, the curvature of water membrane becomes very small and causes very high negative suction that makes sand grains stick together.

[*slide*]A series of laboratory tests were conducted and confirmed the relationship between water contents and soil strength. The results of cone tests are shown in the slide. The bearing strength is only about Pb=5kPa and drastically increases with the decrease of water contents.

[*slide*] The clayey sand showed very strong strength in unsaturated dry conditions,

enabling it to support the heavy stone masonry tower by simple base stones without special foundation elements. Global warming shall inevitably bring heavy and long rains that might induce water into deeper depths in the backfill of the foundation and result in weakening the sandy soil to failure.

[*slide*] We conducted electric exploration surveys to study the foundation structure around the Central Tower of the Bayon. [*slide*] The results of geotechnical boring surveys and previous resistivity surveys suggest the existence of a donut-like ring structure of the laterite surrounding the central tower. The objective of this survey is to confirm in detail the existence of the ring-like laterite block structure by means of non-destructive electrical survey.

[*slide*] Accordingly, the measurement lines were set radially and circularly to the centre axis of the central tower. [*slide*] This data shows a comparison between the underground structure by means of geotechnical survey and the resistivity profile obtained. The relatively high resistivity layer under the conductive surface layer seems to correspond to the laterite blocks.

[*slide*] The result of the survey shows the possible existence of an underground laterite structure around the peripheral area of the pavement surrounding the central tower and the attached structures to the east.

[*slide*] So far, the existence of the higher resistivity materials corresponds to laterite blocks; however, this has not been completely confirmed, with the exception of underground areas around the peripheral area of the pavement surrounding the central tower and the attached structures to the east

[*slide*] To understand the mechanism of the hardening soil mound of the Bayon's central tower, we implemented X-ray Fluorescence (XRF), X-ray Diffraction (XRD) and Scanning Electron Microscope-Energy Dispersive X-ray spectrometry (SEM-EDX) analyses.

[*slide*] The soil samples of rammed earth were obtained from boring cores called 'BH1, No.2' at the different depth of 5.0, 8.5 and 9.5 metres respectively. The 'BH1' is the boring inclined 30 degrees from the horizontal direction. The boring was carried out in 2010. Equipment for these tests was as shown.

[*slide*] This table shows the results obtained from XRF analysis. From this table, SiO_2 (silicon dioxide) is dominant, more than 95 per cent of the weight. [*slide*] These graphs show the results obtained from XRD analysis. From these graphs, the most dominant mineralogical composition is quartz.

[*slide*] These pictures clearly show that larger quartz particles are surrounded by fine-graded material. This fine-graded material seems to bond larger quartz particles. [*slide*] These graphs show that the fine-graded material may be 're-crystallised quartz' and/or amorphous silica.

[*slide*] The most dominant mineralogical composition is quartz (SiO2). Larger quartz particles are surrounded by fine-graded material. Further investigation such as element mapping is necessary.

Thank you very much."

Unknown speaker:

[*OrigE*] "On behalf of Japanese experts on stone conservation, I would like to present on the conservation of the bas-reliefs of the inner gallery. We have two items: the Practical Experiments for Conservation Materials in the Bayon, second the Future of Conservation of

the bas-reliefs of the inner gallery of the Bayon.

[*slide*] At first, I will explain the Practical Experiments for Conservation Materials in the Bayon. [*slide*] Exposure tests since 2007 have been carried out to make a selection of consolidates and water-repellent agents suitable to the sandstone used for the bas-reliefs of the Bayon, for the purpose of recovering the original function, not to strengthen as much as possible.

[*slide*] This table shows the change of water absorption rates in the samples processed with consolidants and consolidants with water-repellent agents over nine years. Water-repellent agents used are maintained in a nearly stable condition and each seems to maintain its effect.

[*slide*] This table shows the change of surface hardness of the samples processed with consolidants and consolidants with water-repellent agents over nine years. [*slide*] The hardness has decreased after nine years to the level before being processed. [*slide*] This photo shows test pieces which have been exposed for six years after the consolidants and water-repellent treatments. The surface has become tainted.

[*slide*] This table shows the change in the water absorption rate of the samples treated with the special property of the water-repellent agent in mind. [*slide*] Photo of the samples with water repellent agents five years after the exposure. Black microorganisms have attached to the samples, except the Wacker 290 sample with silane-based oligomers.

[*slide*] Conclusion is as shown.

[*slide*] Now, the experimental application at the Bayon: Based on these results, an experimental application was executed in the Bayon temple gallery. For this experimental application, we selected mainly parts of the wall that had typical deterioration and no decoration. After careful consideration, we selected six points shown in red and cleaning, consolidants and water-repellent processing were performed.

[*slide*] At the outer gallery, we implemented tests in three places, as shown. [*slide*] In the inner gallery, in addition to deterioration, we selected areas that had characteristic inquiline. [*slide*] At the northeast part of the inner gallery, by setting a tentative roof, we have observed not only the reaction of consolidant and water repellent, but also the alteration of inquiline under the situation blocking the water from the roof.

[*slide*] The result of the experiment for application points O-16 here. The surface hardness was 400 to 450 in L value at the relatively stable part. It can be seen, as shown, that the surface hardness that varied widely became uniform around 12 months after the application. In addition, at the point of losing the hardness, after treatment, surface hardness was recovered after 25 months.

[*slide*] Conclusion is as shown.

[*slide*] The Future of conservation of the bas-relief of the inner gallery of the Bayon: [*slide*] Three factors, as shown, are considered as important factors from the results of the previous survey. [*slide*] This is our study methods for deterioration factors and here the [*slide*] issues for restoration methods.

[*slide*] After confirming the method of conservation and the agreement of the ICC, we hope to implement test treatment at an area that has similar and typical deterioration to that of the inner gallery and which is less visited by tourists.

Thank you for your attention."

Comment from the Co-chairman for France: "Thank you. Let us take a ten to fifteen minute break. Please come back at 4.20 p.m. sharp so that we keep up with time."

Comment from the Co-chairman for France: "We had a long break and can now resume our proceedings. The next presentation deals with the KPX project on Khmer production and exchange and the characterisation of hardened Khmer ceramics and kilns by Dr. Ea Darith and Dr. Tan Boun Suy, both from the APSARA National Authority."

III.6 Khmer Production and Exchange (KPX) Project 2017: Characterizing Khmer stoneware and Kilns by Dr. Ea Darith and Dr. Tan Boun Suy, APSARA National Authority

Mr. Tan Boun Suy:

"Excellencies,
Ladies and Gentlemen,

[*slide*] Our intervention deals with KPX or hardened ceramics. A four-year project, it includes several partners: the University of New England in Australia, the University of Santa Clara in the USA and the APSARA National Authority.

What is the objective of the project? We study changes in the economic organisation of the Khmer Empire through time, based on the production and distribution of ceramics. The study analysed 3.300 samples from eight ceramic kilns and 100 consumption sites. Dr Ea Darith will present the details of this study."

Dr. Ea Darith:

[*OrigE*] "Ladies and Gentlemen,

[*slide*] This is our research team from the US, Australia and the APSARA. [*slide*] The project is a collaboration between 13 institutions. First, I will speak about the previous research on Khmer ceramics and kilns. From 1980, the Angkorian site of Buriram was excavated. Then, from 1996, kiln sites were identified in the Angkor area, of which up to the present more than ten have been excavated. This gave us an idea on the kiln structure and the typology and suggested two phases: The first from the 9th until the 11th centuries, with small kiln sizes of 1.5 -3.5 x 5.5-9 metres producing green glazed and unglazed stoneware. The second phase, from the 11th until the 14-15th centuries, where the kiln sizes were larger, 3 x 11 metres, and with production of brown glazed wares.

[*slide*] This is the structure of the kilns and ceramics produced in Phase I. You can see the green and unglazed stoneware. Here a picture of the second phase, where they produced brown glazed ceramic.

[*slide*] Once we acquired knowledge of the kiln and ceramic typology, we wanted to continue our research on the following goals: Study Khmer stoneware as a proxy to understand the expansion and contraction of the Khmer Empire through time and to examine the dynamic relationship between the Angkorian core and provincial centres.

[*slide*] One project strategy is to combine the scientific analysis of stoneware with a dating programme to establish the geochemical fingerprint for each of the Angkorian Khmer kiln complexes. Another project is to characterize stoneware from many consumption sites from the 9th to the 15th centuries and to trace the stoneware back to the sources. We will use pattern to identify change in patterns of the intervention between Greater Angkor and

its provinces through time.

[*slide*] Our research project involves two basic methods. That first focuses on the site at the production centre. We will study the geochemistry of the stoneware in kilns using the Neutron Activation Analyses and also the geochemistry of geological sediments surrounding the kilns using the same method. We will also study the age of kilns using radiocarbon, luminescence and RHX. The KPX project will analyse eight stoneware kiln sites in Choeung Ek, Angkor and Buriram areas in northeast Thailand.

[*slide*] The second methodology focuses on consumption areas beyond Greater Angkor. We analysed 3,300 Khmer stoneware ceramics from 100 consumption sites. There are now 2,000 samples still waiting to be analysed. [*slide*] After studying the stoneware kilns, 784 samples yielded promising results to establish the geochemical fingerprint of Khmer stoneware fired in different kiln clusters.

This is the third pattern that we will discuss concerning the grey clay ware. All of the eight kiln sites from our study produced brown-glazed ware and unglazed ware from grey clay. This data illustrates that samples from more kiln sites fall into one or a few groups.

[*slide*] The de-clustering pattern is even clearer than the used geochemical composition to plot the samples into multi space. Samples from a few kilns located within the Angkorian core group rather tightly, although they do not overlap. Other kiln products like those from Bangkong, Veal Svey and Torp Chey form different and independent plots. So when we got the geo-composition of brown glazed ware and of green glazed ware, we realised that the local geology had some influence in the past composition. Still, Buriram brown glazed ware from the north of Thailand remained distant from Cambodian brown glazed ware. Patterning in the green glazed ware is more complex and needs more additional study.

Now, we are beginning to find geochemical distinctions in ceramics fired in different Angkorian kilns, but having better-dated kilns could help to further separate these ceramics. Ongoing radiometrics by KPX project members using multiple dating techniques and as part of our former research project, we look forward to presenting the results of our studies when we have completed the Neutron Activation Analysis and the radiometric work sometime in 2018.

Thank you very much to the APSARA and the KPX team."

III.7 Treatment programmes regarding termites and bats as part of the temples' preservation efforts by Mr. Frank Meek, director, Orkin's International Technical and Training

[*OrigE*] "Excellency Minister of Culture and Fine Arts,
Excellencies,
Ladies and Gentlemen,

My name is Wing Lam; I am the director of operations for Orkin Pest Control Management, based in Atlanta, Georgia, United States.

[*slide*] Orkin is the largest Pest Control company in the world; we are trading at the New York Stock Exchange. We only do pest control and we were established in 1901. At 116 years old, we are the oldest pest management company in the world, with over 700 locations in more than 70 countries across six continents, except Antarctica

[*slide*] We have a wide-ranging presence in hospitality, food producing medical surfaces and cultural and art sites. These are some of our brands some are very specialized including animal control.

[*slide*] One of the members of the board of directors is Ms. Pam Rollins; she is the granddaughter of the Rollins family and she is involved with the Board of Directors of the World Monuments Fund, the National Monuments Fund and has a personal interest in the Angkor project. I met with her before I came over here and she has expressed her strong interest for us to contribute and to be involved.

[*slide*] Here is some of the household branding we serve throughout the world. Many of them you probably recognize. Some of the notable projects we are very proud of: that at the Forbidden City in Beijing. In 2006, the Palace Museum found termites in the Forbidden City. Considering the climate of Beijing, this is not a common event. We were called to Beijing and sent our leading experts and our team inspected over 900 buildings. This is an area the size of 100 football fields. We have identified the problem, devised engineering plans and trained the people and staff of the Forbidden City for the long-term monitoring and termite control of the palace. Of course we serve other institutes, like the Getty Museum in Los Angeles and the Metropolitan Museum of Art in New York.

[*slide*] In Angkor, we sent our leading international director of training and chemical support here and did the initial run of inspection and findings. Today, I will present some of those findings and possible solutions. This will focus on three areas: termites, birds and bats.

First, termites: What we found is that there are at least three of the known six common termites of the region that we identified in the Angkor area. All of us who have been there have seen the termite mounds that can be found on walls, on the surfaces and on the statues. They are obvious. I will have pictures showing you later. Termites carry soils to build colonies and the mounds. They create cavities underground. They have created obvious damage to the wooden supporting structures throughout the site. I have noticed that some of the wooden props have been changed by steel structures. This will negate that issue. Nevertheless, there are still wooden structures present.

We also see cavities in the temple's walls that are occupied by termite mounds and colonies. The most obvious victims are trees, especially large, ancient ones that have been damaged by the termite presence.

When you are thousand of miles away and you are being told that there are termites in Angkor, the first thing that comes to mind is that they do not eat stone, they devour cellular matter in wood and paper and would not eat stone. It is true that termites would not directly create damage, unlike in the Forbidden City, where the structure is primarily wooden. You may not have a direct present structural damage, but after inspection we realize the risk is really present and possible. The supporting structures I talked about have been addressed by changing them to steel structures. Everybody realized that the existing termite damage might not be a problem at first hand but that a risk and prevention programme is necessary. The aesthetic impact is important. You come here, you look at one of the greatest UNESCO sites in the world and the termite mounds, the presence of them create an unpleasant image and devalue the aesthetic part of the site and therefore may have a negative impact for the general public and tourists that come here to wonder at this great achievement.

[*slide*] These are some of the pictures. We have taken many and you can see the damage. On the left hand side is a very large termite mound that has become an obstruction and on the lower right the outer surface of the pathway and on the upper side the mound that has grown underneath the structure and can create a risk factor once it collapses.

These are not rare photos, you see this often. Here, if you look at the edges where it touches a wall, there are already traces and the presence of termite activities.

Our solution is that we have available nowadays many treatments (liquid, foam solutions). We have a treatment where we can remove the mounds, but the more important is the long-term monitoring of the places and repeating with monitoring and documenting. We would do the same thing that we have done with the Forbidden City, which is training of the staff and people that work here today and are here to help.

[*slide*] Birds and bats create issues with their droppings when they defecate on temples. Their droppings can be acidic in the long run, etching into the stone and causing damage. The same as on your car; it will damage the coating of your car in the long-term. For birds we cannot kill them; there are some species protected by international treaties and again there are many methods and technologies to drive them away. There is no need to kill them or endanger them but simply to drive them away or prevent their staying at specific locations.

[*slide*] To this end, one can use netting or electrical tracks, that cannot be observed by people, as well as repellent gels or coating. Again, there is a need for scheduled inspection, repeating monitoring and documentation and training of the staff that work here. This is an important element.

[*slide*] Here are some of our experts, made up of the world's leading pest management people, and some of them are from this region. These people are our team supporting our international effort.

Thank you very much."

III.8 Archaeological Research Programme at Angkor Thom: point, illustration and perspective by Mr. Lim Hak, archaeologist, Department of Conservation of the Monuments in the Angkor Park and Rescue Archaeology, APSARA National Authority and Professor Jacques Gaucher, archaeologist, École Française d'Extrême-Orient (EFEO)

Mr. Jacques GAUCHER,

"Excellencies,
Colleagues,
Ladies and Gentlemen,

We will have two successive and short presentations. The first is on a project that is still at the design stage as it awaits financing but has been presented to His Excellency Sum Map and to the directors of the APSARA National Authority, and they have asked us to present it at the ICC.

The name of the project is ModaThom for an explanatory model of the formation of Angkor Thom. It has been submitted to the French Research Agency within the framework of an open tender for all scientific fields. The project should last four years.

ModaThom is the logic continuation of the urban archaeology programme that I have carried out at Angkor Thom for the EFEO and the Ministry of Foreign Affairs. I recall that this programme objective is to summarise the main stages of the evolution of this site from the conditions of its establishment to its abandonment.

It now enters its third stage. The first stage focused on discovering urban space archaeological conditions. The second stage, still to be completed, has recreated the chronologies and urban temporalities. As for the ongoing third stage, it deals with the communication of the programme through the drafting of a publication compiling in an adequate format an unprecedented corpus of planimetric, sedimentary, archaeological and

architectural sources. I add today to this corpus a reflection on the spirit of the urban model set up by the Khmer Kings.

As far as I know, throughout history the Angkor Thom site has been subjected to two explanatory models, each time using an iconic monument. The first model was the gods' citadel, the monument is the temple. The second is the hydraulic city, where the monument is the Baray. Finally, the third model I am working on focuses on a third model centred on the Royal Palace.

Within this framework, the core objective of ModaThom is to study, through the explanatory model, spatiotemporal scope while taking into account the study of all the artefacts discovered during excavation and the production of additional archaeological documentation on the Royal Palace.

It is a programme spearheaded by two individuals: Philippe Husi (laboratoire archéologie et territoire), an archaeologist and for the past ten years creator and manager of the European Network on Information on Medieval and Modern Ceramics, and myself for the EFEO.

There are eight partners: Laboratoire archéologie et territoires (LAT - UMR 7324 CITERES/University of Tours) where Philippe Husi is affiliated; l'Ecole francaise d'Extréme-Orient (EFEO); the Laboratoire de mathématiques Jean Leray (LMJL - UMR 6629/University of Nantes); the French Institute of Pondicherry, India; the APSARA National Authority; the Laboratoire archéologie et archéométrie (LAA - UMR 5138, CNRS/University of Lyon 2); Laboratoire d'|nformatique, University of Tours (LI - EA 6300) and the laboratoire géohydrosystème continentaux, also from the University of Tours.

The project is divided into five unequal parts. The first and second parts deal with the analysis of the artefacts, or the study of the corpus of data acquired on the different sites at Angkor Thom, which is very important for the chronology. Last year, Philippe Husi presented on this topic. The second section of this first part concerns the tools, methods and statistic modelling of the dimensions. It deals with the statistical processing of large amounts of data such, as that represented by the number of shards collected at Angkor Thom.

The second part includes the additional archaeological documentation on the Royal Palace. It entails a series of additional test-pits. They will be conducted mostly around the Phimeanakas, with the view to adding to the archaeological documentation on the deep layers that have already starting to be analysed, if you remember my presentation on the *Thlok* tree in this same forum.

The third part is on environmental studies within the Royal Palace. At the Phimeanakas it includes identifying the nature of the sediment mirco-facies, once again concerning the deep layers that raised the most questions. Secondly, still in the enclosure of the Phimeanakas, to study Srah Srei pond that is filled up over five meters with palinological analyses, which has been entrusted to the French Institute of Pondicherry.

The fourth part is communicating on the scientific research through the serialisation of papers on the searched sites (dealing with the site, the stratigraphy, the analysis of the material and the deducted chronology). Secondly, another aspect of the scientific and more mainstream communication will be the design of a website based on dynamic mapping of the new plan of Angkor Thom to allow for access to texts and spatialised data in different formats (graphic, three dimensions animations).

Finally, the last part is dedicated to research, with awareness-raising on the organisation and operation of excavations on site (Angkor Thom) by Philippe Husi and potential training each year on archaeological methods (University of Tours), with later on the possibility to study a for a Master's degree with the support of a grant from the French

government.

We submitted a draft proposal in January of 2017 and it was preselected by the experts in March of 2017. We then filed another detailed proposal in April of 2017 and the announcement is expected in July of 2017. One can be reasonably optimistic as the evaluation was positive, but caution is advised. The National Research Agency received 6,500 projects with 2,200 preselected after the first round and *in fine* 250 projects will make the cut and be supported and in the field of historical sciences (ours) only 10 to 15 projects will be financed.

I wanted to briefly present this project and now give the floor to my colleague, Lim Hak. He has worked for us for many years on Angkor Thom and will present the latest findings from the Royal Palace at Angkor Thom. Please be kind to him, as it is the first time he attends this meeting."

Mr. Lim Hak:

"Excellencies,
Ladies and Gentlemen,

[*slide*] I will present the project on the western section of the Royal Palace, where the external moat is located. The Angkor Thom Royal Palace plan is an east-west aspect rectangle with three enclosures: an inner wall, a moat, an external enclosure made up of a wall, an earth levy and a terrace.

[*slide*] The Palace has five entrances; the main faces east, with two to the north and two to the south facing each other. There is no western entrance. Each entrance includes an entrance pavilion with a courtyard at the front surrounded by two side walls, with some of them sporting a door to access the moat.

[*slide*] Within the framework of the research carried out on the chronology of the Royal Palace, Professor Gaucher asked me to conduct coring inside the five courtyards and to the west of the Palace in the axis of the eastern entrance.

[*slide*] Out of the 25 corings undertaken using a hand auger, ten profiles are shown on this presentation. What is noticeable are the sandy sediments, which are more or less humic. They only have archaeological value. Also, more than 95 per cent of the coring could not be dug deep, as laterite blocks impaired the digging.

Each profile shows the surrounding wall, its base, its foundation base, the present soil, the coring spots and the laterite.

[*slide*] The three profiles taken in the north-east, southeast and southwest courtyards present all of the above features. In red, the presence of a laterite level at about + 24.00 metres. Note that this level fits exactly with the base of the foundation of the wall of the Palace. In green, presence, in some places, of laterite at a deeper level, about + 23.00 metres.

[*slide*] In the northwest courtyard the situation is similar, but the 23.00 metre level was found twice in profile six. In the two main eastern courtyards, the two situations were also found and the level +23.00 metres was confirmed.

[*slide*] To the west of the Palace where there are no courtyards or entrance pavilions, profile 10 shows the existence of tiered steps to the north and one continuous level of laterite from +22.00 until 23.00 metres. The form suggests a passage inside the moat.

Three conclusions can be drawn: 1) the five entrance courtyards of the present day

Palace are all paved with laterite; 2) It is most likely that in these five courtyards an older laterite paver is located at level +23.00 metres or below the surrounding wall and could correspond to a previous enclosure of the present Palace. 3) One can posit that this previous Palace was equipped with a sixth door to the west.

Thank you for your attention."

Mr. Jacques Gaucher:

"The findings on the courtyard add to the existing discoveries on the inside of the Royal Palace and seem to suggest a long continuity of occupation of this site, which according to me is the core location of the Angkorian scheme. Thank you."

III.9 Metallurgy of the Khmer Empire: The second archaeological research at the newly discovered Angkor iron Smelting site by Mr. Im Sokrithy and Mr. Khieu Chan, archaeologists, APSARA National Authority

Mr. Im Sokrithy:

[*OrigE*] "Co-chairs,
Excellency Minister,
Excellencies,
Ladies and Gentlemen,
Colleagues,

[*slide*] It is an honour and pleasure to be here to present the progress report on the archaeological research at the Angkor iron smelting sites that were recently found, about two years ago.

[*slide*] The site is located inside the World Heritage Site of Angkor and in the former capital of the Khmer Empire. [*slide*] You can see the distribution of the artefacts found on the searched area in the middle of rice fields. This is the landscape of the site we excavated at different seasons, before and after the rice harvest, and the site that we excavated once the harvest was over. It is located in the middle of the rice field and on the dyke of two paddies.

[*slide*] This is what we did last January. We dug two pits and it took us roughly ten days. In the meantime, we carried out stratigraphic studies to find any earlier occupation of the site or of the presence of water, as it is very important for the process of iron smelting.

[*slide*] We noted and recorded all works carried out during the excavations and also all the artefacts found in the pits we excavated. You can see different types of ceramic and furnace structures. Here are some imported or local ceramics, iron ore and tuyeres. At this excavation we found two furnaces, located in this area. In total, after two seasons of excavations, we have found a total of four furnaces in the same location.

[*slide*] For your information on the discovery of the furnace, you can see the wall, the dam, the structure with a hole that remains on the wall that connected the air into the furnace. This is the first time that such a discovery has been revealed. This is the base of the furnace in this area.

[*slide*] The coring revealed more important water flow in this area near the smelting site. The process of ancient smelting sites required the use of a lot of water during firing.

[*slide*] These are the results of our excavations, as is written on the slides. We found

the structure of the furnace, tap slag, tuyéres, and also the foundation of the shelter of the furnace. [*slide*] These are the artefacts collected from the pit: Slag, iron ore, which is very important for future studies and also the ceramic for dating.

[*slide*] We sent some samples abroad for analysis of four different types, as mentioned. A laboratory in Malaysia has carried out these studies for free, thanks to the assistance of a former colleague who works there. Some results of the analysis of iron ore. We know for sure of the composition of metal in iron ore. We also know the furnace clay and we found the clay used was of very good quality and the slag was very clean, with no remains of the metal inside.

As time is getting shorter I will skip this and go to the temporary conclusion. The analysis has evidenced that it was an iron industry not based on laterite smelting. The furnace was well-developed and managed during smelting. The clay used was of good quality and through the X- Ray fluorescence analysis we can find the iron ore composition with a quality of iron from 51 to 60 per cent — the same percentage we found in Khmer ores from Phnom Daek. Absolute dating is underway, based on the ceramics found and it should be from the 11th century onwards. Next year we hope to have absolute dating based on carbon dating.

Last but not least, the clay that our colleague analysed was fired by four furnace structures underneath the rice field.

Thank you for your attention."

III.10 *Prasat* Ta Oun: Conservation and restoration of the eastern pavilion by Messrs. Hout Monorom, Prom Titchhoponarith and Ms. Lor Ratdanita, architects, Department of Conservation of the Monuments in the Angkor Park and Rescue Archaeology, APSARA National Authority

Mr. Hout Monorom:

[*OrigK*] "Co-chair,
Excellencies,
Ladies and gentlemen,

In this presentation I will talk on three points: the current state of the monument, emergency intervention and future plans.

[*slide*] *Prasat* Chan Ta Oun is located in Zone 1 in Angkor Thom. It was built in sandstone in the Bayon style in the early 13th century, under the reign of King Jayavarman VII. It is situated about one kilometre southwest of Angkor Thom. The monument has suffered a lot of damage, caused mainly by undergrowth, water penetration, ground subsidence, and possibly the materials used for the construction as well.

[*slide*] The picture to the left shows that several stone blocks in the southern wall have been dislocated. And to the right we can see that the dislodged stone blocks have created gaps in the northern wall. Further down, you can see cracks in the stone blocks as a result of the soil subsidence. The undergrowth is everywhere – throughout the monument's compound and within the structure.

We also suspect that the stone assembly method that was used in the construction was another contributing factor behind the deterioration of the monument's structure. The stone blocks were placed horizontally and there are very few interlocking points between them. Some stone blocks in the structure do not have any interlocking to hold them together at all. This is one reason that made it easy for the stone blocks to become unstable

and dislocate. [*slide*] As seen in the picture, the rubbing between the stones is thin, causing their outward movement.

[*slide*] Regarding emergency intervention, our team carries out regular clearing work at the monument, at least once a month. Shoring has been implemented for the internal beam, lintel and pediment as we can see in the picture. During this intervention, we conducted an inventory of many stone blocks and will continue doing so in the future.

[*slide*] In this picture we have a study on the architectural plan and actual plan of the monument. Then we drew a layout plan to present the monument from the east, north, west, and south.

[*slide*] This picture shows the impact that the weight of the stone blocks had on the entire structure. As you can see, the force of the weight has pushed the lintel out. The beam broke, causing the roof to cave in. Meanwhile, several stones in the wall dislocated, while the next picture shows soil erosion due to rainwater runoff.

[*slide*] We calculated the weight of the entire monument and the findings are as follows: the tower (Section A) weighs 232 tons, the roof (Section B) 185 tons, and the walls weigh 280 tons.

Thank you to the EFEO for providing the pictures showing the general layout of the monument. As one can see, the entire premises include a pond and the perimeter walls.

[*slide*] This is the plan that we have developed for the back of the monument. [*slide*] These are the combined drawings and photogrammetric pictures showing the monument's perspectives from all four directions.

As for our plan for 2017 and 2018, we are going to conduct partial restoration, one layer of stones at a time. But before implementing restoration activities, we will need to reinforce the structure with steel straps and props to ensure safety. Stone blocks will be numbered and cleaned before they can be set back on the structure.

[*slide*] In this picture, the blue means stones in the front section that need to be disassembled. Down here is the view from the east where we will reassemble the stone blocks that have fallen to the ground, and reposition the pillars and beams. Thank you."

General Discussion

Comment from the Co-chairman for France: "Thank you. We move on to the general discussion. Do you have any observations, questions or comments following these presentations? Professor Lablaude please, take the floor."

Comment from Mr. Pierre-André Lablaude: "I believe that we should all thank Professor Leisen for his presentation. He recalled a monumental task that was carried out some years ago, the drafting of the Angkor Charter and notably the article he wrote on stone conservation. These discussions were shared among international specialists and I believe that it is very important to take stock on a regular basis on the stone conservation question. It represents one of the major challenges for the conservation of Angkor.

We have repeatedly said that the threat is serious and fast developing, notably at Angkor Wat because of the nature of the material and its weakness and porosity. The material is tender and as much as it was conducive to carving refined and rich decors it is now in peril. Professor Leisen recalled an important thing when he said that there are no miracle products.

In the 1930s the miracle product was cement, used worldwide. In the 1980s and 1990s it was acrylic resin, paraloid. We noted that Angkor Wat was treated with acrylic resins and that treatment has now turned into a disaster. Presently, there is a new product that has been used for some years, ethyl silicate. But there again the comparison with medicine must be made. Between swallowing an aspirin tablet and three tubes of the same medicine, one can die. There are no miracle products; they must simply be used and applied at the right place. To only use one product does not mean anything. Each material, pathology or case has its own implementation method and materials to be applied. These materials are always experimental as techniques and science make headways and one must remain cautious by having the necessary laboratory equipment to analyse and diagnose. The approach must be very cautious.

The second point still on stone conservation is the following. We live in a globalised world: the Germans use Chinese products, the Chinese German products and India American products; all the teams drive Japanese cars, use German products and so on. One should not come back to what was advocated some years ago: each country uses its own technique and materials.

The main value of the Angkor site is that this represents a laboratory where each country experiments and these experiments must benefit all. Some years ago the logic was one monument, one flag. I think that today the ICC has shown how exchanges among the teams are on the increase. Some monuments could bear the flags of four or five countries as several teams work on them and I believe that this is the major asset of this ICC, this dialogue and exchange among specialists. Any clinging to identity by saying that 'our technique stands out from the others' must be avoided. The ICC must not be used, through restoration techniques, as place to reassert nationalism.

I think this is a highly interesting point and that it must be reiterated on a regular basis. I thank Professor Leisen for having drawn our attention to the topic of stone conservation and the challenges that are faced."

Comment from the Co-chairman for France: "Thank you Professor for these observations. I think that you were right to recall that the ICC calls upon international experts and that the scientific expertise is based on scientific facts and that exchange and dialogue foster progress. The role of the co-chairmanship is to see to the respect of the recommendations and evaluations of the experts and to the interest of the Angkor monuments and their characteristics, notably their materials (sandstone and etc.) and that everything is done to make sure that each technique used in the monuments, according to their conditions, are tailored and applied. Are there any more comments or questions?"

Comment from Mr. Tan Boun Suy: "Co-chair, I would like to rebound on what Professor Lablaude said. I noticed that this afternoon we heard three teams talking about stone conservation. The lecture from Professor Leisen, followed by that of the Stone Conservation Unit and finally experimental studies carried out at the Bayon. Moreover, I know that there is an Italian team working on stone conservation which is embedded within the APSARA National Authority. I believe that it would be beneficial for the APSARA National Authority to bring together all the results of the different teams so that we adopt the best method tailored for each case. I propose organising a meeting between all the teams to compare all findings and to search for the best technique to treat the stone. Thank you."

Comment from the Co-chairman for France: "Thank you for this comment and proposal, which seems rather interesting. I think that experts form the different teams can only benefit from direct dialogue and that it is also beneficial to the APSARA National Authority. Thank you."

Comment from Ms. Chau Sun Kérya: "I am sorry to take the floor, but I would like to tell Professor Tan Boun Suy that there was a workshop last Friday during which all teams exchanged on stone restoration."

Question from Mr Bong Sovath: [OrigE] "I am from the Royal University of Fine arts. I have questions about the presentation of Mr. Lam on pest control. I know that you showed us evidence of chemicals used in the Forbidden City in China, but how about the use of chemicals in sandstone, as this the material in Angkor, which is a sedimentary rock. Are there any reactions between the chemical and sedimentary rock? Or do you have any previous examples using the type of treatment you envisage for the same type of material that is found in the Angkor region? Thank you."

Reply from Mr Wing Lam: [OrigE] "The chemicals we are going to use are safe to use. We probably would run some experiments with the particular soil and the geography of this region. The materials are widely used and approved by most countries, including the USA. Modern chemicals of termite treatment have come a long way through a long evolution process of change. In the 1990s, residues or some chemicals may have added some negative impacts to the soil or the environment or even other elements. Today, the technology has changed so much in what we use in terms of toxicity and effectiveness.

Some people think that this is a joke, but I actually have tried to drink the termite solution that we applied in houses and I had an upset stomach and I felt really uncomfortable; a lot of this reaction had to do with psychology, but three hours later nothing happened to me. Most chemicals, the vast majority of chemicals, have less damaging components than your table salt solution. I think your question is very valid; we need to be very careful and consider the ecology, the environment and the historical importance. We will need to run some tests with this particular soil and rock samples. I know that it is probably not a very conclusive answer for you, but this is the caution and direction we would be taking. Thank you."

Comment from the Co-chairman for France: "Would anyone like to take the floor? It does not seem to be the case, so today's proceedings can be drawn to a close. Thank you to the APSARA National Authority for hosting this meeting and we will reconvene tomorrow morning."

Thursday 22nd of June

III. 11 Signature ceremony for the Memorandum of Understanding between the APSARA National Authority and Chinese Safeguarding Angkor team

Comment from Mr. Azedine Beschaouch: "After Chau Sey Tevoda's restoration, the Chinese team has worked on Ta Keo, and it will be completed in 2018. A new contract was drafted a long time before the passing of the late chairman of our National Authority. I use the word contract as this is not only friendship but also the terms and conditions of a Memorandum of Understanding drafted a long time ago. The APSARA National Authority and the Chinese team for Cultural Heritage will work together in order to study and restore part of this outstanding temple that they selected. This means that the activities will take place not only within the site of Angkor, World Heritage, but also outside of it, as has been the case for many years.

This will be the first ceremony. Following this ceremony we will have another presentation and signature close to the heart of the APSARA National Authority and of the Ministry of Culture and Fine Arts; the co-operation with India and especially for the laboratory restoration of artefacts. These techniques are well-mastered by the Indira Gandhi Institute, which is one of the world leaders in that field. This is proof of how the Ministry of

Culture and Fine Arts and the APSARA National Authority always look for excellence in training to the benefit of young Cambodians. We will proceed to this presentation after the signature. Thank you."

Comment from the Moderator: [*OrigE*] "We would like next to invite the representatives from the Indian delegation. Thank you very much Excellencies, Ladies and Gentlemen. Please take your seats. Excellencies, Ladies and Gentlemen, we can now proceed to the next item on the agenda. Excellencies Co-chair, the floor is yours. Thank you."

Comment from the Co-chairman for Japan: [*OrigE*] "Let us resume the session with the team activity reports on conservation research and archaeology. The next item is a summary of the final result of the 2012 and 2015 LiDAR mapping seasons. Actually, there is a change in the programme, as we will invite our colleague from the Indira Gandhi Institute to make a presentation first."

III.12 Indira Gandhi institute Centre for the Arts, IGNC, New Delhi, India presented by Ms. Vinita Srivastava, joint secretary

"Excellency Dr Phoeurng Sackona, Minister of Culture and Fine arts in Cambodia,
Excellency Dr Sum Map Director General of the APSARA National Authority,
UNESCO representative from Phnom Penh,
Experts,
Distinguished guests,
Ladies and Gentlemen,

[*slide*] It is a great pleasure and honour to represent my country here and the Indira Gandhi National Centre for the Arts. [*slide*] On the slide, you see the picture of Delhi; we are a national body under the Ministry of Culture of India, in India, where we have our offices. You can see that we are at the intersection of main roads in the city and it is quite easy to find us.

[*slide*] We have nine regional offices across the country. Very briefly, I will introduce the activities that we do. The structure was set up for a mandate for art in all its forms, conceptualised in the 80's. Now we have a document that lays the activities for the next 20 years.

[*slide*] We are chiefly in documenting manuscripts, texts and the spoken traditions of India. We publish authoritative lexicons of art and there are four national projects which involve modern techniques that we are part of.

[*slide*] The names of the departments are a little bit difficult, because they are Indian-ised names. What they do is, for example, research and fabrication, lifestyle studies, modern technology and documentation and archiving and another department documents rock art sites all across India. We also have conservation, museum reorganization and conservation of books and artefacts. A little bit of this we will have the opportunity to do here in Cambodia.

[*slide*] Recent achievements are that we have reconstituted our executive and programme advisory bodies to constitute credible and reputed research scholars. There is a track record of documentation for intangible culture. We had an award winning film this year at the 64th National Film awards, given to IGNC for a film on traditional shadow puppetry in India.

[*slide*] Our Vedic heritage portal is one of our long-term projects. It has a reference portal where interested scholars might read about Hindu scriptures and a special interest is

that there are chapters on the architecture of temples, of homes, religious towns and fortifications that are of relevance to understanding the traditional construction system at the time they were built.

[*slide*] The original Sanskrit manuscripts, which have spread to different parts of India, are now being collected and the owners gently persuaded to share at least digital copies of these manuscripts.

[*slide*] Finally, four thousand hours of digital output has been verified under the National Audiovisual Archives Programme and it is being made freely available to scholars and researchers across the world.

[*slide*] The national manuscript mission is also part of our mission. We have a repository of Pali and Sanskrit manuscripts from across India which is not very different from the beautiful script of the Khmer region. The scholars who study this are part of a well-connected network and also help us transliterate these scripts.

[*slide*] We do a lot of work on rock art and the photograph shows you these sites. How we examine concrete cases where conservation and restoration are very important and how we evolve strategies of rock art computerisation and documentation.

[*slide*] The documentation experience of temples at Thanjavur is a source of special pride for us. There is a temple at Thanjavur, which is important for the study of the Chola period and the art dance forms and music and theatre of that time. We have participated and collaborated in projects in every square inch of that temple, interior and exterior; all inscriptions and decors have been documented. We produced available DVDs and CDs of this which have interactive presentations with details of the icons on the walls of the temple and how they relate.

[*slide*] We have a very small one-minute clip for you on Masroor temple in Himachal Pradesh. This supplements all the comprehensive documentation that we did in 2015. It is a creative documentary that brings alive a Sanskrit text that informs on temple location choices, how to select wood and stone which is correct for the region and the temple and on design, architectural and construction techniques. The local Himachal language is spoken and goes forward to connect the local communities. They live by the temple and accept it as their own, but our film encourages them on the preservation and conservation of the temple as well. I will ask my colleague to help me to play the one-minute film and request your patience. [*a video clip is played*]

Thank you all once again for the opportunity to present it."

Comment from the Co-chairman for Japan: [*OrigE*] "Thank you very much and congratulations to the representative from India. We now proceed to the presentation on the LiDAR mapping campaign by Dr Tan Boun Suy and Dr Damian Evans."

III.13 Summary of the final results of the 2012 and 2015 LiDAR mapping campaigns by H.E. Dr. Tan Boun Suy, APSARA National Authority and Dr Damian Evans, École française d'Extrême-Orient

Mr. Tan Boun Suy:

"Excellencies,
Ladies and Gentlemen,

[*slide*] My colleague Damian Evans and I will present a summary of the final findings

of the LiDAR and mapping for Cambodia. I remind you that LiDAR has the great possibility to delete the vegetation cover from aerial pictures, something other techniques cannot achieve.

[*slide*] This is the temple of Banteay Chen at Phnom Kulen and the bottom picture shows the area without its vegetation cover. Two LiDAR campaigns were undertaken in 2012 and 2015. That first was called the Khmer Archaeological LiDAR Consortium, KALC, with a budget of $US 210,000, provided for by seven partners, including the University of Sydney, the EFEO, AFD, JASA, SCA, HUNINNCO and WMF. In 2015, the new project was called the Cambodian Archaeological LiDAR Initiative; the budget was of 1.5 million euros, supported by the European Union through the European Research Council. This project surveyed more than 200 km^2 throughout Cambodia and was operated by three partners: the EFEO, the APSARA National Authority and the Ministry of Culture and Fine Arts.

[*slide*] This is a picture of the central area of Angkor and the bottom picture shows Angkor Wat and that on top Angkor Thom. This is the northeast section of Angkor, with Banteay Srei on the right of the picture and I now give the floor to my colleague Damian."

Mr. Damian Evans:

[*OrigE*] "Thank you Excellency. [*slide*] I would like to begin this morning by emphasizing that we are speaking here today on the conclusion of mapping and field verification for LiDAR projects within the areas administered directly by the APSARA National Authority. Moving forward there is still a considerable amount of work to be done in areas administered directly by the Ministry of Culture and Fine Arts, like Sambor Prei Kuk, for instance.

[*slide*] But, in relation to the recommendation from the previous ICC to present the data and software analysis systems, we can see that a wide range of methods can be and have been used to evaluate the data. Since 2012, the data for Angkor have been available for researchers in a variety of formats, ranging from paper map form from digital data set at the Documentation Centre of APSARA, and also in a range of formats for easy access and evaluation, including JPEG image files and GIS files, even Google Earth. These are the datasets that have been used for mapping and analysis, and also the numerous joint training exercises completed in recent years. A manual for the workflow was included in the KALC report submitted in 2012.

Since 2012, members of the Greater Angkor Project, in partnership with other teams in the Angkor-Siem Reap region, such as the ADF Kulen team, have been carrying out analysis of the data in the office and also undertaking ground-verification activities. A major focus of these efforts has been training and capacity building, both in formal course settings and in partnerships out in the field. An outline of the main initiatives is on the screen here. They have included numerous staff from several different departments of the APSARA, who have successfully achieved core competencies in the analysis and interpretation of LiDAR data. Moving forward, this is something we should direct our focus to, staff of the Ministry of Fine Arts that are working in other areas.

[*slide*] The issue of data availability and dissemination is closely linked to the questions of origin and ownership of the datasets, which are diverse and complicated and do not neatly fall under the rubric of a unified LiDAR project. We can trace the origins of the current mapping datasets back to 1990s, when Christophe Pottier and his colleagues began the process of collating historical maps of Greater Angkor and creating detailed archaeological maps of the central and southern areas. This work was later extended as part of the Greater Angkor Project and a unified map was completed and presented here in 2007, and archived at APSARA. As for KALC, since 2012 these data have been archived at the University of Sydney and the Documentation Centre of APSARA, and made available in digital and paper forms.

The MoU for KALC currently restricts access to the original data to the eight members of the KALC consortium. Major outcomes for KALC were presented to the ICC in 2012, reported, and published in 2013.

[*slide*] As for the CALI acquisition, since 2015 these data have been archived in full and made accessible in three places: the Documentation Centre of APSARA, the EFEO, and the Ministry of Culture and Fine Arts in Phnom Penh. The intellectual property for these data currently resides with researchers in the three institutions of the CALI programme. The major outcomes were presented to the ICC in 2015, and then reported and published in 2016.

[*slide*] What we have been doing in recent years is using the LiDAR data and other sources to add several thousand new features to the archaeological mapping, all of which have now been verified on the ground and added to a simple GIS database listing sites and including mapping data. The mapping data includes datasets belonging to several different researchers and institutions who have been working on mapping the Angkor region, and combines them all into a single, consistent and easy-to-access archive.

[*slide*] We are now in the process of transferring the data that you can see on screen for archiving and availability at the Documentation Centre of APSARA, and they are governed by a range of cross-institutional agreements as well as the Angkor Code of Conduct for Research.

[*slide*] The complexities of intellectual property and source datasets present some pretty big challenges to the broader dissemination of data, but there are solutions available. Leaving aside for a moment the complex question of what to do about mapping data, there are three main options for disseminating the LiDAR data itself: The first is to maintain the *status quo*, which allows the partner institutions to distribute the data internally as they see fit. Obviously, this is not ideal situation for a number of reasons moving forward. Options two and three involve broadening the scope of dissemination beyond those partner institutions, which I think is desirable for a number of obvious reasons.

There are no legal prohibitions to the dissemination of the 2015 CALI data, so the main obstacle at this point is the 2012 MoU between the eight member institutions of the original KALC programme which restricts access to those eight partners. With the agreement of the eight partners though, we can waive that restriction, which would open the door for options two or three, on screen here. Option two, the licensing of data to approved partners, would be a step in the right direction, but would need a huge long-term investment in bureaucratic and technical capacity to assess applications, develop licensing agreements, implement protocols for data distribution and oversight, and that kind of thing. In reality, it is not a very practical solution.

The third option is to make the data fully open access, which is to say freely available and downloadable on the Internet by anyone, for any purpose. This kind of solution would instantly catalyze a huge array of new collaborations and new applications. It would also align very closely with the global movement towards making publicly-funded data open access, and democratizing access to knowledge for the public good.

It is important to pause here for a moment and note that this overall trend, for example the availability of vast archives of high-resolution aerial imagery in platforms like Google Earth, has never resulted in any documented disturbances to heritage sites. Quite the opposite, in fact, as it puts critical information directly in the hands of planners and decision-makers and gives them the spatial intelligence that is needed to more effectively understand, manage and monitor these important places.

In conclusion, and noting very clearly that it is really not my decision to make, I would respectfully put it to the ICC that a full, open access strategy for the LiDAR is almost certainly the sensible way forward. This is especially true given that in a few short years we

will have satellite-based high-resolution LiDAR data scanning the globe, at which point the question of open access will be out of our hands, so what we have here is really an opportunity to keep ahead of that technological development and be at the forefront of this kind of research.

Thank you very much for your attention."

IV- TECHNICAL TEAM ACTIVITY REPORTS: SUSTAINABLE DEVELOPMENT

Comment from the Co-chairman for Japan: [*OrigE*] "Thank you very much. According to our agenda, we move to the next item on sustainable development and technical team activity reports and the floor is given to Mr. Jean-Baptiste Chevance, representing ADF."

IV.1 Phnom Kulen activity report from June 2016 until June 2017, ADF Foundation, by Dr. Jean-Baptiste Chevance, project director of the Archaeology and Development Foundation (ADF)

"Your Excellency Minister of Culture and Fine-Arts,
His Excellency the Director General of the APSARA National Authority,
Honourable Co-chairs,
Colleagues,

[*slide*] We report today on the activities at Phnom Kulen of the Archaeology and Development Foundation (ADF) since the last technical session of June 2016 and of forthcoming activities.

[*slide*] Let me first recall the geographical and hydraulic features of the massif in relation with the site of Angkor and the City of Siem Reap. [*slide*] This map also shows the different authorities in charge at Phnom Kulen.

[*slide*] Our conservation and maintenance programme has been undertaken in collaboration with the APSARA National Authority for the past nine years. In 2017, we did not undertake any mine clearance operations. The latter is a necessary action before intervening for conservation and excavation activities, knowing that since 2008 we have seen to the co-ordination of the CMAC teams over 39 archaeological sites or 39 secured hectares.

[*slide*] Regular co-ordination with the Department of Sites Outside of the Angkor Park has led to more efficient management of the remains. To this end we finalised the complete inventory of sandstone artefacts, with a total of 460 items, and this was handed over to the APSARA National Authority in March of 2016.

[*slide*] On a regular basis, we flag to the APSARA National Authority's monuments that are under threat of collapse. ADF also informs regularly on existing threats. [*slide*] At Prasat O'Paong, which is one of the temples that have been the best-preserved in the ancient capital and sports the highest tower, a 3D survey rendered an image of the structures without any scaffolding. This will enable the APSARA National Authority to forecast any potential collapses.

[*slide*] Of course, the most visited archaeological sites at Kulen are included in this conservation programme. At Preah Ang Thom and Kbal Spean, exhaustive topographic surveys led to the design of information panels, which texts are yet to be drafted.

[*slide*] In collaboration with the Ministry of the Environment and the APSARA National Authority, ADF designed a parvis project and the development of the approach area to the waterfall and of *Prasat* Krol Romeas. During the last ICC we had the opportunity to present several pictures of unbridled developments in this area.

[*slide*] The highlights of the project, shown here, include redeveloping light infrastructures for picnic and souvenir stalls, which architectural design is simple and respectful of the environment. [*slide*] We also propose to set up a community centre and a parking lot. The main challenge is to adapt to the terrain slope whilst moving away from the monument approach areas and river banks. [*slide*] This project is open for discussion and we presented it to the ICC experts during their field visit on June 18th.

[*slide*] The Protected archaeological areas at Phnom Kulen are also included within this activity. As of today, ADF and the APSARA National Authority have delineated 800 hectares to protect archaeological sites and their surroundings from dangerous farming activities. Their efficiency has now been partly evidenced, as, apart from continuing the logging of large trees, slash and burn agriculture practices have ceased. However, the destruction of the forest has increased on the periphery of these areas.

[*slide*] We remind you that these areas have been officially recognised by the provincial authorities, the APSARA National Authority and the Ministry of the Environment, although their legal status is yet to be legislated on. Similarly, the institution in charge of these areas (at the moment the APSARA National Authority) should also be clearly determined within the framework of the Phnom Kulen Management Plan.

[*slide*] ADF sent a new request for funding to the State Department of the USA through its Embassy (Ambassador's Fund for Cultural Preservation), hoping to increase the number of protected areas and to better manage the most visited waterfall at Kulen, as was recommended by the ICC (27th Technical Session on the 24th of January, 2017) and the National Park Management Plan).

[*slide*] Regarding archaeological research, we have continued our activities focusing on the remains revealed by the LiDAR in 2012 and 2015, highlighting the 9th century ancient capital of Mahendraparvata.

[*slide*] *In situ* checks of unprecedented archaeological sites have continued in collaboration with the APSARA National Authority and the EFEO's CALI project. The objective is the design of a thorough archaeological map of Kulen and its surrounding areas.

[*slide*] As of today, more than 3200 structures have been digitalized and more than 600 checked and recorded, adding significant data to the archaeological map. [*slide*] We have now a clearer understanding of the city's town planning, with main thoroughfares, plots of land and religious sites. This is what the LiDAR really enabled us to reveal: a very organised and spread-out urban network extending over almost all the southern side of the massif.

We hope to finish the field checks very soon and publish the findings and of course present them at the next ICC session. There will also be a report written in Khmer sent to the APSARA National Authority.

[*slide*] Last December, we also started checking major ancient hydraulic structures in order to get a better understanding of their operations and to potentially locate water flow management mechanisms through channels.

[*slide*] Presently, we are working on analysing field data from the 2016 excavation season. They come from the plots and ponds identified by LiDAR located along the main axes crossing through the ancient city. Analysis of the ceramic and startigraphic interpretations are being studied and radiocarbon dating has yet to be conducted. These are pictures of the excavations carried out last year on these ponds.

[*slide*] Already, the stratigraphy on some sites has shown important erosion, suggesting previous activities before the establishment of the city; [*slide*] we now need to get accurate dating. [*slide*] Some sites show accurate defined levels of occupation that suggest the 9th century.

[*slide*] We have also started studying many tile fragments unearthed during previous excavations at the Royal Palace, at the mountain temple of Rong Chen, at Poeng Tbal Cave and at *Prasat* Damrei Krap. This typological analysis is conducted in partnership with the EFEO by PhD candidate Ms. Myonduk Choy and will lay solid foundations to put forth a typo-chronology of these often neglected remains.

We would like to emphasize that we try to invite as much as possible graduates and the APSARA National Authority's archaeologists to all stages of the archaeology activities within the framework of our training programme.

[*slide*] With regard to development: ADF has worked for nine years on Phnom Kulen massif, with a population of 4000 distributed over ten villages on the higher plateau. As you are aware, there is a clear distinction between the population, tourism, development, livelihoods and infrastructure between the village of Preah Ang Thom and the other archaeological sites.

[*slide*] For the past months, the working group mentioned in another presentation has convened on a regular basis under the leadership of the Ministry of the Environment with a view to designing a Phnom Kulen Management Plan, as you heard yesterday. ADF put a great deal of input into the overall reflection and the document is being finalized.

Since 2008, we implemented development programmes that meet several strategic fields defined by the Management Plan. Let me briefly list them.

In order to offer an alternative to slash and burn farming and the systematic monoculture of cashew nut trees, ADF has proposed income-generating alternative farming techniques. As of today, 40 families participate in this programme, benefiting from material and technical support and of an output market for their production. This includes small-scale fish and [*slide*] poultry raising, [*slide*] mushroom and [*slide*] vegetable farms. Gradually, the participants learn to become self-sufficient.

Although these activities generate sizeable income for the households and improve nutrition, they have yet to have any impact on the expansion of cashew nut tree plantations.

[*slide*] The latter are cost effective with large income and are still farmed extensively, with this year more plots of land cleared, [*slide*] sometimes even threatening archaeological sites. These pictures were taken two months ago.

[*slide*] This activity is so widespread that the plots of land are cleared outside of the area traditionally earmarked for slash and burn agriculture and impact the, until now, virgin forest. It is now the entire Kulen massif which has been affected, with the exception of the northern end.

[*slide*] Since the beginning of this year a new threat has appeared, illustrated by this two-year old aerial view of the southern end of the massif: the systematic and large-scale spraying of chemical weeding products before planting on these plots of land.

[*slide*] In order to fight this trend, ADF, with the APSARA National Authority, since 2011, has established Archaeological Protected Areas (APA). Pending sufficient resources these areas should be multiplied.

Similarly, special attention must be given to the Community Protected Areas (CPA), other areas of the forest that are still virgin in the southern section of the massif. Their boundaries are somewhat unclear and as is the case for the northern end of the National Park, illegal timber cutting is still ongoing.

[*slide*] Finally, the environment of the National Park suffers from gradual encroachment on its outer borders due to the lack of clear delineation and staff. There are also massive flows of people migrating to the Park who grab lands, in particular at the foot of Phnom Hop, here in this picture at the entrance of the Park. This exemplifies the absolute necessity and urgency of demarcating the protected areas to preserve what is still left of the natural environment of the National Park.

[*slide*] The reforestation programme has continued in collaboration with the APSARA National Authority and the Ministry of the Environment. It includes identifying each farmer in the Archaeological Protected Areas and monitoring affected plots of land in Archaeological Protected Areas. ADF has also begun reforesting plots of land that were recently cleared, in collaboration with the Adaptation Fund Project and UNEP. More will happen with the commencement of the REDD+ Project: The two projects are steered by the Ministry of the Environment.

The protection of the Park also includes economic development from other sources, to remedy shortages. [*slide*] To this matter, we also collaborate with private sector tourism operators in developing stays in remote villages and community activities benefiting the population.

[*slide*] The village of Preah Ang Thom reaps most of the benefits of tourism and the negative impacts of tourism are yet to be managed. Lack of infrastructure and human resources does not enable proper flow control, especially during ceremonies. [*slide*] Waste management is non-existant, the regulated areas are not respected, car parking is messy and illegal construction continues.

The development project of the waterfall approach area may overcome these issues. We deem more important more efficient management of mass tourism where it already exists rather than developing it in more remote areas.

[*slide*] Some additional uncontrolled developments have sprung up recently and we can only hope that the rapid implementation of the Management Plan will regulate them: They include a pagoda and access road on the slope of the mountain at Preah Ang Chup, and the development of a permanent camping site next to the river.

[*slide*] Our nutrition and sanitation programme is nearing completion. The financing allowed us to offer to four villages programmes reaching out to newborn babies up to five-year-old children. The Stockholm Karolinska Institute is conducting an assessment of the programme to define its future orientations. [*slide*] The rice bank at Thma Chruogn village has offered food security to the poorest and so has [*slide*] the upgrading of the water network in villages.

[*slide*] Finally, the last item in the development field has strived to consolidate the equipment of the most remote primary schools and villages. ADF is now considering a new education and environment programme with the construction of nurseries in three primary schools.

[*slide*] In conclusion, I would say that we are now at a crossroads at Phnom Kulen. The Management Plan initiated by His Excellency Say Sam Al set outs the main activities that should be implemented in the future.

Recent replanting illustrates a hopeful momentum under the leadership of the Ministry of the Environment. Nevertheless, illegal and uncontrolled farming activities have continued to spread. We are presently in a situation where there are plantations on one side and on the other side clearing occurs. It seems logical to stop deforestation.

Our presentation has highlighted the need to act swiftly for the safeguarding of the National Park and archaeological sites. ADF, a daily stakeholder in this context, considers that the most urgent necessity is to appoint and earmark sufficient human and financial resources to see to enforcement of the environmental laws. In the case that resources remain scarce, they could yet be more efficient by focusing their efforts on the time of the year when the clearing of plots of land and the plantation of cashew nut trees take place.

Other urgent imperatives are the delineation of new protected areas, the development of activities generating additional incomes for the locals and clear definition of the roles and responsibilities of the different parties involved.

The layout of the road planned by the authorities will cross through the fabric of the ancient capital and one could imagine co-ordinating the different departments and possibly undertaking rescue excavations prior to and during works.

All of these activities need the sinews of war and we hope that the National Park Management Plan will succeed in mobilizing financial resources. All these actions combined could allow for Phnom Kulen National park to uphold its name as the 'Water Tower of Angkor' and to preserve the remains of one of the first Angkorian capitals on this sacred mountain of Cambodia, in harmony with and for the benefit of the locals.

Let me finish by saying that we hope to sign a new Memorandum of Understanding with the APSARA National Authority and another with the Ministry of the Environment.

[*slide*] On behalf of all the ADF team, I thank you for your attention."

IV.2 Proposed eco-adventure zip line course at Kbal Spean, Phnom Kulen National Park by Mr. Tony Yon, project co-ordinator and founder, and Ms. Rebecca Slade, technical advisor, Asian Biodiversity Conservation Trust

Ms. Rebecca Slade:

[*OrigE*] "Excellencies,
Ladies and Gentlemen,

[*slide*] It is my pleasure to present to you the proposed Eco-Adventure Zip Line at Kbal Spean in Phnom Kulen National Park on behalf of the Asian Biodiversity Conservation Trust.

[*slide*] The Asian Biodiversity Conservation Trust (ABCT) is a local NGO involved in conservation and livelihood development; we work in close collaboration with the Ministry of the Environment and the APSARA Authority in Siem Reap Province.

The proposed project is to install an eco-adventure zip line at Kbal Spean, on the western plateau of Phnom kulen National Park. The course would consist of a single zip line anchored between rock boulders and a landing platform. The infrastructure would be non-permanent with no long-term impact on the environment, and visitors would use the exist-

ing APSARA trail and a further 200 metre trail to access the launch site. They would then return close to the car park on a short walk from the landing site.

[*slide*] For those who are unsure/unaware what a zip line looks like, here is an example of one in Chiang Mai, in Mae Takhrai National Park, a protected area. There are many zip lines operational in most Southeast Asian countries that are present in protected areas.

[*slide*] The reason Kbal Spean is an ideal location for this project is because of its existing public facilities and easy access routes. For example there are restaurants, a car park, toilets and waste collection bins along the trails. The zip line would also add to the existing attractions already present in the area — the 1000 Lingas archaeological zite, the waterfall, and the Angkor Centre for the Conservation of Biodiversity (ACCB).

[*slide*] Here we have a map showing the location of Kbal Spean in Phnom Kulen National Park on the western side. [*slide*] And this map shows you where the zip line would take place at Kbal Spean. The red line shows our proposed zip line course from the view point down to the area near the car park. The green line is the existing APSARA trail and the blue highlights the trail to the launch site. You can see that the archaeological site is a bit further up and that we would not interfere with that. The zip line is to the left of the car park.

[*slide*] The zip line would have the potential to educate visitors of the National Park. Its geography, biodiversity, conservation and cultural interest will be infused into the trails and will be taught to all customers by our staff. Education Boards will engage the public and promote environmental appreciation, and will strengthen the public awareness of environmental conservation; a good example of responsible and sustainable tourism in Siem Reap.

[*slide*] There are many benefits of this project but I would like to focus on a few of them. It is of low impact, meaning there will be access to wild areas without significantly impacting the natural environment, because zip lines do not require any powered systems or the use of vehicles. The revenue generated from the zip line will go directly to the Ministry of the Environment and APSARA, hence providing them with a source of income. Revenue will also go into conservation initiatives in Phnom Kulen National Park, such as ranger training, patrolling support, biodiversity research and surveys, and sustainable livelihood development projects.

The zip line will help local employment by creating 12-15 full time opportunities in the ecological and adventure tourism sector in Siem Reap and the Phnom Kulen National Park. [*slide*] The zip line will broaden the visitor profile, as by being an adventure tourist attraction, it will retain visitors at Kbal Spean which will increase revenue for the local businesses near the car park area and make Phnom Kulen National Park a more desirable place to visit. This in turn will provide environmentally friendly tourist attractions in the area.

[*slide*] So, the zip line will be a single line of 450-500 metres in length, anchored between large rock boulders at the view point and a metal structure at the landing site, which will be constructed to camouflage with the environment; we will be planting around it to ensure that it is not visible to others.

The launch site is at 167 metres above sea level and the landing point at 97 metres, which makes it roughly a 70-metre descent. The trail up to the launch point from the car park is just over 900 metres on the APSARA trail then a 200 metres trail off it, in total a little over one kilometre. From the landing site the visitors will return to the car park on a short walk.

[*slide*] Here is a picture of the area labelling our proposed launch site, the zip line transect in red to the landing site. You can also see the location of the car park to the right of it and the ACCB compound.

[*slide*] I would like to show you some proposed site images. The first picture shows the area behind the launch site, taken from the cliff side looking back at the forest. The next picture is the area at the launch site taken from the forest, looking out to the view point. It is a clear, open and spacious shaded area.

[*slide*] The safety of the zip line and the environment is crucial to us. During the construction of the zip line, specialist staff will use the latest techniques to access areas causing minimum impact on the environment – using the company Duatek Metro Asia Development Corporation.

There will be no powered machinery, which will avoid damage to the tree roots, soil compaction and erosion. International safety standards will be set and maintained in the construction and operation with an international operations management team that has over 20 years experience in zip line and adventure tourism — Angkor Zipline. We will be working closely with these companies to ensure the safety of both the environment and the zip line is kept.

[*slide*] The health of the environment is our top priority. As mentioned earlier, the construction will be of low impact, using a lightweight design. The boulders used as anchor points will not be perforated; a bolt-free system and guards will be installed to protect them and to stop abrasion during the operation and stop any damage to them. And the installation process will involve minor disturbance to habitat to provide a safe avenue for the riders.

[*slide*] To finish off our presentation, I leave you with some examples of zip lines. The first image is a launch site with minimal infrastructure, just using natural resources; secondly, an image showing a landing platform and, lastly, a long single zip line through the forest. These are the types of examples we might be looking at for our zip line.

Thank you very much for your attention."

Comment from the Co-chairman for Japan: [*OrigE*] "Thank you. The next item is new ticketing booth at Banteay Srei, presented by Mr Ly Se from Angkor Enterprise."

Comment from Mr Sum Map: [*OrigE*] "Actually Co-chair, Mr. Ly Se presented yesterday."

Comment from the Co-chairman for Japan: [*OrigE*] "We listened to this presentation yesterday, so let us move on to the rehabilitation of the big and small circuits in Angkor, presented by Mr. Heng Kim Leng from the APSARA."

IV.3 Rehabilitation project of the grand circuit and small circuit roads by Mr. Heng Kim Leng, Department of Technical Support and Intersectoral Projects, APSARA National Authority

[*OrigK*] "Excellency Minister,
His Excellency Director General,
Co-chairs,
Ladies and Gentlemen,

[*slide*] Since 2008, we have carried out improvement works on the grand circuit and small circuit roads that we see on this map, and up to last year, 2016, a total of 11.22 kilometres of roads have been upgraded. For the road along Angkor Wat moat, the main, six-meter wide section (the car lanes) has been paved with DBST mixture. Its shoulders, which are the bicycle lanes, have been covered with SBST mixture. The width of the shoulder

lanes varies from 0.85 to 1.85 metres at different locations, especially where trees are present. Notwithstanding specific lanes for them, many bicycle riders still continue using the car lanes – a habit that affects the order and the flow of the traffic. On the other hand, the curbs on both sides of the car lanes are perceived to be a troublesome feature, interfering with the bicycle lanes, making them look too narrow. This is why motorcycle and bicycle drivers abandon them to use the car lanes instead.

Drawing on this experience, we have decided, in the upcoming road improvement projects, to remove the curbs and make adjustments to the width of the bicycle lanes, to 1.5 metres equally, on both sides. While there is a shortage of space for vehicle parking, removing the curbs can also be a good idea as it will enable drivers to pull over to the sides to park their cars and tuk-tuks. So, the modified design with curbs removed does have some benefits during the current period while we are still working to find solution to the parking issues at major temple sites within the Archaeological Park.

[*slide*] Going forward from late 2017 through to 2018, we will be upgrading the small circuit road and the remainder of the big circuit road. The total distance is 21.53 kilometres. There will be some adjustments made to the axis of the road at the Elephant Terrace. [*slide*] As we can see here, the small circuit road crosses through what appears to be a temple ground and, therefore, we will build a bypass to connect with the small circuit road instead.

In our road improvement work we have never touched trees, even when they interfere with the road, but this has caused criticism from members of the public who are concerned about safety when driving. Thus, to address these concerns, next time we will not bypass trees and continue implementing the current design, which features a 9 metre wide road: 6 metres for cars and 3 metres (1.5 m on each shoulder) for motorcycles and bicycles. We will cover it with a bituminous mixture. In this design, small trees located within five metres from the middle point of the road will be cut down and cleared. According to our estimate, ten trees along this road will also be cut down. On this point, we would like to hear feedback and comments from the participants as to what impact these measures (cutting down of some trees to widen the road) might have on the landscape in that area. Thank you."

General Discussion

Comment from the Co-chairman for Japan: [*OrigE*] "Thank you very much. We now have some time for the general discussion; if any of you have any questions or observations, the floor is now open. Please Madame, take the floor."

Comment from Ms. Anne Lemaistre: "Thank you Co-chair. I will make some comments with regard to this morning's presentations. Whilst being fully satisfied with the work of the LiDAR phases 1 and 2, I rebound on the question raised by Dr. Damian Evans on the way the data should be shared or not and how. UNESCO entirely supports the last proposal, as we are also an institution that works on the law to access data. This is something we have been doing in Cambodia with the Ministry of Information, and UNESCO supports any initiatives relating to what we call an Open Institute, which is a major partner of UNESCO. We thereby can only support the third proposal to make the data accessible to all so that all can access them. What we foster is the democratisation of knowledge. We wanted to take a stance here but obviously the final decision belongs to the partners working with the LiDAR.

We will have this afternoon a presentation on new technologies and I would like to know whether we could listen again to Professor Tan Boun Suy and Mr. Damian Evans on the LiDAR's major discoveries. We have been very interested by the discovery of the Angkorian capital at Phnom Kulen, but it would be good to hear the highlights of the second LiDAR season and to get a global vision of the novelties in terms of archaeological discover-

ies. Let us wait for this afternoon if you agree.

The second point is to congratulate the presentation on Kulen, which was thorough and clear but it raises a paradox that I would like to share with you. I am delighted with the new discoveries revealed by the LiDAR confirming the existence of the first Angkorian capital, which most academics have known existed for decades and I am sure that Professor Claude Jacques will agree with me. I marvel at the discovery of this urban network. Yet, I realised throughout the presentation and as the Management Plan is in the design stage that a road will be built crossing this newly discovered urban network.

Let me share my thoughts as UNESCO representative: For the past 15 years we have advocated the extension of the site of the World Heritage to include Kulen. This was not possible in the past as security and access to the site were uncertain and also because the archaeological elements were missing to argue the extension. I think that we now have the archaeological evidence, thanks to the fruitful collaboration between the APSARA National Authority and ADF, and the extension of the World Heritage site to its source and connecting Angkor to its first capital would be justified and legitimate.

Yet, the fact that a road would be built on the location where the first Angkorian capital was discovered would definitively compromise the possibility to request the nomination for extension. Let me be clear on the strategic choices that involve Cambodia and the APSARA National Authority for the next ten or twenty years: This is something one should think about. I know that nothing is yet definitive or signed and I hope that within the framework of the Management Plan this question will be put on the table and alternative routes for the road are found or it will be detrimental to the site.

My third question relates to the upgrading of the large and small circuits that were created by the French in 1921 and are nothing new. I think that Professor Claude Jacques would confirm that they do not allow for a clear legibility of the temples, as you are aware that, apart from Angkor Wat, a temple should be entered from its eastern aspect and that this is not the case in terms of the spatiality of this itinerary. This was simply something we have inherited. I would like to know whether there is any urgency to upgrade these roads, as I did not really understand. Have there been any accidents, problems or flooding that would justify this rapid upgrade?

Thank you very much."

Comment from the Co-chairman for Japan: [*OrigE*] "Thank you very much. Mr Beschaouch, please."

Comment from Mr. Azedine Beschaouch: "Thank you Co-chair. Let me make a point and notably on the great efficacy of the work that ADF has conducted for the past decade. Let me also pay tribute to the personal engagement of our colleague, Mr. Chevance, who has a close relationship with the site. This is a deserved tribute because this not only concerns the safeguarding of heritage but also includes a global approach. Not only does he deal with heritage but also with society and living conditions and I find this exemplary and we must congratulate him for this.

Let me concur with what Ms. Lemaistre said about the road. I think that the APSARA National Authority and the Ministry of Culture and Fine Arts are also concerned by this road project. No decision has been made yet and we understand that there is a need for improvement of access, but to leap from a simple access to a road means changing gear. We must then pay attention and remain vigilant with regard to the Management Plan and we know that the Ministry of the Environment listens to us. We congratulate and thank the Ministry and especially the Minister, as he himself took on personally the design of this Management Plan.

I would like to say two things about this morning's presentations. I am not convinced

by the Kbal Spean eco-adventure project. I cannot fathom how leisure activities can bring anything substantial. Please forgive my passionate tone, but I have had enough. For years people have visited and forgotten the universal value of Angkor and talk about adding values to the value of Angkor. Do leisure activities help in understanding Angkor? Allow me to say that this approach is not cultural and not normal. When one shows respect to one of the greatest pieces of heritage of humanity, one cannot talk like this. They talk about leisure activities, saying that they bring us something, as if we were uneducated. What will be the added value? What is the value of earning $US 20 to 50,000 per year when one sees that this will be located in the middle of the forest?

I am on principle against new projects when they do not have any added value for the site. I have adopted this stance for the past 50 years. I am against this concept of leisure activities and etc. You can criticise me. The Angkorian heritage is outstanding, the Khmer heritage. What will this bring? This is why I tell the APSARA National Authority to be cautious before taking any decision.

Nevertheless, I am happy about one thing: many years ago we faced a *fait accompli*; authorisation was granted to the Flight of the Gibbons project, but this time the project is presented to us ahead of its implementation. Thank you, as this enables us to react. As the Secretary of the ICC I would like to recall the regulation. A project presented here does not mean it is approved. To talk is to inform and everyone knows that to present does not mean that an agreement has been reached. There must not be any misunderstanding.

The last observation is to suggest to the Director General of the APSARA National Authority to change the title of the presentation on the circuits. To rehabilitate the big and small circuits means that the 1920's approach is like giving official recognition these circuits, although many academics and historians, including those French, question them. If you rehabilitate something, it means you earmark a special status, it would be better to say *upgrading* or *maintenance*, or *repair of the roads*. This is important because this title 'rehabilitation of a circuit' is too philosophical. We can pay tribute to the EFEO and the authorities at the time who designed the itinerary, but almost one century on and to use the term 'rehabilitation' would mean that this a choice based on ethics, even philosophy. Please, Excellency, let us use the words upgrade or maintenance of the roads.

I am delighted to notice that the width is of six metres and not that of a motorway; because some people started panicking and thought a motorway would be built. Our colleague who presented was very direct and mentioned trees to be uprooted or felled and so on. Excellency Minister and Excellency Director General and Co-chairs, allow me to state that the Angkor site was inscribed on the World Heritage List not only for its cultural, monumental and hydraulic heritage values but also for its forest and cultural landscape. These are values that are vital to understanding the approach of the conservation. If you have a sick tree or a useless tree that grows in the middle of the road, yes, you can do something about it, but please make sure there is a study prior to the decision taken.

There are specialists at the APSARA National Authority and a Department of Water Resources and another on Forests that can guide you. Make sure also that what you just said is not stated publicly in an international conference like this one, especially in a meeting of the World Heritage Committee; otherwise people would say that you want to uproot trees. This can be done depending on the site and traffic conditions and must be fully backed up.

I thank you for your attention."

Comment from the Co-chairman for Japan: [*OrigE*] "Mr. Lablaude, please".

Comment from Mr. Pierre-André Lablaude: "The issue raised by this road project is very important. It would have been interesting to have access to the file before this meeting so that we could have assessed the impact. With regard to the width of the road: I have been

fortunate to travel to Angkor for the past 25 years and I have seen this road widened and urban development traffic increase and this will not end. Today, we talk about trees that should be felled but the entrance at Angkor Thom still uses one lane of traffic. What is the point of having two, three, four, five lanes of traffic if when arriving at Angkor Thom there is only one lane?

The fact is that improving the road conditions has only a single impact, which is an increase in traffic jams at the bottleneck of Angkor Thom's south gate. There will come a time when one will have to decide that the big and small circuits that were designed at a time of low visitation are not adapted to today's traffic flow, as the area has become urban or peri-urban. To simply upgrade the road is fine, but this will only postpone dealing with issues for three years which will at that point be even bigger.

Another point is the change of itinerary on the Angkor Thom Royal Plaza. The project shows that the road would cut between *Prasat* Suor Prat and Preah Pithu which are archaeological areas where our Japanese colleagues work and any construction works there would have a significant impact. We cannot give the green light on such a project here at the ICC after a single presentation. We need to see the entire project submitted to the Standing Secretariat and we can exchange with the team responsible for the project and with the *ad hoc* groups of experts on sustainable development and restoration and establish a dialogue with the APSARA National Authority on this topic. The impact is too important to simply give some counselling and take decisions that would then be forcibly premature. There must be critical thinking on what the vehicle flow will be in 10, 15 or 20 years, multiplied by four maybe, and to study alternative routes that need to be conceived to protect the atmosphere of the small and big circuits of the 1920's."

Comment from the Co-chairman for Japan: [*OrigE*] "Thank you. Madame Minister you have the floor."

Comment from Ms. Phoeurng Sackona: "Thank you for this presentation and the observations made by the experts. First, I would like to talk about the presentation on new technologies and notably LiDAR, on Kulen and in particular that of Mr. Jean-Baptiste Chevance, whose activities can only be admired. The different projects presented Kulen at length. I agree with Ms. Lemaistre, who said that Kulen is one of the ancient capitals of Cambodia and the source of the glory of Angkor and that it should be protected. This relates to the issue of the project on tourism activities and that of the Kulen road. Is there any urgency? I speak here as a participant, not as a Minister.

The Ministry of the Environment requested the construction of a road crossing the Kulen in order to facilitate transportation, not only for tourists, but also for locals. This is not a secret, and we know that this year the government of Cambodia decided to earmark 50 per cent of the revenues from Angkor ticketing to different organisations, including the APSARA National Authority, the Ministry of Culture, and those of Tourism, the Interior and to Siem Reap Province. The share is based on a percentage, with the bulk for the APSARA National Authority and suggested concrete projects to improve the historic site are approved on a consensus basis.

There are two planned projects for the upgrade and not rehabilitation of the small and big circuits conceived by the EFEO in the 1920's and there is the Kulen road project. We also took note of the LiDAR project and that of Mr. Chevance. Cambodians know that Kulen Mountain still holds many secrets still to be discovered and this site needs to be thoroughly explored before any proper developments take place. I agree entirely with the issue of the road and we need suggestions and help from our friends that are committed to that project. If you tell us that the big and small circuits are no longer sufficient an alternative solution must be found. The ICC has been meeting for many years and the correct itinerary to visit Angkor has yet to be found. This must be the work of the APSARA National Authority and the experts.

As for the zip line project, I am not an archaeologist but as a Cambodian I have to think about respecting the site. This location is in the place of the ancient capital of Cambodia, and who knows what the forest is hiding? The LiDAR could tell us whether below this zip line there may be important remains from our ancestors, temples or ancient villages. Personally, I find disturbing the idea of setting up a leisure activity in a sacred site, as we should respect our ancestors. I do not fully endorse this project; we should rather look into what is needed at Kulen.

I am extremely concerned by the destruction there. There are many. I will hold talks with my colleague the Minister of the Environment so that the Management Plan Project for Kulen may tackle all of these problems. We are fortunate to have the ICC, an international forum and international authority. Any projects presented do not mean they are endorsed. We listen to people's advice and also people's complaints.

If you go to Preah Khan, the access road is dotted with many potholes and is undulated. There are motorbikes and other vehicular accidents, and the locals criticise the APSARA National Authority or the Cambodian government for having increased the fare at Angkor, but for not having repaired the road and built a cycle lane. The condition of the road draws criticism. You asked whether this was urgent. Yes it is, as there are sometimes accidents with visitors. If you say that we should not rehabilitate the ancient road, give us a new blueprint for a new road. This is what I had to say. Thank you."

Comment from Mr. Sum Map: [*OrigK*] "First of all, I would like to extend my support to what Professor Azedine Beschaouch has just mentioned concerning the plan to repair and possibly widen a section of the small circuit road and the entire length of the grand circuit road. I also agree with Mr. Lablaude when he questioned the reasons behind the plan to enlarge the road in the Angkor complex when the main gate can fit only one car at a time. I would like to draw attention to what Her Excellency the Minister of Culture has just mentioned.

First, it has been almost 20 years since this road was upgraded. Throughout this period we have regularly done repairs on it. Nevertheless, the quality of this road has outlived its lifespan already. It is currently in rather poor condition. When it was built it was six-metres wide, but the actual width has been gradually narrowed by soil erosion to be less than six metres now. Secondly, damage that has occurred to the road has been quite substantial, making it more and more difficult to travel on and thus requiring urgent repair.

Another reason for the road expansion is the increase in tourist numbers and the traffic that it generates. Based on the current trend, the road is projected to get even busier with the movement of people and vehicles. Each year we have many accidents that are caused in large part by the poor conditions of the road, and those cases seem to be on the rise. The road is filled with potholes; its surface is wavy and can easily cause accidents, no matter how cautious a driver may be. In this regard, the Minister also pointed out the lack of comfort that visitors have complained about during their tour of the temples.

When it comes to the landscape, Angkor Park is unique in its own right. In other countries, you will find a designated location for parking vehicles and visitors would disembark to tour monuments by foot. But in the Angkor Park it is impossible to tour all the monuments by foot and it requires vehicles to take visitors from one monument to the next. Consequently, it requires a convenient road network to serve the traffic of visitors. Therefore, the rehabilitation of this road is an utmost necessity; otherwise we will not be able to meet the current and future needs of visitors. Perhaps, the presentation on this topic was not as clear as it should have been, but let me elaborate on it a little further.

First, the existing road is an asphalt road and six meters wide. Along the road there are laterite sections of seven to ten meters in width, which are wide enough already. So, the rehabilitation or expansion work will be dictated by the increase in the traffic of cars, tuk-tuks and bicycles on the road and through the park. As we can see, presently the six-metre wide road makes it difficult to accommodate two cars travelling in opposite direc-

tions. But there we have tuk-tuks and bicycles using it too. The road is getting more and more crowded. What is now planned from Angkor Wat to Bayon is a six-metre wide asphalt road with shoulders on both sides (1.5 metre wide each) for bicycles. This is the rehabilitation plan that we have, which takes into account the imperative of safety for visitors coming to Angkor. When fully implemented, this plan should be able to put to rest criticism from local and international visitors on the condition of infrastructure in our World Heritage site.

Earlier, the presentation touched upon the impact this rehabilitation plan might have on trees along the road. When we say we are going to widen the road it seems that many trees will be affected. We have carefully looked into this and there are about ten big trees that will be concerned. The rest are small ones, the size of an arm or a leg. As Professor Lablaude has pointed out, these are the types of trees that can re-grow easily.

These arguments that we are now giving represent the necessities in response to the questions from Ms. Anne Lemaistre. Going forward, we, acting on the recommendation from the *ad hoc* experts, will prepare a complete project plan to submit to all *ad hoc* experts for review and comment before the next ICC meeting in November or December. In it, we will provide specifics about the scope of the impact that it, the plan, will have on the trees along the road. We can also give details of tree species their size in the report as well. We will make a presentation on this. I would also like to concur with Professor Beschaouch in correcting the title of the presentation title. Thank you."

Comment from the Co-chairman for Japan: [*OrigE*] "Thank you very much. Please, you have the floor."

Comment from Mr. Jean-Marie Furt: "I just would like to comment on the matter at hand. One needs to establish a distinction for the case of the road: the access needs to be secured and so should the shoulders, and of course when the road is in bad condition there is no need to ask further questions and simply proceed to repair the damage caused by weathering or nature.

There is a difference between securing the road and maintaining or widening it. One can say that it will be enlarged because traffic increases with the number of tourists. This is one perspective of the strategic vision. This relates to the typical opposition between conservation and development. To add to the discussion, I would say that this strategy can be understood but that it remains a one-sided stance. There will come a time when one would have to think that tourists will wander everywhere and do as they please. I always say that tourists should be given some freedom, but that there must be capacity in place to regulate tourism flow and to say at a given time, maybe without being too strict, that tourists must follow this itinerary and respect things; to respect some itineraries and time.

In the increase of tourists scenario, one must think that there is a need for better knowledge of what they are going to do and based on this we will be able to maybe regulate the flow and circuits and consequently to not worry about any possibility of road widening. To be clear, strict and practical; using an example, tour operators come every morning from 8 until 10 a.m. Based on this, the data can be included in the traffic flow and knowledge of the clientele and when organising new circuits. I believe that organising circuits can be conceived not simply by studying the client flow, as people do not always visit all the time, at the same time and moment. I of course understand that some may at a given time criticise some sites as they are not very well marketed and that multiple answers need to be found."

Comment from Mr. Kim Sedara: [*OrigE*] "Thank you Excellency Co-chair. I would like to say a few words about the eco-cultural site of Phnom Kulen in comparison with managing the sites of Preah Vihear and Koh Ker. Of course, it is a nightmare to manage and keep the sustainable development of the forest area of Phnom Kulen. It is very similar to Preah Vihear and Koh Ker. Right now we have an existing mechanism by setting inter-ministerial

committees that work on this.

On site we are facing three challenges: land mines, deforestation and land encroachment. As far as land encroachment is concerned, it is really difficult. The best way is to have full co-operation between local authorities and the committee and concerned ministries. For example, in Preah Vihear, I am not saying that we have had 100 per cent success in managing this, but we have great commitment from the local authority and mainly the province, which co-operates. Secondly, we have to educate local communities about the value of the site; otherwise it is really a big challenge to stop these activities. Thirdly, we have to stop land speculators. It is a big problem not only in Kulen or Siem Reap, but also in Preah Vihear and Koh Ker, and to stop that we need real co-operation from local authorities at the commune, district and provincial levels, in collaboration with the technical agencies. Thank you."

Comment from the Co-chairman for Japan: [*OrigE*] "Thank you very much. Madame, I give you the floor."

Comment from Ms. Francine d'Orgeval: "Thank you for giving me the floor. Let me share with you a thought. I would like to concur, deepen and rebound on what Mr. Furt and previous speakers have said with regard to the issue of accessing the site and widening roads.

There are about six million visitors flocking to Angkor and one can imagine what types of new infrastructure would be needed and what would be their impact if they became twelve millions. Once a thorough study is done, one realises that there is a bottleneck and that this has a negative impact on the site. In that case everything should be stopped and the complete organisation revised with regard to flow and visitation times accorded to each visitor, depending on the different temples. I deem this prospective thinking valuable, rather than to simply enlarge a road depending on the increase in tourists but rather to conceive a long-term vision. Thank you."

Comment from the Co-chairman for Japan: [*OrigE*] "Thank you very much. Are there any other comments? I see none. I suggest taking a very short break before we begin the *ad hoc* report."

Intervention from Ms. Phoeurng Sackona: "I am sorry to barge in Co-chair, but I do not understand the decision mechanism. Should we wait a little bit to review the dossier of the road of the circuits and that at Kulen? A Khmer proverb says that 'Fire is somewhere far from water'. We will wait until a decision is taken on undertaking the work or not and when there are alternative decisions we will study their urgent implementation."

Comment from the Co-chairman for Japan: [*OrigE*] "We will not decide upon this immediately, as we have just listened to the presentation and we will ask for consultation with the authorities concerned."

Comment from Mr. Mounir Bouchenaki: [*OrigE*] "Mr Co-chair, may I? I think all these discussions, should lead, if you agree, to a following decision by the ICC. First, the ICC acknowledges the legitimate request by the Cambodian authorities concerning in particular these projects of resurfacing, maintenance and enlargement of access roads to the site of Angkor. Second, the ICC acknowledges the urgency of repairing some of these roads, which are in bad condition. Urgent reparations should be carried out as a first step now before waiting for the second step, which will be the presentation to the Secretariat of the ICC and the experts in order to have a thorough analysis of the situation, as said by Ms. d'Orgeval and Lemaistre and Messrs. Furt, Lablaude and Beschaouch. I believe everybody is aware, as is the Director General, of the importance of access and road maintenance and of the vision for the future. If you put it as one of the major points on the agenda for December, both sets of experts will study, go on site and make proposals for future implementation."

Comment from the Co-chairman for Japan: [*OrigE*] "Of course, the Secretariat will take the necessary steps to make sure that this point is treated in December. The Co-chairs agree. I now propose a very short break and to come back in ten minutes."

V- REPORT FROM THE *AD HOC* GROUP OF EXPERTS

Comment from the Co-chairman for Japan: [*OrigE*] "Let's start from the report from the *ad hoc* group of experts in conservation. I think that the draft recommendations have been handed out around the room, so that may help understand the recommendations. Professor Hidaka, please, you have the floor."

V.1 Report from the *ad hoc* group of experts for conservation, by Professors Mounir Bouchenaki, Pierre-André Labalude and Kenichiro Hidaka

Mr. Kenichiro HIDAKA:

[*OrigE*] "Excellencies,
Ladies and Gentlemen,

[*slide*] I am going to report on five sites. That first is *Prasat* Ak Yum. Location: behind the southern embankment of the West Baray, near its southwest corner. The site is in ruins, covered with vegetation and buried under the back slope of the Baray; in several places we see piles of bricks barely showing the remains of the central pyramid and surrounding structures.

[*slide*] The site has a great historical importance as one of the oldest mountain-temples in the Angkor area and the largest at the time it was built, and was discovered by Georges Trouvé in 1932. Research has been conducted and there is rich documentation and a history of excavation. Recent excavations were carried out in 2001, 2012 and 2016 by the EFEO, following those made by Trouvé. The site extends to an area of 100 x 100 metres. At the centre, the sanctuary with a tower was composed of three platforms forming a pyramid.

[*slide*] The picture on the left shows the top part of the pyramid structure. Here you have the stairs of the south platform and on the right is the rest of the pyramid composed of bricks. The importance of the site is not only the historical evidence and long history of research.

[*slide*] A site in ruins but a symbol of research transfer from foreign experts to Cambodian people: compared with the situation seen in 58 sketches and 135 photos (largely done from 1932 to 35), the decay and destruction of today is sadly very serious. Very urgent and quick intervention should be made. Thus, the research conducted by the EFEO is now being transferred to Cambodian experts, who are preparing the restoration project of this important site. A comprehensive project involving multidisciplinary experts of the APSARA National Authority in co-operation with EFEO may be set up. We *ad hoc* experts appreciate very much this transfer of technology and expertise.

[*slide*] Recommendations: 1) The exceptional historical importance of this large complex should be stressed in parallel with the tourist management for the approach from the

east. 2) Human resources and inevitable budget should be assigned by the APSARA National Authority to promote the long term conservation of this monument, now in danger, very serious danger that is. 3) The conservation project should be submitted to the next ICC.

[*slide*] The next temple was Banteay Kdey, the northwest corner of the enclosure. The enclosure was destroyed at the corner facing diagonally to Ta Prohm. Intervention: urgent intervention was needed and is being carried out to protect the area; the method and technique of the operation are proper. One comment: it is advisable to submit the project to the ICC prior to its implementation to assess its relevance, even though the scale and amount of intervention is very small.

[*slide*] On the left you see the platform on which the enclosure will be rebuilt. To the right, we are checking the mortar put in previous reinforcement operations. [*slide*] Recommendations: 1) The north-west corner of the enclosure wall of the temple should be closed, paying attention to the visual balance with the slightly wavy course of the existing part. 2) Old cement mortar joints on the two vertical rows in the northernmost end of the western part of the enclosure should be removed - this we can see on the picture to the right. 3) The watercourse just outside the enclosure should be improved in order to secure the efficient water flow. 4) The partial destruction of the enclosure wall is seen in many places; the risk map should be made to prioritize the intervention.

[*slide*] The next site is *Prasat* Ta Oun: It is located 800 metres form the northwest corner of Angkor Thom's moat. The monument is barely standing, with partial collapse and serious cracks; the eastern gate of the encircling wall has completely collapsed. Yesterday, we had the presentation referring to the eastern pavilion. Architectural Feature: a massive cruciform tower with longer eastern arm as antechamber.

On these pictures: left are the supports of the lintel and pediment, but we think this propping is not sufficient. On the right, serious cracks and displacement of the façade of the main body. To the left is the almost destroyed eastern pavilion and to the right the western gate, also showing a remarkable outward tilt.

The recommendations: [*slide*] 1) Approving the project shown to us on the site, we recommend the partial dismantling and reassembling of the eastern antechamber of the temple. During this process, particular attention should be paid to the condition of the basement, which shows uneven subsidence. 2) Displacements and cracks observed in other walls to the west and to the south should be adjusted by cramps and tie-rods. 3) Temporary propping/shoring at the eastern doorway of the antechamber as well as the interior of the temple should be strengthened to secure the safety of the work, especially the eastern doorway, where the support is very weak. 4) The western entrance gate, showing a threatening inclination, should be urgently propped. This is the picture on the right. 5) Many blocks scattered around the building should be inventoried and anastylosis should be advanced. 6) Visitor routes should be defined with the approach from the north to pass the eastern entrance gate, now in a ruined condition. Signage of the site should be set. 7) Anastylosis should properly be advanced on the eastern gate/pavilion as the main access to the temple.

[*slide*] The Western Mebon: It is a very big site and we appreciate the corresponding effort of the French team, including archaeological research and structural engineering, both nicely combined on the site. Archaeological research: Importance of archaeological research in this exceptional site was stressed in the ICC of June, 2012, when Mr. Royère was directing the site. The excavation by EFEO staff has brought the trace of wooden supports for the passage connecting the central monument to the eastern side. Later, the actual platform was constructed in place of this weak passage.

Structural consolidation of the dikes: the sandstone steps of the dike have been reconstructed with the backfill of the corresponding strata of soil, consolidated by geo-textile and geo-grid. The combination of these modern materials is very effective and in past rec-

ommendations we appreciated this technical solution. On the eastern side, the concrete base for the upper structure (anastylosis and partial reconstruction to be set) are being laid.

This is the central area, with a unique combination of pit and square wells. On the right you see the materials used.

The recommendations: [*slide*] Recognizing the urgent necessity of large amounts of sand to be refilled on the back of the embankments, the *ad hoc* experts recommend that the APSARA National Authority should provide appropriate transportation means passing through the Baray to the Mebon. It is a very soft surface and a great deal of sand must be transported on it.

[*slide*] My last site is Preah Pithu, where the KOCHEF team works. The issue is not heritage but the environment. Surging threats towards heritage: vendor stalls and small restaurants are contaminating the land with their scattered garbage and oil for generators. What are the solutions Education? Regulation? Relocation of the vendors? What is necessary? We have yet to reach a conclusion.

[*slide*] The comprehensive restoration project is nicely conceived, with preliminary surveys for conservation; archaeological research; architectural/structural research; site management and especially capacity building, which is a very important element. [*slide*] This is Temple T, for which a MoU will be signed very soon.

[*slide*] The recommendations: 1) The project of conservation methods including partial dismantling and reassembly should be submitted as quickly as possible to enable the *ad hoc* experts to assess its minimum necessity. In fact, two days ago we received this detailed plan regarding the terrace in front of Temple T. I could not include this fact in the recommendations. But the overall detailed plan is still necessary. 2) While appreciating the steady progress of the preparatory work, we, *ad hoc* experts, should make an intermediate verification visit to the site well before the next ICC as the schedule of KOCHEF shows rapid development of the work towards the end of this year.

3) We repeat recommendation 11.1 of January 24, 2017. We recommend the urgent and absolute necessity that a land use project to the west of the temple complex be made in association with APSARA National Authority. The ever-extending shops, their increasing garbage, and a big diesel generator are all negative threats to this exceptional temple complex site. Urgent and appropriate measures should be taken. 4) On a larger scale, a broader land use plan should be made to preserve the area of the Royal Court area. Any intervention should be deliberately checked and discussed by the ICC before its implementation.

Thank you very much for your attention."

Mr. Pierre-André Lablaude:

"I will expound on three dossiers; a project and work site on Angkor Wat and one on Banteay Srei.

[*slide*] The Sophia University and APSARA National Authority restoration project of the west part of the north face of the Angkor Wat causeway dike was visited, followed by an extensive meeting with the representatives of the APSARA National Authority, the site manager and the team of engineers overseeing the technical support.

[*slide*] The engineers have studied several technical options to buttress the facade wall based on the principle of consolidating without any dismantlement, as recommended on several occasions by the *ad hoc* group of experts, including at the time Professor Croci. As

you know, the wall presents in several places different parts that either date from the original construction or from later reconstructions, probably dating from the 16th century, therefore old, and that memory and traces should be preserved as they are part of the history of the monument.

[*slide*] Once the engineers analysed the pros and cons of the different technical options, they suggested selecting a solution that plans for the construction at the back of the façade wall, here on the left, of an L-shaped reinforced concrete structure adhering to the wall by anchoring stainless steel bars sealed within the ancient masonry, based on a principle of efficiency and long term sustainability that seems obvious.

This principle perfectly respects the article of the 1964 Venice Charter that provides for, and I quote: 'Where traditional techniques prove inadequate, the consolidation of a monument can be achieved by the use of any modern technique for conservation and construction, the efficacy of which has been shown by scientific data and proved by experience.'

[*slide*] Two additional test-pits were dug inside the causeway dike and once again presented coarse backfill made up of gravel and rocks that are more or less unstable.

Moreover, pumping in the cofferdam protecting from water the lower courses of the humidity-damaged wall have highlighted some issues with the water tightness of the cofferdam that may have been aggravated by more seepages forming from the south face of the causeway dike. The water in some areas runs off across the causeway dike and the cofferdam has problems keeping the water out when the level of water in the moat is 'normal', as this level is way higher than what it was during previous works carried out on the western part of the dyke. In any case, there is the need to lower efficiently the level of water inside the cofferdam in order to be able to carry out the works.

The *ad hoc* group of experts, based on these facts, has recommended the following points for this particularly sensitive and complicated work site: 1) Improve the water tightness of the current cofferdam with a thick outside wrap, such as an unbroken plastic sheet, seamless or with sealed joints, enabling it to perform fully and efficiently its intended role.

2) With His Excellency Dr. Hang Peou, look into the possibility of lowering the water level of the moats to some extent during the rainy season to help make the cofferdam more efficient.

3) Difficulties are encountered due to the probable contact of the inner fill with water and from risks caused by its instability. Therefore, look into the eventual feasibility of using the inner supporting structure of reinforced concrete; however, not working in the bottom of the trench but rather prefabricating the components above ground, one at a time, then setting them in place using a crane.

Prefabrication of the individual components in this way could speed up the work and allow for a better fitting with the major wall deformations found in the ancient wall. And it could have the advantage being reversible, which would not be the case if cast in the trench.

4) Consolidate the inner unstable fill with injections, both in-depth and superficial, using an appropriately composed liquid mortar, to improve the stability of the structures during the work phase and to achieve greater final compactness and water tightness inside the causeway-dike. For this operation, give preference to materials that do not generate soluble salts.

5) Compliance with the structural consistency embodied in the general principle of providing inner reinforcement using modern materials, without dismantling the façade wall, as described earlier and validated, does not, however, rule out making adjustments here

and there in using them: 5.1) Either by one-off dismantling work, strictly limited to sections of the façade wall that are excessively deformed; 5.2) or, wherever apparently feasible, stable, efficient and durable, placement of an inner lining of the façade wall with new masonry work of traditional style, but always without dismantling the ancient façade wall, which is to be kept intact.

6) In any case, the detailed implementation plan should be submitted to the *ad hoc* expert group's opinion in due time and before the beginning of the work.

[*slide*] The second site, still at Angkor Wat, concerns the two north and south ponds flanking the west inner access causeway to the temple. Visitors take many 'traditional' pictures of these two ponds in front of the temple reflected on the water's surface, with lotus flowers or take selfies with the Angkor Wat towers in the background. A postcard image or glossy tourist brochure; this is the picture that visitors hope to bring back from Angkor Wat.

In order to preserve the photogenic reflection of the two ponds that cannot keep any large amount of water due to the high level of silting, they are on a regular basis filled up artificially with pumped water so that the tourists can still take pictures, especially during the dry season when the water table is low.

[*slide*] The picture-taking exercise can be treacherous, with people using selfie-sticks and climbing on the unstable in ruins of the old sandstone kerbing of the ponds and also to the west of these kerbings, where soil is strongly eroded, as shown in this picture, as the grass has disappeared which makes the presentation of this area unpleasant.

Soil trod on by visitors explains the erosion and it has reached the grass areas of the temple forecourt. [*slide*] It is also rendered worse by the existence of a grid network of artificial walkways designed some years ago. The latter do not follow any natural ambulation of the visitors and are hardly used by them. The mix between these walkways and the natural foot traffic of visitors (here that yellow triangle patch where the best views are found of the temple's reflection) gives to the entire area a confusing and rather unsatisfying presentation.

By the way, we would like to recall that these alleyways were designed without any prior presentations to the ICC or any validation and that several previous recommendations taken by both *ad hoc* groups of experts have already been made on this subject.

[*slide*] Based on this evidence, the *ad hoc* group of experts recommends the following to the APSARA National Authority: 1) Dredge out both basins to their original depth to allow the groundwater table to naturally maintain the desired level, even during the dry season. It should be kept in mind that although archaeological investigations done a few years ago on the south basin did not reveal any significant archaeological potential, a similar survey is required of the north basin.

2) It is to be expected that the dredging operation will expose the laterite steps surrounding the basins. It is assumed they were originally topped with a limestone lip or coping. The condition of these structures must be diagnosed, then a programme developed to consolidate and restore them.

3) To this end, by the next ICC session, with the support of the *ad hoc* group of experts, have the initial surveying and dredging work done to enable a better analysis of the nature, layout and condition of the infrastructure currently under the ground and/or water.

4) If restoring the steps is not sufficient to support visitors and photographers who stand to the west of the basins, provide ground reinforcement immediately to the west of them in the form of a laterite chip pathway able to withstand the localized foot traffic.

5) As for the grass-covered areas within the first enclosure of Angkor Wat (and this repeats earlier recommendations), the current orthogonal network of gravel-covered walkways must be removed altogether so that a naturally built up network of walkways can be restored. Based on actual observation, such an approach would make for a visually more effective way of marking off the grass-covered areas from the walkways.

6) In order to restore and maintain the grass cover over this area as a whole in line with the new layout, and as suggested by APSARA, put in a comprehensive watering system including: a pumping station in the moats, possibly a backup reservoir put in inconspicuously in the treed area to the north, permanent HDPE piping, hydrants to be distributed over the site where watering is needed, and able to be hooked up to moveable, flexible overhead pipes so that sprinklers or drip irrigation devices can be connected.

7) To minimize the archaeological impact from putting in such permanent networks (HDPE pipes), make use of the old drainage culverts put in on the north side by the Angkor Conservation Office (that require repairing in many places to restore their original function of storm water runoff).

On the south side, however, most of the permanent surface networks should be placed within wooded areas; underground installation along with the requisite archaeological surveying should be limited to just the places where they cross walkways and spaces with no tree cover.

For the latter, give priority to putting in the underground networks in line with the ancient 'canals' of the inner urban fabric as revealed by the LIDAR images and/or work follow the current gravel-covered walkways to be removed, going no deeper than their foundation layer.

In addition to the foregoing, the group of experts has the following two recommendations:

8) Provide more details on the agenda that APSARA seems to be looking into at this time to replace or restore a number of balustrade supports along the temple's inside western access causeway. A number of such supports have reportedly already been made, but based on a model not in keeping with the original model.

9) The building that was formerly used to showcase Italy's last project to the south at the monastery entrance has fallen into disuse, so APSARA is invited to consider what would be best: demolish it, or, if it can be put to another use, redo the roof using a traditional material in keeping with the heritage nature of the site. The foregoing applies to any similar type of building put up for temporary use during work campaigns on any of the monument sites of Angkor

[*slide*] Ms. Boatto presented the last item on Angkor Wat yesterday. I am sure that you all remember the project initiated many years ago by the APSARA National Authority and WMF to reset the ornamented wooden ceiling in the Churning of the Sea of Milk Gallery in Angkor Wat, based on the model of an original fragment from the temple and presently stored at the Guimet Museum in Paris.

The carving of the test panel of the décor previously presented at several stages of the work to the *ad hoc* group of experts and to the ICC is now finalized and we propose to validate it.

Its presentation that we studied on site with the ceiling mock-up is a good replica of the connecting beams' structure of different widths, as is the spontanaity and flexibility of the carved decor and the natural ageing of the weathered material that was rendered here

by artificial sandblasting. In this last picture you can see the last fragments of the ceiling set on site.

It also gives a perfect decorative and coloured harmony between the carved wooden décor of the new ceiling and the carved décor of the stone of the monument bas-reliefs and with the other architectural members of the Gallery. Based on the last site vist, the *ad hoc* group of experts has formulated the following recommendations prior to the forthcoming launch of the execution of the whole ceiling:

[*slide*] 1) The width of the gallery varies due to earlier deformations of the structure, so a very precise survey must be made of the ledges to identify perfectly the location and scope of the deformations.

2) Using this survey, adjust as required by a number of centimetres the size of the gridded floral décor frame in relation to the minimum width measured from ledge to ledge and complete the decor with the addition of a decorative strip of non-prominent relief at both ends of each beam using a pattern taken from the carved lintels of the gallery. The strip will be inconspicuous where the gallery width is narrow but visible where the spread is widest.

3) For the top of the ceiling, in sections where it cannot be seen: 3.1) Prevent any warping of the ceiling beams by firming them up using perpendicular wooden cross pieces; 3.2) Look into the advisability of applying a preventive insecticide treatment to all wood-work; 3.3) Look into ways of providing a measure of ventilation in the empty space above the ceiling, while providing a closure preventing bats from entering the interior space – the objective is not to turn the area above the ceilings into a bat nest; 3.4) For maintenance purposes, put in a couple of hatches to allow access to the space above the ceiling, inconspicuously fitted on the underside of the carved decor frame.

4) Age the carved decor artificially by sandblasting. It currently has a very pleasing colour. Preference should be given to putting in the overall ceiling apparatus after the sanding operation, then simply allowing the colour of the wood to evolve according to the natural hygrometry of the site for a year or so and see if it would be advisable to apply any corrective patina to it to achieve the final colouration.

5) Draw up for prompt submission an implementation plan for the project as a whole.

[*slide*] The last item is Banteay Srei. The *ad hoc* group of experts has regularly monitored the progress of restoration and development works at Bantey Srei. During our last visit, the group noticed the implementation of previous recommendations by the APSARA National Authority and the conclusion of the stabilisation work for the second Gopura as well as significant progress of the reassembly of the south-west corner of the temple's enclosure wall.

During the visit, the recurring question of the lapidarium was discussed as was upgrading some facilities to host, control and improve the visit of the monumental site.

[*slide*] Based on this the experts recommends the following:

1) Now that the recent structural work has been completed on the second Gopura, close the axis gate connected with it. That will ensure the protection and conservation of the priceless historical inscriptions found on its column (or columns). The visitor itinerary must therefore be redirected through the north gate of the Gopura.

2) The south-west corner of the enclosure is slated for reconstruction. Its moulded coping of laterite is to be restored, using as many old coping stones as possible from the

nearby stone storage lot. Missing stones are to be filled in using new laterite blocks made in a style and motif identical to the ancient model.

[*slide*] 3) A quick look at the various stones found in the storage lot, currently out in the open air and not given any protection, highlights three categories of artefacts:

3.1) Laterite blocks, all of which could be easily reused for monument restoration (assorted blocks and moulded coping components). A general principle applies here: Materials from a given monument should, wherever possible, be put back on that monument. Therefore, there is no reason for them to be kept in a stone storage plot.

3.2) Decorative carved sandstone pieces of large size (pediments in particular, some of which really belong in a museum). Among these, it is recommended that two or three of the most impressive be selected and put on display in the site's intake centre gallery as an introduction to the site visit. The others are to be conserved and put on public display in a covered shelter near the temple itinerary exit point.

3.3) Smaller decorative carved sandstone elements that could be a temptation for thieves: Although there are relatively few such artefacts, they must be kept in a safe place. Three options are up for consideration by APSARA as to how to handle them :3.3.1) Put them in a small on-site depot (see below); 3.3.2) Put them in storage unit at the Angkor Conservation Office, in an area to be cleared out or built for this purpose; 3.3.3) Put them in a storage unit at the APSARA headquarters at Roluos. It is suggested that this be a centralized stone storage unit in an already existing building- this is a problem often encountered in archaeological sites. Do we centralise the artefacts found or store them near the excavations?

A specialist should be assigned to make a detailed inventory of the corpus of architectural artefacts (checking it against the inventory made previously). Such a task is fundamental upstream for the knowledge and analysis of that corpus, and likewise for determining the surface area and features of the sheltering and storage units needed to house the various artefacts.

4) Regarding a new ticket booth required as needs evolve, the *ad hoc* group of experts recommends putting the building up immediately to the left of the current entrance to the visitor intake gallery. A small stone storage unit could also be worked in, a possibility mentioned earlier (if it is eventually decided to set such a unit up on the site). In terms of architecture and to have it fit nicely into the context, the new building of modest size must be made in the likeness of the materials, proportions and colours of the adjacent buildings already built.

[*slide*] 5) The experts agree with the new fence and sequencing gate recently put in the visitor intake gallery which guides exiting visitors towards the commercial zone. They also recommend that an identical fence be put in just off of the small building housing the existing ticket booth (including an access gate for vehicles carrying VIP visitors and a sequencing gate for regular tourists). The small building can be converted into a space for the pass and ticket control staff.

[*slide*] 6) Stele models of two different sizes have been proposed for the Angkor monument sign system. The experts recommend that a third mid-size model be included. The choice to be made will be determined by the size and significance of the individual monument.

The sign system must include both: 6.1. The official, commonly used UNESCO/World Heritage logo and 6.2. The APSARA logo.

Thank you."

Mr. Mounir Bouchenaki:

[*slide*] I take over from my two colleagues, Professors Hidaka and Pierre-André Lablaude, to continue the presentation of the sites where, all together and including experts in sustainable development, we inspected a few interesting sites concerning conservation and development of the site.

[*slide*]I start with the Angkor Wat roundabout. In previous visits, the *ad hoc* group of experts analysed with the relevant staff in charge of the APSARA National Authority the traffic flow (buses, private cars, tuk tuks and motorcycles) arriving at Angkor Wat. The group noticed the potential bottlenecks and accidents at the crossroads of the road coming from Siem Reap and that from the temple of Bat Chum, Banteay Kdei and Srah Srang.

The point to improve there is a small strip that is here on the picture and that is not off the axis of the road coming from Siem Reap and leading to Angkor Wat. We discussed it with our colleagues who are more used to dealing with traffic issues. To prevent cars and other vehicles coming from the bank of Angkor Wat and that sometimes do not respect the roundabout it was asked to improve the signage. The implementation of that recommendation needs some readjustment.

The recommendations: It is recommended that the concrete strip put in on the southern segment of the traffic circle be made symmetrical. And a suitable sign must be put up indicating very clearly the traffic flow direction, indicating the direction to follow. Now is the low season so there is not much traffic so we did not notice so many violations of the traffic law, but our colleagues from the APSARA National Authority said that this was happening often.

In order to more effectively highlight the historical landscape of Angkor Wat, attention is again drawn to the need to relocate the large official information board, moving it from the access road to the point where the forest is entered when coming out from the city

[*slide*] We move on to a site that we have visited many times in the past with our ASI colleagues. Yesterday, you heard the deputy director, our friend Professor Sharma, who thoroughly presented the progress of the project on Ta Prohm, which is a flagship of the Angkor complex. We focused on the more recent works carried out by Mr. Sood and his team.

A technical visit was organised and joined by APSARA staff in the area of the temple where a shallow dig was undertaken in the alley located below the south wall of the Hall of Dancers. This was the subject of a long discussion yesterday and I will not dwell on it. I will just inform the Committee and the two Co-chairs and Her Excellency the Chairperson that these are members that fell from the pediment of the door of the Hall of Dancers and that once the relevant documentation and analysis of each member is done it will be easy to set it back using anaystilosis.

[*slide*] A laterite paver was also unearthed at a depth of 40 to 50 centimetres below ground which you can see in this picture. We had long exchanges with our Indian colleagues to find out whether complete clearing was needed to recover the level of the ground below that present. It was decided to replicate what was done on previously restored walkways by simply leaving a small window to exhibit the fact that there existed a laterite paver prior to the level of construction of this façade of the Hall of Dancers. This is the solution agreed on for this area that was discovered and it will be presented to the public.

[*slide*] We also discussed stone conservation with our Indian colleagues. Following the discussion on site, a seminar was organised by the APSARA National Authority on stone conservation. This is a common issue shared on many work sites and we were able to analyse the issues with stone pathologies of laterite and sandstone. At Ta Prohm, experts carry out treatment on the pathology of the stone using products to mend the blocks and prevent further alterations. This topic will continue to be discussed and I suggested sending to the our APSARA National Authority colleagues and the different teams the proceedings of an international symposium that we organised at UNESCO on the conservation of stone and that could provide for bibliography and additional references. I also mentioned that ICCROM offers an international training on the conservation of the stone and that Cambodian colleagues and others can join this course organised with the Universities of Venice and Rome and including a famous expert, Professor Lazzarini.

This is a very important topic. We are aware that in terms of conservation, methodologies and products evolve, and we want to make sure with our colleagues that the most relevant methods are used for the most sustainable conservation of the Angkor monuments.

[*slide*] Moreover, it is also recommended to clear the passageway between the south wall of the Hall of Dancers and the enclosing wall, taking into account and documenting the substrate of this zone. The architectural fragments from collapses are to be inventoried and conserved for possible restoration work. The zone should be covered over again without changing the visitor itinerary or putting in a 'window' that would expose a component of the laterite floor. This is a theoretical and practical topic. This structure was entirely collapsed. It was suggested to restore part of it and to leave the other as was found. This was to show not only how the monument was when the project was started, as a historical witness, and also to leave the possibility for future restorers to discuss and decide whether this was the right idea.

This is in line with the spirit of what is found in different ICOMOS charters as well as in the Naga Declaration and other documents. The philosophy is to preserve the traces of what our ancestors did, but when there is decay to show what was decayed. I will talk about this later and will present what has been done in Palmyra at the temple of Bel and Baalshamin. There are two theories. The reconstruction: the blocks exist and anastylosis of the document will be performed. The other theory is to partly rebuild to present the monument as it was and to leave another part collapsed in order to preserve historical traces of the monument.

This is what was presented by Professor Sharma yesterday about this temple which I repeat is of the highest value. I will recall the choice of preserving and restoring part of the Hall of Dancers and leaving the collapsed part of the Hall both for documentary reasons and as a way of recalling the condition in which it was found prior to intervention operations by the expert Indian team and likewise to enable future generations of archaeologists and conservators to consider another approach.

[*slide*] We then visited the Baphuon temple with our colleagues of the APSARA National Authority in charge of maintenance and Ms. Beaufeïst. This restoration project has already been presented many times at the ICC. An issue on water runoff and potential hazards was flagged to the experts. These are pictures that we took to show that there are visible water seepages although it was a rainless day. We noticed these along the walls of the Baphuon and with the help of our colleagues Dr Hang Peou, Ly Vanna and Ms. Beaufeïst we have looked into finding the plans of the water runoff outlets and to start cleaning them to prevent water accumulation. All of you as experts know how indispensable a regular maintenance and repair plan of the monument is.

[*slide*] The group of experts has requested that a maintenance plan be put in place, not just for the Baphuon, but also for all temples in which rainwater drainage devices and manholes require regular inspection and servicing visits during the dry season. The temple

terraces also require regular plant removal. Any new plant growth between stone blocks must be quickly removed - we saw at the Baphuon that plants create cracks in the structure. An overall operation focusing on rainwater drainage in the temples and on their perimeter areas must be planned and implemented before the next rainy season.

[*slide*] We visited the Bayon with the team of Professor Nakagawa and Cambodian colleagues that together work on studying and restoring the Bayon, another flagship temple that is found in all tourist brochures and books, for which professor Nakagawa has conceived a very important study. We already held several seminars and meetings to present the work of the Japanese experts and of their Cambodian colleagues. This was done over the past years and dealt with several parts of the temple. More particularly, the work presented the ongoing works and the studies on towers 55, 57 and 59, on the bas-reliefs and carved members.

The work is remarkable and makes up for highly valuable documentary references that can be used for those who would like to carry out studies, theses or research on the documentation. This could be the case for students from the Royal University of Fine Arts; they would be able to conduct analysis and studies, for example, by cross referencing the documentation drawn up by the EFEO over the past 70 years and today's documentation that uses state of the art technologies like fluorescence X, georadar and others. All of these have facilitated thorough analyses of the structure of the temple, towers and bases of the monuments of Angkor and in the case of the Bayon.

What we also noted is that this documentation will allow for the continuation of the consolidation and restoration work on the two towers respecting the philosophy based on the major ICOMOS texts and others such as the Angkor Charter. This work has entailed minimal dismantling and the use of as few as possible new stones for anastylosis.

During the visit, the team of *ad hoc* experts and the APSARA National Authority staff in charge were able to realise the attraction this monument represents to the public. Our Japanese colleagues showed us some areas of potential hazard for visitors and the threat represented by the decayed condition of towers notably showing signs of near collapse that could be disastrous for visitor safety.

The discussion also underlined the difficulties in restoring bas-reliefs on very fine decors, as is the case in other countries. With Professor Beschaouch and the UNESCO team, we are looking into organising a special session on ancient patinae and whether to treat them or not, the impact it has on the previously restored walls and the type of protective film that could be used. Pierre-André Lablaude also mentioned this. I have been asked to stop, but I still have points to present.

These are the towers and the ongoing work. The plans showed us the will to belt the main tower as it presents structural issues.

[*slide*] The recommendations: After reviewing the state of conservation of the towers most diligently studied by the JASA team, the *ad hoc* group of experts recommends that a consolidation and restoration project for those towers be implemented. Structural analysis and detailed surveys confirm they need urgent attention.

That is particularly true of the central tower. The Japanese team plans a system of straps at three different levels. That operation requires the prompt approval of APSARA so that it can get under way.

Finally, to choose an appropriate material for the protection of the bas-reliefs now cleaned off and rid of the blackish patina that covered them, along with monitoring the said material, the group of experts recommends that APSARA work with JASA to hold a scientific workshop during the 2018 calendar year. It would bring together experts with experience in that field. The purpose would be to assess the impact of the procedures currently being

applied in other parts of the world and their potential application to the bas-reliefs found on the Angkor monuments.

We held a workshop on the conservation of the stone at the APSARA National Authority premises on the 16th of June, 2017. The group of experts expresses its satisfaction with the quality of training made available to junior Cambodian conservators and restorers, from both the theory angle as well as on APSARA work sites and the various restoration work sites conducted by experienced international teams — something we appreciated. We noted how restorers Ly Vanna or Ros are absolutely qualified to present methodology, the issues at stake and the relevant solution for stone conservation.

[*slide*] The *ad hoc* group of experts recommends that the initiative led by APSARA be continued, that all the teams working at Angkor be involved, with a view to studying the various aspects relating to both the doctrine and practice of material conservation, more particularly stone, wood and metal. This is a picture of the workshop organised by the APSARA National Authority on its premises.

[*slide*] The last site was also presented yesterday by our colleague from China and is Ta Keo. Yesterday, we heard the presentation and after each visit to that temple we have been able to see how the Chinese team proceeds on this temple of high historical and architectural value. The problems are similar to those in these pictures, with deformations of structures, notably at the corners, and the solutions are yet to be found. I remember that with Professor Croci and our Chinese colleagues we mentioned on several occasions the types of materials and techniques used. We requested our Chinese colleagues to monitor the stone members already set on the corners of the temple and to suggest potential solutions to consolidate the gates of the temple towers.

[*slide*] Another problem already mentioned for a few years does not only deal with the structure but also the temple's décor, with, on the north side, some scientific analyses presented by Professor Marie-Françoise André from the University of Clermont-Ferrand on the state of the carved decors. You may remember this. We recommended to our Chinese colleagues to review the documentation accumulated and compiled by Ms. André, who did an excellent job on the analyses of the climate during the hot and cold seasons and of the water seepages on these decors of unique quality and how one can proceed to their treatment and conservation.

[*slide*] These are the issues on that temple and what we discussed. The group of experts recommends that the finishing operation be done on the recent limestone block additions to the monument's facings. As I have often repeated, and as we always say in our discussions with our colleagues of the APSARA National Authority and of the international teams, is to insist on the fact that our work is not only technical and of anastylosis. We also work on the aesthetic of the monument, which means that the whole aspect of the monument must be taken into account.

The experts further point out that all restoration projects involving Ta Keo Temple must be submitted to the experts for advisement prior to being carried out, via the ICC secretariat. I believe that this dialogue has been very useful on all the projects we have monitored over the years.

As for restoration of the sculptured decors and in light of the stone conservation workshop just held, the group of experts feels that it is extremely important to do upstream technical studies and analyses of products as to their suitability for the type of sandstone found on the Ta Keo

I am sorry for having taken so long, but we are passionate. I am saying this because I have experience of many other sites and safeguarding campaigns with UNESCO. I would like to say this in front of the Minister and chairperson of the APSARA National Authority.

What is being done in Cambodia cannot be compared with any other UNESCO sites. The work is of great quality, with hundreds of people implicated. One has the feeling that this is almost the World Heritage Committee, and Anne Lemaistre will not contradict me on this. When we attended the World Heritage Committee with Azedine Beschaouch as young archaeologists in Carthage, the co-ordination and co-operation work between the different teams (French, English, Polish, Italian, German and American) was done during one meeting per year. It was like a small ICC. We convened once a year, listened to the different teams, collated the documentation and sent it to a clearing house that put together all the technical documentation on Carthage. Later on, Mr. Beschaouch will present how important a site like Carthage was as an example of an international archaeological campaign.

I would like to insist now on the importance of co-ordination and information. There was simultaneous co-ordination when all the teams gathered in the presence of the late Deputy Prime Minister His Excellency, Sok An. I will say here something, which is not to please you, but because it is the truth and Anne Lemaistre, who has worked with me in Paris, can confirm it to you. In most meetings, the authorities attend the opening speech and leave and let the experts discuss. Here, the two countries that launched this process in 1993 in Tokyo and the national authorities responsible for all the projects stay for the two days of the conference. I can tell you that this is something rare, and I am familiar with this, to have the highest administrative and technical authorities attending for two days for a project as important as Angkor.

Thank you very much."

V.2 Discussion of new recommendations for conservation, research and archaeology

Comment from the co-chairman for Japan: [*OrigE*] "Now we move to the general discussion on the report and recommendations of the *ad hoc* group for conservation. I open the floor and as we expect another presentation from the group of experts on sustainable development, please be as short as possible if you have any remarks. The floor is yours."

Comment from Mr. Ly Vanna: [*OrigK*] "Please allow me to spend two to three minutes to elaborate for you some information concerning the restoration work on Angkor Wat causeway, which is a joint project between the Apsara National Authority and Sophia University of Japan. First, I wish to recall that during the ICC meeting a couple of days ago, a team from the Archaeology Department of the APSARA National Authority was engaged in a lively discussion with a group of Sophia University's professors at Treang village. Present during the discussion were *ad hoc* experts Mr. Pierre-André Lablaude, Mr. Mounir Bouchenaki, and Professor Kenichiro Hidaka, who also took part in it.

The discussion was robust, which I was very pleased with, especially the fact that opportunity was given to Cambodian experts from the Conservation Department to share their experiences as well as to learn from our foreign partners. It was a very fruitful interaction and a new experience for us, to consider in raising equal value for the knowledge and expertise that both national and international experts can contribute to our work. This is an extremely important point for us moving forward, and I believe that this causeway restoration project is the first step in that direction.

But I would like to urge that the *ad hoc* experts and Sophia University's professors allow the Apsara National Authority, which is represented by the Department of Conservation of Monuments in Angkor Park, to explore other alternatives to concrete mixture to be applied in the restoration of the causeway. By raising this proposal I do not mean to reject what we had discussed together during the past few days at all. What we had discussed is just one option. But I would like to ask that a little more time to be given to the team from the Conservation Department to work with Sophia University's team or with other experts,

including Cambodians from other institutions such as the Ministry of Culture, and come with two or three more possible options to be presented at the next ICC meeting or to be submitted in the form of documentation to the ICC secretariat prior to the next ICC in December.

Why do we need more options? I totally agree with what Mr. Pierre-André Lablaude just mentioned concerning the 1964 Venice Charter's Article 10. This article states that – and let me summarize: 'where the traditional approach cannot ensure the safety of an ancient monument, new techniques will be required.' Therefore, I would like to emphasize the application of new techniques – this could mean a concrete or metal wall. Now once again, I would like to request that the meeting – the ICC, the Secretariat, the experts, and the Apsara National Authority – give our experts, local and international, a chance to explore other alternatives to propose to all of us and then we will discuss which one would be the most effective in helping preserve the authenticity of our monument.

I would like to stress once again that I am not at all, personally or as a team member, dismissing the proposal put forth by the *ad hoc* experts and our partners to use concrete walls as a restoration approach. Thank you."

Comment from the co-chairman for Japan: [*OrigE*] "Thank you very much. Please take the floor."

Comment from Mr.Takeshi Nakagawa: [*OrigE*] "I have highly appreciated the recommendations of the *ad hoc* experts that urgent restoration and treatment is to be taken into consideration and especially for the safety of tourists. I have an opinion for our project and as Dr Ly Vanna mentioned about the Angkor project for the restoration of the Western causeway of Angkor Wat. I have great respect for the traditional method of construction but for the reconstruction of the damaged laterite, if they use the L-shaped concrete structure of reinforcement, this method will not respect their restoration principals.

I think the laterite rock should be set back after reinforcement. If they are not strong enough to support stress, the blocks should be changed with newer ones. The most important part of this project is how to prepare the correspondence between the former restorations and the new one. It is possible that there would be further deterioration based on an evaluation of previous restoration work on the east half. I hope to request to propose new method. Thank you very much."

Comment from Mr. Pierre-André Lablaude: This is a very interesting discussion on the notion of authenticity. The group considered, when it was asked to look into this project two years ago, that one of the authentic components of the monument was to uphold its structures, the fact that these structures still exist throughout the centuries and their different reparation and reconstruction stages. To dismantle these structures, to reassemble them, would be attacking their authenticity. This is the first notion of authenticity. Then comes the question of the authenticity of the techniques, traditional or not. When you visit a physician, do you ask him only for traditional medicine and not want to have surgery or take tablets? The restorer, the architect, the conservator restorer, must have different tools available in their tool box; some are old, using traditional techniques, others modern. As would a good physician when choosing the right medicine, the good restorer is also one that chooses the right tools to treat the issue at hand.

I find this opposition between traditional and modern techniques a caricature. For example: the east part of the north facade of the causeway dike previously restored by Sophia University. On this worksite, cranes were used; that is not traditional. The wall was entirely dismantled and this was possible thanks to the concrete slab laid by George Marchal before and after the Second World War. People say it is a restoration using traditional methods, but it is all laid over a concrete slab. We should not be grotesque.

As for the causeway dike, I believe that Professor Ishizawa and his team would be

better placed to answer. Yesterday we saw that the two ends are still authentic from the original construction and I believe they can be consolidated using traditional practices. Traditional medicine has the capacity to stabilise these ends. The central part to the contrary, with the instability of the backfills and the presence of water at the bottom, would require a more modern solution using contemporaneous techniques that would be more adapted to spans B1, 2 and 3 conservation work.

I did not choose to use concrete; the team in charge of the implementation did. There are several factions within the APSARA National Authority. Mr. Ros Borath attended the meeting and as an architect he advocated the use of concrete for better sustainability when others proposed different solutions. The discussion was open and this opposition between traditional and modern techniques exists also within the APSARA National Authority.

I think that if there is a disagreement between the Sophia University and some managers of the APSARA National Authority on which technique to choose, it is not our role to arbitrate differences of opinion. The team put forth a solution that we judged as fitting. The discussion lasted two hours. It can be questioned, but I would like to emphasize that the site is already two years behind schedule. It can still be delayed for another year for a new discussion. I do not have a problem with this. The Cambodian authorities have the last word and they and their Japanese partner need to assess the impact."

Comment from the co-chairman for Japan: [*OrigE*] "Please, Mr Ros Borath."

Comment from Mr. Ros Borath: "Thank you Co-chair. I rebound on the present discussion. I believe there has been major work done with a technical, philosophical and methodological exchange to solve an issue that seems easy, that of the causeway dike. It is actually more complicated. First, it needs to be a solution that meets the robustness and sustainability of the internal structural while keeping the present state of the ancient heritage. The presented method was discussed, as said Mr. Lablaude. We all discussed, presented and assessed all potential solutions.

This project has been well assessed and studied. This means that the expected outcomes are to restore the causeway in its several stages and conditions. Excavations have been conducted to support the solution that was imagined. We studied the pros and cons before choosing, and I said choosing, the concrete components that were presented, explaining that the solidity of this very fragile wall on the inside was the issue and that the reversible construction of a concealed concrete wall was one solution. Do not think that it is anything big and the wall can be placed where there is a problem. It is not to be built everywhere. You could not disturb the wall and leave the authenticity, but it needs to be consolidated, the damaged stone replaced and strengthened. This will be done step by step. We also noted one more thing. Once this project has been completed and the authenticity restored, the quality of the soil is also questionable and we will be able to leave the archaeological and historical traces to future generations.

I do not think it is an intellectual or unreflected choice. We worked hard towards this proposal. The APSARA National Authority and Sophia University assessed this and intellectually this solution seems honest, feasible and fits with the schedule. It can be implemented as you saw, whilst being reversible if needed.

Thank you."

Comment from Ms. Phoeurng Sackona: "I would like to add something. We are now dealing with the recommendations. The choice has been made. All the work done is not going to be questioned. If the APSARA National Authority and the Sophia University agree, as I did not attend the meetings but I guess that the several years of discussions have led to this technical solution, it is just not taken after one meeting. As the experts said, it is arbitration and not siding with one or the other party. What has been selected is the best solution to preserve the authenticity of the structure whilst consolidating it.

Maybe Mr. Ly Vanna's observation can be kept in mind for the next stage. I am not versed in the ins and outs of the discussion inside the APSARA National Authority; it was not made public. I would not like to question work that has been thought out for a few years, knowing there is also a schedule to be respected. One team of the APSARA National Authority has led the discussion with the experts. I do not wish to delay this project, so maybe the discussion can be adjourned to the next project."

Comment from Mr. Sum Map: [*OrigK*] "I just would like to say a few more words about technical aspects. I have followed closely the work to rehabilitate the wall, and its technical aspects have gone through many discussions already. His Execellency Ros Borath has just touched on this, that the Apsara National Authority has given consent to the plan for rehabilitation, so has the team from Sophia University. The *ad hoc* experts also did not object to the method to be applied in this plan either. Like Her Excellency the Minister just said, we have almost reached the end, so why revisit everything? We just want to reiterate that we will fully comply with the recommendations of the *ad hoc* experts as we go forward. Thank you."

Comment from the co-chairman for Japan: [*OrigE*] "Thank you very much. On this question, we propose that maybe the parties concerned discuss further without impacting the time already taken so that they can find a compromise and progress further whilst taking into account the input and advice of the experts. Thank you. One more intervention."

Comment from Mr. Sum Map: [*OrigE*] "With your permission, I would like to invite my colleague Dr Heng Kim Leng to make some remarks with regard to the recommendation provided on the roundabout."

Comment from Mr. Heng Kim Leng: [*OrigK*] "Regarding the mini-roundabout, we have thought of how to build it in a way that is proportionate with the existing road, and we have no plan to widen that section of the road either. We have done a computer simulation to see how the size of the mini-roundabout can accommodate big vehicles such as a 45-seat bus, how easy or difficult it will be able to make a turn at that spot. According to our simulation, the inner circle of the roundabout cannot be enlarged any further. The triangular traffic sign is a standard one, so it should remain as is now and cannot be enlarged, otherwise it will interfere with the curve to affect the turn of big buses and subsequently traffic jam at that point. Thank you."

Comment from Mr. Mounir Bouchenaki: [*OrigE*] "Co-chairman. I think we are totally in agreement. We are not proposing to enlarge the roundabout and not proposing the enlargement of the triangle, just the little strip which must be aligned to the street coming from Siem Reap. Basically it is not in the centre. It is not a question of enlargement of any central reservations. Thank you."

Comment from the co-chairman for Japan: [*OrigE*] "Thank you very much. Can we move to another presentation by the expert group on sustainable development?"

V.3 Report from the *ad hoc* group of experts for sustainable development, by Professors Bernard Hubert, Jean-Marie Furt and Shinji Tsukawaki

Mr. Bernard Hubert:

"Excellency Minister and Chairperson of the APSARA National Authority,
Director General,
Distinguished Co-chairs,
Excellencies,

Ladies and Gentlemen,

[*slide*] I will start the presentation of the three sustainable development experts followed by Shinji, and Jean-Marie will conclude. We will stick to the frame that we have respected, which is not to formulate the recommendations but simply report on our visit. The recommendations that we will touch upon will be read out by Professor Beschaouch later on this afternoon, as has been the case in the past.

[*slide*] You are already familiar with this map showing the five sites that we visited in the days leading to this session. We visited first Phnom Kulen, Srah Srang to check on local handicrafts and followed the meander of the Siem Reap River with Professor Beschaouch and took stock on Kbal Spean, which we quickly visited on our way from Kulen and the conclusion will be on the Tourism Management Plan.

[*slide*] We had a technical meeting last Sunday, held at the Environmental Station. The issue at Phnom Kulen is the National Park and the implementation of the Management Plan. The meeting was held at the ranger station in Preang Thom and discussed the first draft of the UNDP-designed project that is being reviewed by the relevant departments of the Ministry of the Environment and the government. By the way, the experts were disappointed by the absence of representatives of the provincial or national authorities, contrary to what had been previously informed.

[*slide*] Dr Nguon, here in this picture, was one of the consultants outsourced by UNDP to draw up the first draft of the Management Plan and presented in English and Khmer to the delegation, with Park rangers and the Director of the Park attending. He recalled the working methodology with working group meetings held from January onwards. They had been announced at the last ICC, in January of 2017, and commenced three days after the session was held. There were also field visits, consultation with local partners and exchanges on the successive drafts.

This quality presentation confirmed the relevance of the document drafted by the consultancy team and unfolds in four strategic axes: That first sees to the protection and conservation of natural and cultural resources; second, to engage the local communities in undertaken activities and generated benefits; third is to build the capacity of the relevant institutions and their collaboration and, finally, to secure financing for the implementation of the Management Plan of the National Park.

[*slide*] The document is founded on thorough knowledge of the local cultural and natural resources and on the overall situation. With regard to natural resources, it refers to the biodiversity report of the Park made in 2013 by a consortium of organisations under the aegis of ISAC. The first strategic axis suggests a zoning with four zones (core, conservation, community, sustainable) based on the Law of The Environment of the Kingdom of Cambodia and tailored to the local situation. The four zones are here on the map. The core zone is fully protected, with most of it on the area of Kulen and another area located to the northwest where there are no human settlements. A conservation area represented in orange is traditional for protection and use. The last zone is a multiple use area in grey along the road and farming areas and also areas for the communities represented in those circles marking the five villages that have been now acknowledged as legal settlements.

This zoning proposal seems very relevant, as long as (this is not clear yet), the areas are precisely delineated, which needs to be done during the implementation phase of the Management Plan.

[*slide*] The schedule of the preparation of the document respected the calendar and respected the procedure announced by Mr. Seng Soth, representative of the Ministry of the Environment at the last ICC session in January of 2017. As was confirmed to us, the next stage should be the presentation of the Master Plan validated by the Ministry based on this draft.

The *ad hoc* experts express their satisfaction that things are heading in the right direction as was observed in the conclusion of last January's report: 'The three points that must govern the Master Plan of the National Park (conservation of the sites, protection of nature and development of communities) can lay the foundations for an ambitious and integrated project based on the convergence of skills and knowledge of all the organisations taking part in and supported by the ICC'.

[*slide*] They use this momentum, as we noticed when exchanging on the technical characteristics, to set out recommendations, notably on the determination of activities that could be authorised in the different areas. Presently, eco-tourism is allowed in the core zone, which we do not deem reasonable. This area should only be for fully authorised administrative and scientific activities. In case there are tourism activity areas of significance then, as a last resort, they should be removed from the core zones and classified as conservation areas. There are safeguards in this zone and allowing activities in the core zones would open Pandora's box.

An additional issue on the conservation areas concerns the fact that the locals could collect timber or firewood. We would rather restrict this to deadwood or wood cut in regenerative stages to allow for thinning and thus not to foster any forest exploitation within the conservation zone. [*slide*] Another item is that five villages have been given legal status by the Ministry of the Environment and there are other ancient villages that have not been referenced and this should be done. There are also other, more recent, villages that should be relocated, but among the four or five villages that are not present on this map, a field check should be done to make sure that some of them are not old settlements. This should be possible by asking, and examining archives and ancient maps.

[*slide*] The last recommendation is on fund raising. The Management Plan is set for five years and half of the financing is earmarked for reforestation. Due to the forest conditions and the weather, we believe that spontaneous regeneration should be the selected method. It is true that reforestation is a more spectacular, recent occurrence with the planting of 50,000 trees, but regeneration is more adapted to the terrain and also the monitoring of young forested plants that will compete with shrubs and herbaceous plants will be more expensive and the success rate probably be less than with spontaneous regeneration. Recommendations are included on this point.

Another satisfaction is the CPA and APA, which already existed on this map and that have been integrated in the conservation area. The work must continue and build up on previously started activities.

[*slide*] One more thing to highlight is that when you leave the Park on its west aspect, we noticed along the road recent settlements that were not there in January, with slash and burn practiced before planting and the development of gardens and the skeleton of a house. These plots of land were managed by the forestry administration and have been under the purview of the Ministry of the Environment for a few months. It seems that people have abused a legal loophole. This picture shows you one settlement, but if you take an aerial picture you can see this repeated in many locations along the road and even further.

I now come back to the discussion held today on the road. I listened this morning to the road project that would use today's route to enlarge it and would exit that way. A road can be an important feature, especially for the development of alternative activities to cashew nut plantations that encroach on the forest and grow to the detriment of forested areas. A road can facilitate access to a market and trade for local products but a road is also what I showed earlier. It leaves the door open to things that can be dangerous, as it can be profitable for transporting products to a local market. This should be borne in mind at the road route design stage. We were not briefed about this nor shown anything so beware when you open spaces whilst doing the opposite and trying to limit and protect them for their own good.

I conclude this part of my presentation on Kulen. Measures would be needed not only to stop these small vegetation clearances that are only one or two months old and especially forbid them: The people that do this need to be told clearly that they will not be able to settle. I showed you their approach; first a zinc roof is built, followed by a garden and a family and it will be harder to take action.

This was for Kulen. Overall, we think we are heading in the right direction. The Ministry of the Environment fulfilled its promises and we should put the matter back on the table in December, hoping that our recommendations will be heeded.

We have asked in the past years to monitor the New Zealand project on communities and we were taken to a workshop where four families produce handicrafts and sell them to middlemen. We visited the village and talked to liaison officers of the APSARA National Authority from the Department of Habitat; we met many other craftsmen with better equipment including lathes and tools. This picture shows you one but we saw four or five in the same situation. We would like to take stock of this community development project supported by New Zealand that we deemed as dynamic, close to the locals and applying participative methods conducive to endogenous development.

The project has extended from nine villages in its first phase to 16 and we would like to see more villages in December. We do not need to see the 16 and not only Srah Srang because it is always the same area that we visit. This activity is in line within the future potential sales of handicrafts at the Angkor *parvis* (intake plaza) with stalls showcasing the local artisans' production and we could think about a handicraft itinerary and prioritise local handicrafts. You know that we are concerned with tourism activities around Angkor that could beneficiate as much as possible the local population. I hand over the floor to my colleague Shinji, who will present on the visit to the river inside the city of Siem Reap."

Mr. Shinji Tsukawaki:

[*OrigE*] "I will explain our visit to the Siem Reap River and to Kbal Spean. [*diapo*] Everybody understands that the Siem Reap River is a central component of the water environment of Siem Reap province and the Angkor World Heritage site.

On the basis of our recommendation on the importance of the river, in 2012 we visited the river during our site visit programme. At the time the provincial governance started maintenance work of the river. We revisited the sites along the river. We easily could observe and recognize six problems. I will explain and show you what they are quickly, one by one from upstream until downstream.

[*diapo*] Maybe you all know that ten years ago many shacks were located along the riverside of Siem Reap, nearby the Angkor Conservation office. The government relocated the people living there and they are now located in the upper reaches of the River in areas outside the heritage site. You could see many small houses and there was uncontrolled dumping of rubbish and the water was used as a sewage system. Also, from the viewpoint of river management, they could become a kind of barrier to floods and Dr Hang Peou explained that there were more than 200 houses in this area.

[*diapo*] A great amount of rubbish is observed at a net set below a bridge of the river nearby the Angkor Conservancy. This rubbish mostly originates from the illegally constructed houses in the upper reaches. The provincial government collects the rubbish regularly but cannot catch all of it as there is too much. This is the second point that we observed.

[*diapo*] In this area there is a local market and a great amount of wastewater with rubbish flows into the river nearby a bridge of the middle reaches. The water comes chiefly

from residential quarters and markets on the west of the river.

Also in 2014, I visited some areas here on the east of the river where the APSARA and the provincial government and some private properties set up a drainage system. But in the west I never saw a wastewater system or treatment plant on the way. You do not need more explanation; the water looks dirty and smelly.

[*diapo*] The Old Market located to the west of the middle reaches of the river is one of the core tourism components in Siem Reap. The riverside around the market has been very beautifully maintained since 2011. There are two stylish bridges crossing the river. This is a view in the daytime.

[*slide*] However, a large number of street food and drink stalls occupy narrow streets around the market in the evening and tuk tuks and motorbikes wait there for customers. Here, an aerial view of the area and last evening. This activity causes heavy traffic congestion every evening, even in the quiet season. Only two days ago I was preparing these slides in my room at my hotel located by the Old Market and I was able to observe a big traffic accident where a man was injured and it took forever for the emergency services to reach the scene. That is another problem I recognized: Emergency vehicles cannot arrive in cases of fire and accidents.

[*slide*] The next point is riverbank protection. The provincial government carried out maintenance works of the riverbanks in the lower reaches of the river in 2011, I believe. The area around the Old Market was beautifully treated but in some parts they have been left under a tentative protection using gabions. They are not permanent systems and they have to take much care to replace the rocks inside of these metal wires. It does not look that beautiful. We would like to continue these walls downstream.

[*slide*] This is another example, with the ring road crossing west to east to the south of Siem Reap. There is a bridge and the maintenance work stopped here. You can see clearly the difference between upstream and downstream across the bridge. Water flows smoothly upstream but cannot after. This means that at times of flood this area could be a big barrier for water. The provincial government has started to remove houses and people in this area. Of course, it is the rainy season now so please take care of this area too.

[*slide*] This is the conclusion of our visit of the Siem Reap River. The Siem Reap River is obviously a main component of the water environment of Siem Reap Province and the Angkor World Heritage site. In order to create an ideal water environment along the river, the government should continue maintenance works of the river to solve the aforementioned issues. Further, collaborative works between the provincial government, which takes charge in the lower reaches, and the APSARA National Authority, which is responsible for the upper reaches of the river respectively is considerable in the improvement and maintenance of the entire watershed of the river.

[*slide*] Now, the Kbal Spean zip line. I will be quick as we heard the detailed explanation this morning. You all know about it and we visited the site. We passed the car park, the landing point and the launch point. The height of the launch point is 197 metres and the landing point, near the car park, is at an altitude of 97 metres. This is the view at 70 metres height that tourists and hikers could enjoy.

[*slide*] It is an attraction; we will not recommend but not stop this proposal. With regard to the actual operation of this activity, every possible care must be taken to hold off destruction of the rocks and damage to the forest. Any modification of them should be presented to the ICC and approved accordingly. We heard a detailed presentation this morning but in case of any modifications, let us know. The closest attention should be given to sudden weather changes, strong winds and heavy rainfalls in particular. It is always raining and windy so it could be dangerous.

[*slide*] Please keep the zip line invisible to hikers and tourists. They would be surprised when they see people flying over the dense forests.

Thank you very much."

Mr. Jean Marie Furt:

"I will conclude the report of the experts in sustainable development and talk about the TMP team projects.

On Friday the 17th of June, the *ad hoc* experts in sustainable development visited the Phnom Bakheng car park, accompanied by Ms. Oum Marady from the APSARA National Authority and Mr. Nou Niran from the UNESCO office. We talked about the follow-up on recommendations and after a meeting was organised and several projects presented. I will briefly mention the recommendation follow-up part to dwell more on the projects.

[*slide*] We went to Phnom Bakheng and first looked into the protection of the statues of the causeway dike of Angkor Thom's south gate, where the TMP team asked us at the last ICC session how they could protect with a light infrastructure the statues so that visitors do not climb on them to take pictures and also simply to avoid any incidents for tourists. The advocated solution (small metallic posts of about 30 centimetres in height standing right by the causeway's side and cordoned together with a thin wire) is being installed.

[*slide*] The second point was on the car park development at Phnom Bakheng that should ease traffic flow and secure access to the temple and deal with disorderly, if not dangerous parking practices — let us be frank. Once again, several suggestions were made, notably to park large buses by redeveloping the existing car park, here on the picture, annexing the western area or annexing and clearing the northern area. For that last area, trees needed to be uprooted. As the last two solutions are not relevant, notably cutting down trees, the experts asked the TMP team to start by assessing the need in terms of numbers (especially for large buses, but exact numbers are not available) and depending on the need to first look into redeveloping the area as is.

[*slide*] The last point is on lighting the ascent to the Bakheng hill. Nothing has been decided and the TMP team is looking into the best option (technique, aesthetic, savings) between a solar or traditional buried electric installation. The project is still at the drafting stage.

[*slide*] Among other projects, the replanting of the area of the causeway along Angkor Wat closed to the public. It is not a large-scale operation that creates any specific problems although the *ad hoc* experts in conservation should be consulted prior. What we regret, as previously said, is that this type of operation is part of a multitude of projects that the TMP team has to deal with and which hinder their reflection to find a more global vision that we have asked them to research.

[*slide*] The second project is more interesting; it presents the methodology to better understand the clientele. [*slide*] On several occasions we have insisted on the necessity for the TMP team to work on a crosscutting approach and suggest structuring actions for the long-term. Among these actions is to get knowledge of visitor experiences rather than the clientele. It is a key point that allows validating a strategy that will enable, for example, the design of itineraries or organisation so that stress on the temples would be reduced and would increase the quality of the visit. We deem these aspects to be very important, if not crucial. As there is no online ticketing available, the method should be simple and repeated regularly.

Thanks to the support of Ms. Justine Muzy, a trainee studying for a Master's degree in tourism, they have devised a methodology with observation over one month repeated every two or three months with the aim of gleaning sufficient data that can be used by all. This methodology is two-fold.

That first requires assessing the visitation peaks, to the left of the picture. This will also allow for better understanding of the carrying capacity. There is still some ground to cover but this initial approach could turn out to be interesting. The assessment will concern three main temples: the Bayon, Angkor Wat and Ta Prohm. The outcomes should able to regulate and redirect some traffic flows.

The methodology includes starting by taking pictures of visitors at exact times and places at the Bayon, Angkor Wat and Ta Prohm (inside and outside the temples). They will take one picture per hour. The pictures will be processed but not archived. They will be analysed then destroyed. The second part is to count on a regular basis at different entrances in order to know the number of people that enter and exit the temples. This scheme mainly relies on the quantity and requires extreme regularity and exactness.

The second part is to understand the behaviour and experience of the visitors (still in the same temples). Once again, to be as accurate as possible there is a dual mechanism. The visitors are tailed so that their itinerary inside the temple is known, where they stop to rest and how long they observe places and etc. I recall some of the points presented by the TMP team yesterday. The selection of tailed visitors is done randomly. This operation will last three weeks (one week per temple). The data is entered into a simplified table so that a mapping of the visit can be drawn (the itinerary, where they go, stop and etc.) — this is very interesting.

A questionnaire with 14 closed questions is also part of the study. I will not mention all of them; they ask about the organisation of the visit (direction, use of a guide or not, services used, times spent inside the temples, mode of transportation, type of ticket bought and etc.). I reiterate that this is not a precise knowledge of the clientele but to know what it does. This compiles the experience of the visitors and level of satisfaction and feedback. For example, have they previously visited the temples, when, how and etc?

This research will start in July, although some part on the methodology needs refinement. This should be finalised quickly. It is a very interesting research that we had requested for a while and that the APSARA National Authority can use for many purposes, as can the private sector. This type of work should be encouraged once the July test runs smoothly. The implementation of this type of research is to be highly supported.

As a conclusion, we can say this is a cost efficient but time consuming investment that requires exactness for each of the teams in charge. The teams of the department of Tourism and of the TMP responsible for this research were briefly trained. This type of activity takes its full meaning if it is continued. It is a repetitive activity. The teams have already set a calendar but we know that in order to obtain results the research needs to be thorough, comprehensive and exact as well as analysed, as the data must not be shelved.

The second point that we consider very interesting is underlined in red: once the analyses are completed, actions will be needed or at least a discussion, as once again, the data must be exploited or the research will be useless. Finally, to come back to this morning's discussion on the circuit road, this type of research should be extended to contribute to a forward-looking vision of visitor flow.

The number of visitors may increase at a given time, if not double, and this is where the first part of the research comes into play. There is a need to know what type of visitors come. Do they have a precise objective during their visit and what can we bring to them? I often say that tourists should not be given too much freedom. Travellers need to be partly let free but for the safeguarding of heritage or of the locals they must be controlled and

guided, which means that briefly at given locations, the visitors cannot enter some areas at some times of the day."

V.4 Discussion on new recommendations for Sustainable Development

Comment from the Co-chairman for Japan: [*OrigE*] "Thank you very much. The floor is now open for discussions on the report of the experts on sustainable development. Please, Mr. Hidaka."

Comment from Mr Kenichiro Hidaka: [*OrigE*] "With regard to the recommendation on the sustainable development river recommendation, I would like to add that we should say preservation of the cultural value and landscape and to add one phrase in the last part. May I read: 'Paying particular attention to the value of the cultural landscape and historical context of the river'. If my colleagues of the sustainable development group agree."

Comment from the Co-chairman for Japan: "In principle, the regulation stipulates that the report of the *ad hoc* group is made by them, so it is up to the group on sustainable development to integrate your observation or not."

Comment from Mr Kenichiro Hidaka: [*OrigE*] "I will speak with them then. Ok, thanks."

Comment from the Co-chairman for Japan: [*OrigE*] "Any other observations? Yes, please."

Comment from Mr. Adam Starr: [*OrigE*] "Good afternoon, ladies and gentlemen, my name is Adam Starr: I am with UNDP. I am the project manager for the environmental reform project working directly with the Ministry of the Environment. With regard to the presentation and the work done by Mr Peahkdey, I have been in contact with him for the last 15 minutes here. I just would like to say that we are ready to continue to work with the Minister of the Environment, providing assistance with regard to the zoning and mapping.

I do not want to speak on behalf of the Minister of the Environment; I believe Mr. Seng Soth is here and may have more to add. We are working with the department of GIS. In fact, next week we are performing a training session with the GIS department on the nation decision support systems. Potentially, that training could be used towards improving the mapping. That was prepared in the original draft. This is all I want to say. If anyone has any questions about the project and how UNDP is supporting it, my colleague and myself are here to answer your question."

Comment from the Co-chairman for Japan: [*OrigE*] "Thank you very much for your comment and availability."

Comment from Mr. Ros Borath: "Thank you Co-chair. Thank you to Dr. Shinji for his analysis and comments on the Siem Reap River. According to me, it is a vital element in the landscape. It is structured, although part of it is manmade. What I mean by that is that from Kulen to Tonle Sap, the first sequence is environmental, then heritage, followed by urban and rural sequences respectively. Based on this I believe that the analysis on the river was correct, as it is ill.

I would like to insist and share my feeling on its value when it flows through the urban sequence. You know that 20 years ago, buildings in the modest town of Siem Reap were of good quality and on large plots of land, then the urban and economic development turned the construction into unbridle developments. No land use plans exist, nothing that could uphold the quality of the small town of Siem Reap.

I am in the mind that this urban sequence could be the basis to understanding the relationship between the existing town and water. How should it be done? By studying and

evaluating proposed developments and restructuring this sequence that flows through the town to save not only the river but also Siem Reap town. I believe the relationship is very important and the only element that could revive the urban and architectural quality of the town is the river. I think that this river needs to be saved. Thank you."

Comment from the Co-chairman for Japan: [*OrigE*] "Thank you."

Comment from an unidentified speaker: [*OrigK*] "I would like to make some intervention concerning the construction of parking area at Phnom Bakheng. The increase in the number of vehicles using the parking lot at Phnom Bakheng presents a huge challenge, as pointed out by the Tourism Department of the Apsara National Authority. In my view, perhaps the Apsara Authority might want to consider looking into the possibility of making the best use of the parking area in front of Angkor Wat. Normally, it is busier in the morning, as it is the preferred time of day for most visitors to see Angkor Wat. But in the afternoon, this parking area is less crowded with free spaces becoming available.

I think that the Apsara Authority should look into the types of transport that go to Phnom Bakheng and the feasibility of the Angkor Wat parking area to accommodate more vehicles. Supposedly, whenever necessary we can assign buses to park in front of Angkor Wat and use lighter transportation vehicles like moto taxis, tuk-tuks, or electric vehicles to take the visitors to their next destination. Or another possibility, we can assign tuk-tuks to operate in shifts and the parking at Phnom Bakheng should be used only for drop-off and pickup. This could prevent the need to enlarge the parking area at Phnom Bakheng. In this scenario, the parking space there should be reserved for access and use by emergency vehicles to assist visitors in case of emergency only. In short, the parking of all vehicle types should be shifted and relocated to the area in front of Angkor Wat instead. That is all I had to say. Thank you."

Comment from Mr Mong Vibol: "Good afternoon and I will speak in French. My name is Mong Vibol and I work for the Ministry of Land-use Planning and Land Concessions in Phnom Penh. With regard to the recommendations on sustainable development I would like to suggest some bullet points. First on land management in prohibited areas to bring transparency for all: You are aware that before communal elections villagers have built houses in prohibited areas. I hope that the APSARA National Authority or the local authorities have thought it all out so that they are transparent with the villagers.

The second point is on water management. I remember that 15 years ago, JICA had already suggested how to use drinkable water. This means tap water. In Siem Reap, most people still use wells. This is not what I would consider as drinking water. In the 1980s, after the war and the end of the Khmer Rouge genocide, water came from the tap in the house and it was drinkable; now rainwater is used. I hope that the APSARA National Authority can collaborate with in-line institutions to think out the proposal.

The third point is on the recommendation that I received earlier on fixing the roads inside the Park. I have been following the discussion since this morning and I believe that if we could avoid cutting down trees to widen the road it should be done. This morning, His Excellency Dr Sum Map said that there are not many big trees planted along the roads. Better solutions should then be found and the trees not cut down. Thank you very much.

Before concluding, let me have a word for the work carried out by the APSARA National Authority and the person whom I really highly consider my former professor of general knowledge, Ms. Chau Sun Kérya, who taught me this subject back in 2001. It would be great if you could give her a round of applause before the lunch break."

Comment from the Co-chairman for Japan: [*OrigE*] "Thank you for this point on water. The ICC will continue dealing with this in the future."

Comment from Mr. Sum Map: "Thank you Co-chair. As the question asked earlier does not

relate to the experts in sustainable development recommendation, I would like to answer this question on a personal note, as it is already late. With regard to the point on illegal constructions and drinking water: all these questions will be answered by me to the representative of the Ministry of Land Use. Thank you."

Comment from the Co-chairman for Japan: [*OrigE*] "Thank you very much. Are there any more questions? I see none. So we break for lunch and come back on time, at 2 p.m. sharp."

Comment from the Co-chairman for France: "Let us resume our session and I hope you enjoyed your lunch. The floor is to Mr. Beschaouch who will introduce the General Interest Debate."

VI- GENERAL INTEREST DEBATE ON ARCHAEOLOY AND NEW TECHNOLOGY

VI.1 Introduction by the Scientific Secretary, Professor Azedine Beschaouch

"I would immediately like to introduce this topic by sharing some of my archaeological experience. I am not the only person with such experience, as Professors Bouchenaki, Claude Jacques and other experienced academics can also recall that in the old days, when we started using aerial photography, it was a milestone.

This technology enabled archaeology to make great discoveries. After the Second World War and military campaigns a name became famous. Sir Mortimer Wheeler, using aerial photography, discovered structures buried underground, sometimes up to two metres below ground, even more. In 1963, as far as I know, more than 50 years ago, in France the Ecole pratique des hautes etudes (EEHP) initiated the first course in the interpretation of aerial photography for archaeology. I remember this, as it was my first encounter with Angkor. I only knew the name Angkor through my studies and for the first time it was shown how around Srah Srang there was an excavation organised in the area of the necropolis to the left of Banteay Kdei. The EFEO member who dug up this whole area was also the director of studies at the EEHP.

I remember his lessons on Srah Srang and that of his colleague who started the first course on the use of aerial photography in Angkor. Mounir Bouchenaki is better place than I am to talk about this, but in southern Algeria, the Roman border was found thanks to aerial photography. For people of my age, the first great technology was aerial photography. The LiDAR came 60 years later and maybe later on will you allow for this morning's presenters, Messrs Damian Evans and Tan Boun Suy, to expound on the scientific aspect of it. They talked about the operation this morning but what is the value of this method? I started with aerial photography and it makes me really happy, as 60 years ago aerial photography started serving archaeology and 60 years later LiDAR gives us similar discoveries. In less than 50 years progress has been made, a complete epistemological evolution.

Another aspect of archaeology is photography. Let us not forget that archaeology and the architecture of historical monuments went hand in hand. When I was a young archaeologist, I was taught that an archaeologist could not undertake successful excavation and understand it without an architect involved. And this is the same here, as our colleagues in the APSARA National Authority and international teams are archaeologists and architects. At the time, photography for archaeology was initially used for surveys. It was impossible to present an excavation without topographic surveys. Topography and archaeo-

logical photography are techniques that have constantly improved.

I remember that at a given time, even before I was involved with UNESCO, I went as an archaeologist to Italy for a colloquium on photogrammetry. This created great enthusiasm among archaeologists, to be able to conduct extremely accurate surveys. Later on, I was told that the use of photogrammetry helped restore to identical condition buildings that had been bombed; the historical centre of Dresden, for example, and Warsaw. This latter is a World Heritage site and thanks to up to a millimetre of accuracy of photogrammetric surveys, the restoration was possible. For people of my generation, photogrammetry is an extraordinary milestone in the history of archaeology and is one of the technical resources for archaeological research.

Step by step, advances were made. Claude Jacques is well aware of this, as when he taught Khmer epigraphy there was a colleague that was teaching how to take stereoscopic photography and how to get relief pictures with dual shooting. This technique started at the time and we marvelled at the archaeological structures found in excavations turned into 3D images. At the time, 45 years ago, it was a novelty. Today, it would make people scoff; just look at what is being done nowadays in comparison.

I will then give the floor to my colleague Mounir Bouchenaki so that he can speak about an experience he conducted to save Palmyra in Syria, one of the Mediterranean sites that was bombed and, even worse, destroyed during the terrorist occupation. He became aware of new technologies that can assist in recording data and eventually to restore sites to original condition. We have a great specialist, that Professor Pierre-André Lablaude, a UNESCO expert, knows well, who masters this new method and technology.

We will start by listening to Professor Bouchenaki on state of the art methods to record data for archaeology and especially for monuments in danger. How to record data for a structure that has unfortunately been destroyed. This method allows for safeguarding. The next presentation, if you allow us, Excellencies, Co-chairs and friends, will be that of Dr Evans and Professor Tan Boun Suy that will go beyond the simply technical and administrative presentation and use examples to show how the LiDAR was successful for many teams carrying out research.

Those in attendance, Cambodians, Australians or French, will be able to take the floor and show us how they use the LiDAR surveys. We held some time ago a very fruitful seminar during which our friend Jean-Baptiste Chevance talked about discovering this city which is one of, if not the first, capitals located on the Kulen plateau. We would like to enrich our discussion and exchange by studying all these points and understand how we moved on from the LiDAR surveys to the discovery, and how history and epigraphy, by cross-referencing data and using the best methods, bring results. We will start with the first presentation on data recording and the use of new technologies."

VI.2. Brief presentation on new technologies for the recording of archaeological data, in particular for heritage in danger (Palmyra, and etc) by Professor Mounir Bouchenaki, *ad hoc* expert of the ICC-Angkor

[*slide*] "Thank you, colleague. My friend, Azedine Beschaouch, asked me to take the floor and expound on new technologies relating to heritage and especially heritage in danger. Cambodia is a country that unfortunately went through wars and we are now in a country that thanks to the international co-operation has succeeded in taking ownership of its heritage and safeguarding it.

[*origE*] I would like to present very quickly some examples of worldwide destruction of historic centres and heritage. This started unfortunately during the Second World War, with

Warsaw in September 1939, Coventry 1940, London in 1941, Courbevoie, Dresden, and etc. There are many examples of destruction of cultural heritage. You can see how in times of war not only populations but also cultural heritage was targeted.

[*slide*] When UNESCO was created in 1945, it was declared at the time, after the horrors of the Second World War, that 'as war began in the mind of men, it is in the minds of men that the defence of peace must be constructed.' At UNESCO we have seen new kinds of hostilities erupting during the second half of the 20th century. I was at that time in charge of the division of cultural heritage and I followed the civil war and internal conflict in Lebanon, the disintegration of the former Yugoslavia, the internal conflict in Cambodia, the Afghan conflict, etc.

[*slide*] In Lebanon, this is what I saw on the 24th of May, 1991, when the peace agreement was signed and we were able to go into the city of Beirut. As you can see, the centre was entirely demolished and more particularly what was hurting us was the state of the National Museum at the time; no doors, no windows. This is the team of ourLebanese colleagues, completely shocked by what had happened to their museum. [*slide*] You can see sarcophagi, art objects, part of the Mediterranean heritage totally destroyed. After some years, reconstruction happened and the site of the Museum reopened in 1998, as you can see. [*slide*] Then came another danger for Lebanon. In 2006, I was sent there again on a mission to see how sites like this and others were put in danger by air strikes.

One of the things which was very painful for us was when the city of Dubrovnik in Croatia was bombed, and the Mostar bridge in November of 1993. [*slide*] It was a pedestrian bridge of no military or strategic value. Unfortunately, it was targeted and we went with UN bodies to see the city of Mostar in 1994 and this is the bridge after the destruction. Only a temporary military bridge remained. We started to work using all the methodologies we have been discussing in this assembly towards reconstruction of the bridge. It was completed in 2004 and listed as a World Heritage in 2005. I will not speak about Cambodia, because you all know the situation.

[*slide*] In the last 20 years a new type of destruction has emerged in Afghanistan, Syria, Mali, Yemen etc. In Afghanistan, we were confronted with the decision of the Talibans to destroy two Buddhas in the valley of Bamiyan. This is before the destruction and after, and here what the niches of the Buddha look like now. This is one of the major issues for the Afghan government these days. In September, we will have an international meeting in Tokyo on what to do with the Buddhas. Is there any way they could be rebuilt or do we leave the space as it is now for the public? I remember I had a very important meeting with President Karzai of Afghanistan and the Minister of Culture discussing what to do. You can see after 15 years and the destruction of Buddhas, the problem is still there, what is to be done about them?

[*slide*] Iraq was also, in May, 2003, subject to a mission that I took to see officials, Americans, and Iraqi conservators. Here you can see the Ambassador of Italy, who was designated by the Americans to be in charge of the culture of Iraq and to assist us to assess the condition of the Museum of Baghdad. [*slide*] These are the American troops with us and the conservators of the Iraqi Museum: The shelves were totally emptied because 15,000 objects were looted in April of 2003. This is a picture of one of the sculptures coming from a site — the only site at that time which was inscribed as a World Heritage site, Hatra. [*slide*] This is the gallery of the Museum. In addition, what we discovered at the time was the burning of the national library in Baghdad. These are pictures of the interior of the library. This is the site of Hatra.

One enormous and dramatic event, which appeared during this UNESCO mission in Iraq in 2003, was the scale of illicit excavation. [*slide*] This is one of the sites that were excavated by the German archaeological mission in Iraq and this is what it looked like when I returned in July, 2003. Unfortunately, we have seen continuous attacks on monuments. This is Samarra, a World Heritage site where monuments were attacked. In 2012, during

the World Heritage Committee meeting, UNESCO and particularly the French Ambassador in UNESCO launched an appeal for the protection of the mausoleum in the City of Timbuktu. Two days later the destruction of the mausoleum started, together with the burning of manuscripts in Timbuktu, a World Heritage site.

[*slide*] As Azedine said, I was monitoring the situation of the sites in Syria and we have seen that the great Mosque of Aleppo was also targeted during this still ongoing conflict. This is the mosque of Aleppo, a World Heritage site that has been destroyed and burnt when restoration had just finished in 2010. [*slide*] The city of Aleppo and the old city, badly damaged. You see the buildings before and after. It was a terrible situation; pictures before and after.

We were all completely shocked with the news that in May of 2015, only two years ago, the very famous site of Palmyra was occupied by the terrorist group of Daesh. Here a satellite picture. This is the use of new technology. Satellite images give us precise information: The Bel temple on the top picture before and after destruction. Of course the temple of Bal Shamir, as these people not only destroy, but also film the destruction. We have the pictures on how they destroyed cultural heritage. [*slide*] This is last year in Palmyra, with the director of antiquities of Syria, of course under the protection of the Russian Army. Here with the Director General of the State Hermitage Museum, Professor Piotrovsky from St Petersburg. We discovered the present condition of the museum of Palmyra,[*slide*] a World Heritage site.

The story of Palmyra is a tragedy. The site was re-taken and you have seen my pictures with the Director General of Antiquities in May of 2016, one year ago. In December 2016, Daesh returned to Palmyra and they destroyed what you see here, the façade and wall of the theatre of Palmyra, which was then reconquered, two months ago, by the Syrian army. You see here the archaeologists and people from the Department of Antiquities of Syria, coming and singing in the amphitheatre, happy to see their city of Palmyra liberated.

[*slide*] I now move on to new technology. During the past five years we have been working with a French architect who established a new start-up called ICONEM. His name is Yves Ubelmann and this is a picture he gave me only last week when he was in Mosul when the city was recaptured by the Iraqi army and he was able to visit the tunnels dug in the soil by Daesh. They discovered in these tunnels the basement of an Assyrian temple. Once again the wonders of technology are proven.

[*slide*] This is a picture we received recently from the Department of Antiquities of Iraq. Madame Bokova organized a big meeting in Paris with three ministers: that of Culture, Tourism, and the Minister of the Presidency of the Republic and all the officials of the Department of Antiquities of Iraq, and a plan of action was developed. [*slide*] I explained in this meeting how we are working as UNESCO in Cambodia with all our friends. They received this very well, as I know that the Minister of Culture of Iraq has developed with the colleague of Anne Lemaistre in Baghdad a plan to rehabilitate, rebuild and restore the site. As you can see, the attacks have not stopped.

[*slide*] One of the most famous museums of Tunisia, the Bardo, came under attack. People there had to hide from bullets. You can see traces of blood outside the Museum. Destruction in Hatra: Here is one of the temples of Hatra, dating from the pre-Roman period in Iraq, with sculptures intentionally destroyed and degraded by Daesh. [*slide*] This is a mosque in Mosul. This is what I think people who have re-taken the city of Mosul see. [*slide*] We can continue: destruction of a mosque in Libya, destruction of Hellenic tombs at one of the largest Greek sites in North Africa, and also prehistoric sites. I know that one colleague from Cambodia told me he is a pre-historian. Well, these are carvings in the rocks in the desert inscribed on the World Heritage list.

I am sorry to say that all these destructions and activities are taking place openly, nobody is hiding it. They are destroying. [*slide*] This is Saana, the capital of Yemen, which

has been subjected to strikes and here in the centre of the city the World Heritage site where the damaged occurred and here another incredible act of destruction, of a dam in Yemen which was subject to an important study by the German Archaeological Institute in Yemen, restored by the Germans and now destroyed by air strikes. We do not know why a dam became a target in this war. Another site in Yemen, where the walls were destroyed by air strikes. The air strike on the citadel was in May, 2015.

This is the reason Ms. Bokova has insisted that actions should be taken and prioritised by UNESCO. With the Secretary General of the UN for the first time, the Security Council took decisions about Cultural Heritage. Traditionally, the Security Council only deals with peace, security, political crises and events; for the first time last year and the year before, two resolutions from the UN addressed the protection of Cultural Heritage. This has given us some hope on how the international community can stand together. This is one resolution: 'The Security Council this morning underlined the obligations of Member States to take steps to prevent terrorist groups in Iraq and Syria from benefiting from trade in oil, antiquities and hostages, and from receiving donations'.

I move to the second part of my presentation, which is not mine; it is that of Yves Ubelmann and I will speak in French.

Yves Ubelmann is a French architect who has designed a surveying method using drones. With his drones, he has surveyed some of the aforementioned countries; Afghanistan, Syria and Iraq. There is a slight technological hitch that should be solved very soon. [*video*] He goes on site with material he set up himself and when he is back in his studio in Paris, there is a team of architects and IT experts that supports the processing of the aerial data and he designs 3D reconstitutions. [*slide*] He provided these pictures; they are not mine, he passed them on to me and asked me to show them to you.

This is a survey of secret archaeological excavations carried out in Afghanistan. He also went to Palmyra. This is a satellite picture of the temple of Bel. Yves Ubelmann went on site and using drones he surveyed the area. Here he demonstrates how to use the equipment. He can take thousands of pictures and he processed these pictures to represent in 3D sites often located in dangerous areas. This is a major archaeological site from the Buddhist era, Mes Aynak in Afghanistan, which is in danger, as there are no proper safeguarding measures in place. It is a major Buddhist site that was studied in the past by the EFEO and the Guimet Museum.

[*video*] Here the plans resulting from the photo survey. He uses a grid system and gradually all the elements are extracted from the survey. This is in Afghanistan, with a site he shot and surveyed. It is a short clip, only five minutes. These are all the areas shot. He even films inside the building, like here in Mosul, so that he can get more information on the objects and the decors. This is the survey and how they are really unique. In the past we never had the capability to do this so quickly in sites in danger and to obtain such accurate surveys and restitution.

[*slide*] I now move on to Iraq. With the UNESCO office of Baghdad he recently travelled to Nineveh, Nimrod and Khorsabad. This is how he worked protected, by the Iraqi armed forces supported by the American security forces. He explained to me that he can control the drone from quite a long distance so that he does not have to be exposed to any immediate danger. This is a picture of a ziggurat completely destroyed by Daesh in Nimrod. [*slide*] This is the survey he conducted with all the points that are transferred on plans. These are the plans and the ziggurat before and after destruction.

Once again, these are very quick presentations of this new technology using drones and the three dimensional processing of the pictures taken. [*slide*] This is the Museum that I showed you. I did not have any drones and simply took pictures of the outside of the building; with his drone he was able to take pictures from inside the Palmyra Museum. He recreated the conditions into which the objects were kept inside the Palmyra Museum.

What I was able to see in the ground he could see from a bird's eye view and recreate.

[*slide*] This the colonnaded alley with the temple of Baal. This is how he recreated it, with all stone blocks surveyed and when the restoration works have been conducted and especially for the anastylosis it will be very useful to know exactly the position that those blocks occupied when they were destroyed. [*slide*] This is an ideal reconstruction of the temple of Baal, with all the facades.

[*slide*] His work has been so successful that the French Ministry of Culture organised an exhibition in Paris at the Grand Palais in September of 2016. I am favourably talking about him because I believe that his work deserves to become famous. He asked me to tell you that he is at the ready for those who would like to know more about his technique or even learn it, as he is happy to train people in the field of picture taking and ideal restoration. These are pictures on ideal restoration. He made a proposal here for the restoration of the colonnaded avenue in Palmyra that was destroyed and based on these pictures he made this restoration. [*slide*] Other pictures he gave me, such as those of the Crac des Chevaliers Castle and others.

[*slide*] Let me finish by saying that as previously mentioned by our friend Azedine Beschaouch, archaeologists, conservators and architects have technical resources available to them and new ways of surveying and taking measured drawings that previously would have taken ages. It would have been impossible in the past to survey all the stones of the temple of Baal when it was destroyed. There are also presently resources available to make three-dimensional representations.

Thank you for having been patient and listening to me, as it is beneficial to be updated in terms of technology for the conservation of heritage. I thank you for your attention."

Comment from the Co-chairman for France: "Thank you Professor for this lively and interesting presentation, although there were some technical hitches."

Comment from Mr. Azedine Beschaouch: "Co-chairs, Ladies and Gentlemen, I would like to add that fortunately a representative of ICONEM visited Cambodia and met with Dr Chau Sun Kérya in Preah Vihear. They recently told Professor Lablaude that they are ready to come here to train at the APSARA National Authority. We will organise with His Excellency the Director General at the training centre of the APSARA National Authority for a week of this training and make sure that the junior staff from Preah Vihear National Authority, the APSARA National Authority, the Ministry of Culture and from the faculties of architecture and archaeology can attend. This technology is very important and you have seen what it is capable of. Let us hope that God will save us from any destruction, but it is better to plan in life and these surveys will enable us to keep the evil away and safeguard heritage.

Now, if you allow me, I would like to ask Dr Tan Boun Suy and Damian Evans to present and explain, based on examples, the operation of the LiDAR at Angkor and how some sites have been recreated."

VI.3. LiDAR operations in Angkor, presented by Dr Tan Boun Suy and Mr. Damian Evans

[*origE*] "Thank you Professor for allowing me this opportunity to elaborate a little on some of the presentations we made this morning. While the presentation is loading here I would like to underscore something, a point mentioned by Professor Beschaouch which is worth reiterating. It is tempting to see the LiDAR as a revolution in archaeology. I am not of that view myself and it is more a kind of evolution of particular technologies, methods

and approaches that have been developing for a century.

[*slide*] This morning in the presentation, we looked a little bit at the results of the LiDAR in the Angkor area, which enabled us to create incredibly detailed mapping in central areas. We can also see incredible advances in understanding the archaeological landscape and not only in the centre of Angkor. [*slide*] One example is the site of Beng Mealea, for instance. This view is taken from aerial photography from statellite imagery, as you can see there is not much to see there. We can make out the moat of the temple and the large reservoir in that area. Using the LiDAR we remove that vegetation and reveal very clearly within the moat of Beng Meala to the left a great pattern of residence and occupation, much the same as we find at Angkor Wat and perhaps contemporary to it. Of course, it is dramatically different from the kind of pictures that we had before.

[*slide*] To move away somewhat from Angkor and look at other areas, as was mentioned this morning. We undertook two campaigns. That first, in 2012, focused on the areas in orange on the screen and in 2015 we covered essentially every major temple site of the Angkorian, pre- and even post Angkorian periods throughout Cambodia, with a couple of rare exceptions. This was the coverage here at Angkor. One of the main things we wanted to do in this particular area was to look at the full extent of the urban area up here at Phnom Kulen. My colleague J.B. Chevance talked about it this morning.

[*slide*] Just to give you an idea of what we are finding in these locations, it is worth looking back at Angkor itself for a moment. You can see here to the east of the East Baray a collection of earthen mounds that we call mound fields. These were known partially prior to the LiDAR and discovered using aerial photography. Here the LiDAR has clearly uncovered a grid of 10 x 10 mounds on the landscape. There are no particular temples associated with this landscape structure, it is incredibly large. Something we first identified here at Angkor and thought was unique to this particular area and it turns out that it is more or less ubiquitous in the Lidar data across Angkor-era sites in Cambodia.

[*slide*] Another example of what we found at Phnom Kulen, at this famous site of the River of the Thousand Lingas. If you look at this area using traditional imagery, all you can see is forest, fields, villages, the car park where people go to see the river and is just some hundreds of meters of carved streambeds in this area. Using the LiDAR, however, we can remove the vegetation in that area and see that it is not one carved riverbed in that area but a completely engineered landscape, once again consisting of these strange, patterned mound fields which functions and purpose remain obscure to us at this point. This of course was simply not visible before because of the vegetation coverage.

[*slide*] Interestingly, also is this northern area, if we look at the area around Banteay Srei Temple, which is well known for its monumental architecture: If we look from above with conventional imagery, what we see is a temple hidden amongst some trees and a patchwork of fields and vegetation and so on. Using the laser scanning data we can completely remove those trees from the landscape and in fact see a highly structured ancient pattern on the surface of the ground that was previously hidden by the vegetation. Here, the temple surrounded by its moat, a large reservoir here dating from the Angkor period, most probably, and renovated in the 1970s.

[*slide*] Once again at Banteay Srei, we see the existence quite clearly of one of these mound fields near Banteay Srei. Unfortunately, this particular area has been cleared by a farmer and we are looking at variations of the landscape of only a few centimetres in scale, and people do not recognize this necessarily as an important heritage site, as it is just mound patterns and earth. It is difficult to understand what is going in this area. Here, beneath the vegetation and the field you can make out the existence of those mounds that were there previously. Sometimes there are very subtle, sometimes very obvious. Here one which is about five metres in height.

[*slide*] In recent years, in association with the APSARA, the University of Sydney and

the ADF team, we have undertaken several excavations in mound sites within these mound fields. Curiously, they revealed no particular material remains, ceramic or others that could have helped us to understand what they are. We still are trying to figure out the meaning of these particular things at this stage.

Looking at other areas of the 2015 coverage: Here, the great north canal that extends away from Angkor and leads to another mountain range near to Phnom Kulen. We also used the LiDAR to find previously undocumented sites in this area. It is not only at Kulen that there are archaeological remains; the LiDAR has revealed several significant features in this area as well, which is part of the new documentation that we are currently preparing for handover to the Documentation Centre at the APSARA.

Another thing we are able to do is to strip away the vegetation and to see the remains of industrial sites, like quarries, for example. If we look at this elevation model here we can see this strange scarring pitting in the land. These are signatures of quarries. This one here is a laterite quarry that was well known before the LiDAR. Laterite and sandstone quarries have the same signature and if you go there on the ground you see this quite characteristic configuration that many of us would be familiar with. What was unclear before the LiDAR is that these areas were also huge quarry fields; they share the same pattern. If you visited on the ground these quarries have been filled in by soil. You can still see the patterning very clearly on the landscape and they also have large amounts of debris from the quarrying of stone.

[*slide*] Looking at the well-known quarry from which the stone of Angkor was sourced: Previously, our Japanese colleagues had embarked on a mapping programme of these quarries in this area and I think they had identified something in the order of 40-50 discreet individual quarries in this area and those are marked as red points on this particular map. In fact, an analysis of the LiDAR shows us that they are not individual quarries but in fact one vast quarry field that just has occasional surface expression. If we zoom in, these quarry fields are in yellow and in this particular area we can see the characteristics of the quarry buried beneath in the ground. This is a pattern that was identified by His Excellency Tan Boun Suy by looking at a paper map of this area.

[*slide*] Other examples of work outside of Angkor: Here in Preah Vihear province around the town of Chheb are numerous iron working sites. They differ from occupation, or the termite mounds that are scattered around the landscape. These are furnaces for smelting down iron; the ancient iron kilns are in this particular area. Once again something which on the ground is hidden by vegetation.

[*slide*] A couple more examples of interesting things and research questions that have been raised by the LiDAR data: One of the things we reported many years ago were these enigmatic and geometrically shaped features immediately to the south of Angkor Wat. They are clearly associated with Angkor Wat; dated from that period, we can clearly see there is a feature probably built in the late 12th and early 13th centuries that override the top of them. Therefore, we know they are ancient. We used to think once again that these were limited to the Angkor area and it was the only place they appeared. We still do not know what they are. They are a mystery to us from an archaeological point of view, and excavations have not been particularly informative. [*slide*] Once again from the LiDAR campaign of 2015, we see these features everywhere across Cambodia. For instance, if we look at the Beng Mealea area, there is the temple site I showed you before, there is an ancient reservoir here and once again these geometric features carved on the surface and made of mounds of earth. Here an enhancement of this particular area.

[*slide*] Looking at Sambor Prei Kuk, one of our target areas: A lot of analysis remains to be done on this particular site. This is a map that was prepared by our Japanese colleagues years ago, noting the temple complex of this area. Once again the LiDAR imagery showed us a range of features, canals and so on linking to this particular temple site that had not been recognized or mapped clearly before. I know that His Excellency Hang Peou

has been analyzing this particular area from a hydrological point of view.

[*slide*] Looking at post-Angkorian site: It has become a strong movement now to investigate the post-Angkorian period in archaeology. As a contribution to that, we covered the area of post-Angkorian capitals like Oudong and areas that are under threat from urban development and the expansion of the city of Phnom Penh. In the area which is not covered by dense forest or vegetation, you see brick factories and lightly developed areas. In these areas we can use the laser scanning to filter out the modern development and clearly see the walls dating from the 15th century in this particular area. It is not only interesting in its own right as a focus of scholarship to understand the post-Angkorian area, but also as a means to understanding what happened towards the end of Angkor itself.

[*slide*] There is a theory, a model of the movement of the capital away from Angkor which perhaps says there has been a migration of people from the central area which was densely inhabited. On the other hand, if we look at the LiDAR mapping of these post-Angkorian sites, we cannot necessarily see the same level of occupation in these areas. So, if there was a sudden demographic decline of Angkor, we can say that these people did not move or sail to these particular areas.

I am not sure how long I have to continue and if I have reached the end of my time, please interrupt me. [*slide*] Looking at the site of Preah Khan of Kampong Svay, which has been the focus of work and collaboration with the Ministry of Culture of Fine Arts and the University of Chicago for many years. For those who are not familiar with this site, it is an amazing place. It is the largest enclosed site in the whole of Southeast Asia. Its walls are five kilometres long on each side. Those were well known in the past and it was also known that there was a sandstone temple in the middle, a few reservoirs and other sites in that particular area. This is a map we published in 2015, just before the arrival of the LiDAR data and one of our conclusions was essentially that it was an unfinished city site.

Ten years of work and we failed to uncover any kind of significant urban development inside this enclosure. We probably should have waited for the arrival of the LiDAR data because it shows a complete different picture of what is going in this enclosure. If we zoom to that central area there, what we can see is much the same as what we see in other sites of the Angkor period: a neatly divided grid system of occupation mounds, a city grid in the centre, almost invariably the mounds are not neatly enclosed by so-called enclosure or city walls but extend far beyond those areas. The LiDAR is precise enough that we can zoom in on particular areas. As you can see, it is a very different picture from the quite crude map we had before and gives us a whole new level of information that did not exist. Now, we are in the process of reviewing the maps of this site and doing it based on the laser scanning.

[*slide*] To zoom in on this northern quadrant here, one of the other things we can see if you look closely at these blocks, which are not as distinct as those from the Angkor area. We once again look at the pitting and scarring of the landscape and this is not from industrial activities. These are the remains of looters' pits. Looting took place some years ago there and does not happen any more, but we can clearly see the areas that have been disturbed. Looters' pits have been filled and are overgrown by vegetation and are clearly visible in that pattern in the LiDAR imagery which mirrors very closely the pattern of quarries on a smaller scale.

Another interesting thing about Preah Khan of Kampong Svay is that we can once again see these geometric patterns on the landscape, the same as we can see at Angkor; here again these mysterious patterned areas.

That is essentially where we are at this stage. [*slide*] The only place that we covered with the LiDAR data that did not show significant development during the Angkor era in terms of well laid-out grids is the site of Banteay Chhmar. If we look into this area, this is our coverage in that part of Cambodia. If we zoom in to the central temple area, once again

we can see the moat and temple inside, a reservoir to the east, and smaller well-known temples around that. If we remove that vegetation and modern development, what we can see in the LiDAR is not too different to what was known before. Here is a map produced before the LiDAR and in fact the LiDAR data does not reveal any significant new information in this area, which suggests that something very different was going on at Banteay Chhmar compared to the other cities.

If we look closely at this area once again there is very little trace of a well-organised, downtown core in that particular area, even after we remove the trees completely. There is not much to see. As I mentioned, this contrasts starkly with other temples from this period. Here, for example, we can see Ta Prohm within its enclosure abutting Banteay Kdei; once again, a very organized patterning of the landscape. Preah Khan of Angkor divided up into a city grid and so on.

In the interests of time, I think I will leave it there; it was just to give you a broad summary and overview of where we are in terms of our understanding of these various places. Perhaps Excellency Tan Boun Suy has something to add? No. We will leave it there and thank you very much for the time and I hand the floor back to the Co-chairs."

Comment from Mr. Azedine Beschaouch: "Co-chairs, Excellencies, as you can see, this topic can be discussed for hours. Time is running short but you have seen how Khmer studies have benefited from the use of LiDAR. It is today impossible for an archaeologist to ignore these new surveying and investigation technologies, considering their input.

My colleagues and I, the senior archaeologists that I represent, have been fortunate enough to witness all this evolution and today junior Cambodians should be trained to these techniques. It is difficult to acquire notions of epigraphy, ceramography or numismatics for an archaeologist, whereas once these modern techniques are mastered they can be very important. We can only hope that the APSARA National Authority will endorse them and the *ad hoc* experts stand ready to help.

Thank you; we will have other opportunities to get more information, notably on the LiDAR. My ICOMOS colleagues tell me that the use of LiDAR data by the experts of the Ministry of Culture has impressed. They have realised that in Cambodia modern technologies have been both mastered and used. Dr. Hang Peou contributed to the nomination file with his study on Sambor Prei Kuk's hydraulic system and also used the LiDAR data. Thank you, and as said, there will be other opportunities to discuss this topic."

Comment from the Co-chairman for France: "Thank you Professor. I think that we can move on to the next item on miscellaneous points and especially a point of information with the presentation of the ICC-Angkor database by Mr. Nou Niran from UNESCO."

Comment from Mr. Azedine Beschaouch: "If you allow us Co-chairman we will do this after a tribute in honour of Mr. Claude Jacques."

VII- MISCELLANEOUS

VII.1 Points of information presented by Professor Azedine Beschaouch

a. Presentation of the database website of the ICC-Angkor by M. Niran Nou, Professional of the Culture Programme, UNESCO, Phnom Penh

[*slide*] "Excellency Minister of Culture and Fine Arts, Chairperson of the APSARA National Authority,
Co-chairs,
Ladies and Gentlemen,

[*slide*] Today I am delighted to present some very brief information about our website. This has been designed for easy access to all members of the ICC and others. The purpose of the website is to collect all information related to the ICC-Angkor; reports, recommendations and also articles from the press. For example, on this page, which includes five navigation tabs. This is the site in French and I can switch to the English version. Here, pictures of our activities. It could be visited sites, conferences and etc.

This is the home page and you can find quick information about the ICC, its role, operations and a search icon that you can use to find something specific. Sorry, the computer is slow and does not load. Here you can find information on the next date of the ICC Angkor, for example; here, for example, the technical session announced. The next time you log on to this page, you will have the date of the next meeting. Here is the contact information and an access to the latest articles clipped from the newspaper. That is from the *Le Monde* Neswpaper.

This icon is for our partners. You click on it and it sends you to the official website of the partner. We have an 'about us' icon; there is a preface from the Director General of UNESCO and a statement from His Excellency Sok An. Here you can see them. The ICC Angkor chairs gives us a list of the Co-chairs from the start until today. The Ambassadors and the Co-chairs from the technical sessions are also listed. We also have the *ad hoc* experts with a biography of our experts and you can find all the information about them. We also have the former members of the expert groups (François Houiller, etc.). We then have the ICC Angkor Secretariat members and their biographies (Professor Beschaouch, Anne Lemaistre, Philippe Delanghe, Chau Sun Kérya, Mr. Prom Chak, myself and former members like Mr. Lim Bun Hok, Blaise Kilian etc.).

These are the publications that you can download in French or in English. For example, the 15 years of the ICC, the Angkor Charter and all the reports from the beginning until today. This menu is about the recommendations and activity reports and can only be accessed with a password. And you will find the reports or presentations of the ICC, such as PowerPoint or related documents to the ICC. You have the periodic reports and final reports. It can be filed by team, project, session and year. For example, if you want to find the project by WMF, just click on the button and it will pop up. I do not have all the reports yet, but this will be uploaded soon.

These are the ICC-Angkor recommendations and this is the core page of our website, where you can find all the information related to the first recommendations from 1993 until today. We want them to be available for all experts and ICC Angkor members. For example, if you are looking for a recommendation on the Mebon, you can refine it by session, category, project and temple because it happens that one of the Professors wishes to have a precise recommendation on the site. All they need is to click and it will display it. This icon is for modification. For example, the WAPCOs project is marked as completed and there is a comment to say that this project was not approved by the Ministry of Hydrology and will not be implemented.

You can download items as pdfs. Its shows the dates of project and recommendation dates, or you can download the recommendations in their entirety. This will soon be available in Khmer.

That is it for my presentation. Thank you and do not hesitate to ask me any questions."

Comment from the Co-chairman for France: "Thank you Niran. Let us move on to the next point and the floor is given to Ms. Francine d'Orgeval, expert to the Ministry of Foreign and European Affairs of France, who will read out a statement on behalf of the Ministry of the French Republic."

b. Statement by Mr. Bruno Favel from the Ministry of Culture of France, read out by Ms. Francine d'Orgeval from the Ministry of Foreign and European Affairs of France

"Thank you, Co-chair. Let me read out a statement from Mr. Bruno Favel, who you all know here and who is the Head of the Department of European Affairs at the Ministry of Culture and Communication of France.

'Since the 1991 Paris accords for the reconstruction of the Cambodian heritage, confirmed by the October 1993 Tokyo conference, the Ministry of Culture, alongside that of Foreign Affairs, has taken part from the onset in the ICC meetings and noted the numerous successes linked to the inscription on the World Heritage List since 1992 and the progresses made for the safeguarding, protection, conservation and development of the site.

Yet, illegal activities inside Zones I and II of the buffer zone of the Angkor site have put in the balance the relevance of the inscription of the site on the UNESCO World Heritage List. The Ministry of Culture thereby requests an immediate freeze on construction inside the Angkor site and to come back to the original delineation of the nomination file.

No violations can be tolerated as the Universal Outstanding Values of the site are truly put at risk, as is the credibility of the ICC technical sessions.'

This was Mr. Bruno Favel's statement. The Ministry of Foreign and European Affairs concurs fully with this statement. Both ministries would like to plan a World Heritage mission that could take stock and draw up proposals based on mapping and aerial pictures that would enable us to monitor the evolution of such construction since the site was inscribed on the list in 1992. This is a proposition on the table at the ICC and we would hope that this mission could clarify and further inform discussion.

I wanted to express my gratitude to the APSARA National Authority, as I am aware that they do their utmost to destroy some illegal constructions and I will reassure Mr. Favel of this on my return to France.

Moreover, as I have the floor, I would like to come back to the presentation and words of Professors Bouchenaki and Beschaouch with regard to ICONEM, the French start-up. We will invite it to the Mebon site to assist in identifying the stone blocks, as there are still some to be analysed for work progress. This start-up would be delighted to be invited by the APSARA National Authority to present its work conducted in World Heritage sites in danger to demonstrate what it is capable of and offer training services in the use of this rather outstanding method.

Thank you."

Comment from the Co-chairman for France: "Thank you Ms. d'Orgeval. Are there any additional comments? No. I guess this proposal to the ICC could be agreed on."

Comment from Ms. Phoeurng Sackona: "Thank you Ms. d'Orgeval. Your statement from the Ministries of Culture and Foreign Affairs has been noted. We also noted down the suggestion to review the 1993 zoning."

Comment from the Co-chairman for France:"Thank you Minister. Let us move on to the next point, with the ICC tribute to Professor Claude Jacques. Mr. Beschaouch, the floor is yours."

c. Tribute to Professor Claude Jacques introduced by Professor Azedine Beschaouch

"Excellencies
Ladies and Gentlemen,

I feel privileged to have the opportunity to honour one of our colleagues and journeyman for a journey that commenced in 1993 at the Tokyo Declaration and has continued into the 21st century under the high patronage of His Excellency Hun Sen, the Prime Minister, as said by the Minister of Culture.

We are fortunate to count among these journeymen Professor Claude Jacques. I will not offend him by reading a list of his books and articles, as I could forget some. I would suggest to him to compile them into one or two volumes, as they are sometimes really hard to find. Two volumes that could be called 'Khmer Studies' or 'Epigraphic Studies'; you can choose the name better than I could.

I will not tell his age, as it is part of history, but he arrived in Cambodia in 1961. He came here for two reasons. Firstly, to represent the EFEO, as he was a member, and to teach at the Royal University of Fine Arts, to be precise at the Faculty of Archaeology and to teach the ancient history of Cambodia and Khmer studies. For ten years, he taught at the Faculty of Archaeology and simultaneously represented the EFEO Office in Phnom Penh.

Allow me to recall that he was at that time very close to the late King Norodom Sihanouk. His Majesty told us, and I quote: 'Claude Jacques used to be one of my regular guests'. He moved back to Paris at the École pratique des hautes études in the fourth section, that of historical and philological studies. He taught Khmer epigraphy in Cambodia and also Laos and Thailand until recently, wherever the Khmer civilisation shone. He decrypted inscriptions.

I have spent a lot of time with him, and I apologise for remembering this here, as it is for me a very moving moment to have lived long enough to honour him here and that I am the speaker. When I was a boarder at the Lycee Louis Legrand, I was a chatterbox, and one day I was punished and placed on detention on Sunday. I asked the invigilator: 'I am a poor Tunisian boarder, I do not know anyone, could I go out and buy some groceries?' He let me do it. I never forgot this and thought to myself what a nice man. This was in 1960, before he moved to Cambodia and he was an invigilator at the Lycee Louis Legrand.

I went to listen to his classes for my own entertainment. It was great because I could not understand any Khmer or Sanskrit but his stanzas were unforgettable. The stanzas could last up to three weeks in a row and he explained them with unforgettable mastery. One day, I arrived in Cambodia and I realised that I was right to have listened to Professor Claude Jacques.

He rose to fame through his books and papers, which are now worldwide references. Look at his bibliography and all fields, from history, archaeology and Khmer epigraphy have been the subject of a book or a paper authored by Claude Jacques. Everybody knows this, so we can say it. Thanks to his friendship with one of the great directors of UNESCO,

Frederico Mayor, he can be credited with persuading him to open one of the first offices of a UN institution in Cambodia after the war. We are obliged for this friendship with one of the greatest directors of UNESCO. This friendship lasted and Mounir Bouchenaki can tell you that later on Mr. Mayor always had Cambodia in his heart. This helped a lot during the first years of the difficult implementation of the national policies for reconstruction and development.

Claude Jacques has continued to visit Cambodia to attend the ICC. This is the reason today, I have had the honour to say a few words, but the honour for you, dear friend, is that all your friends present here will applaud you and Her Excellency the Minister of Culture and Fine Arts will personally bestow an honour on you through a message."

Comment from Mr. Sum Map: "This is a great honour for me to convey this message in recognition of your services on behalf of the Minister.

'Acknowledgement: As chairperson of the APSARA National Authority, responsible for the management of Angkor, a site inscribed on the UNESCO World Heritage List, I am delighted to pay tribute to Professor Claude Jacques and to convey my highest consideration. His academic work for Angkor on the civilisation of the Khmer Empire and on the major epigraphic heritage of that same Empire is praised internationally. As is his contribution to the training of junior specialists in these fields and his research in Cambodia at the Faculty of Archaeology of Phnom Penh and within the framework of the focus of his research at the École pratique des hautes études in Paris. Drafted in Siem Reap on the 21st of June 2017, Dr Phoeurng Sackona, Minister of Culture and Fine Arts, Chairperson of the APSARA National Authority."

Comment from the Co-chairman for France: "Thank you for this tribute ceremony to Claude Jacques. People of my generation know his achievements, although 1961 for me is like the pre-Angkorian era."

Let us move on to the publication and information point. Mr. Beschaouch, the floor is yours once more."

VIII- PUBLICATIONS

VIII.1 Introduction by the Scientific Secretary, Professor Azedine Beschaouch

a. Water and Angkor

"One of the most famous publications of UNESCO is the *UNESCO Courier*. The pride of UNESCO for many years, it was a forum for high-level free thinkers. Many Nobel Prize winners contributed to the prestige of this publication. Some, like Pablo Neruda, who was Ambassador for his country to UNESCO, cherished this publication. There were also historians, philosophers and writers; one of the most famous in France was Mr. Jean d'Ormesson, who repeatedly published in the *UNESCO Courier*. Sadly the *Courier* ceased publication as a forum for humanity's critical thinking and not only in French but in all the major languages of the world.

Thanks to a donation from the People's Republic of China, the *Courier* republishes as of this year. We rekindle with a rich publication and in this edition there is an article on Cambodia in the section 'Agenda 2030, challenges for us all'. There is one text on water. We would have hoped for Mr. Hang Peou to be the author of that text and Ms. Tan Theany, who has many contacts, will discreetly remind UNESCO that there are great specialists in Cambodia that can contribute. Mr. Chamroeun Sok, who is Cambodian, but not a specialist in hydraulics, wrote 'Angkor Water Crisis'. The title is punchy but it is interesting. I mention it and will, as is the tradition, give a copy to the Documentation Centre so that everyone will be able to read it. I have one French and one English version. I will pass them on to our friend Professor Tan Boun Suy, as he is the guardian of the books."

b. 'Héritage Mutilé' book by Mr. Mounir Bouchenaki

"We now have three major publications, one which is already finished and two more to be completed. I start with the latter and will hand over the floor to Mr. Mounir Bouchenaki. He published *'Patrimoine mutilé'*. In the last few years he has dedicated his work on behalf of UNESCO to the safeguarding of heritage and at the same time to an extraordinary accomplishment of cultural diplomacy, by visiting regions at risk. Some people at UNESCO even said 'but why is he going there? We should not be there', but the Director was informed. The Russian army protected him when he visited Palmyra, as everyone was worried and especially his family.

He wrote this book *'Patrimoine mutilé'* and I have a copy for the Documentation Centre so that young Cambodians will be able to read this book that presents what one can do to serve the heritage that unfortunately extremists ravage. I come from this region and obviously I condemn these actions that set terrible precedents. One can always oppose on principle but there is no need to go to such extremism. Mounir, would you like to say a few words about your book?"

<u>*Comment from Mr. Mounir Bouchenaki:*</u> "Thank you Azedine, my dear friend. It is not really good to advertise your own book, but we are among friends here and with colleagues I have worked with for many years. From my colleagues among the *ad hoc* experts, let me single out Gorgio Croci, with whom I went on difficult assignments that are yet to be told of. For example, during difficult times we visited Jerusalem to try to save the heritage when there existed deep strife in the society. I just informed Ms. Lemaistre and Mr. Lablaude that we have been told of the destruction of the oldest Mosque of Mosul by Daesh. I am sure that you have seen the picture of this slightly tilted, Pisa-tower like minaret; it has just been destroyed by Daesh. This type of situation led me to try to do something to save what we can during my work with the successive directors of UNESCO (Messrs. Mayor and Mastuura or Ms. Bokova).

This book is a testimony of what can be done. Anne Lemaistre remembers that when she worked in the Department that looked after Cultural Heritage, the issues linked with the protection of in danger heritage were very important, as they concern all of us. As said by our friend Azedine Beschaouch, I believe that it is necessary today to raise these issues at the highest level, not only with the Ministry of Culture but also of Education and I talked about this with Ms. Bokova recently. At the next General Assembly, the Ministers of Education must think out what is in the heads of these 18 to 25 year-old young people that wear explosive belts and kill, for no reason, other young people. What is going on in their heads? This relates to the UNESCO 1945 founding text that contains the sentence that 'since wars begin in the minds of men, it is in the minds of men that the defences of peace must be constructed'. These are the reasons that led me to write this book. Thank you."

Mr. Azédine Beschaouch:

"Two more books: The first, from Ms. MenChandévy, which is dated from the 12th of November 2015 and is being edited for future publication. She was kind enough to send me a copy, as she knows that I am the spokesperson of the CIRDA (Angkor International Documentation Centre). This book is very important as it categorises the terminology used in Khmer architecture and includes a Khmer-French glossary which is very useful for researchers. I will ask her whether she has anything to add and on her behalf I hand over one copy to Mr. Tan Boun Suy and congratulate Dr. Chandévy for this work.

All at the Documentation Centre will use it. One more thing is that the Guimet Museum, through its president, has proposed to work on this publication with the president of the APSARA National Authority in order to prepare a glossary in the two languages and maybe even with the English language included. Ms. Kérya knows more than I do on this subject."

Comment from Madame Sisowath Menchandévy: [*OrigK*] "Her Excellency the Minister of Culture and Fine Arts and Mr. Co-Chair. I will make a presentation later on, but at this moment I just would like to take the opportunity to thank the French Embassy for providing me with Master's and PhD scholarships. I would like to thank also the Ministry of Culture and Fine Arts for helping co-ordinate these scholarships. Thanks to these scholarships I was able to complete my studies in 2015 and bring back home some useful documents to help our work in the future as well. Thank you."

Mr. Azedine Beschaouch:

"The next book is that of Ms. Fabienne Luco and her PhD thesis. One could say that it is a lifetime's achievement, although she is still rather young, but she dedicated many years to social anthropology in the region of Siem Reap Angkor. She will, in a second, present her work, which we hope will be soon published."

Comment from Ms. Fabienne Luco: "Excellencies, dear friends and colleagues, today is very special as I am in this room and it has been many years since I attended the first Technical Committee, back in 1995 or 1996, certainly not in 1993, as I worked for UNTAC at the time. This first ICC was made up of a small group of people who in the morning visited the temples and in the afternoon convened in a meeting room. This is when I started fieldwork. I met Mr. Claude Jacques, who in the temples talked to the farmers and I must say that time kept on going and that after many years of interreptuted studies to work in other functions I finally managed to finish this thesis and it will be available for those who would like a copy in electronic format at the end of this session."

Mr. Azedine Beschaouch:

"I finish with an important publication from the weekly magazine *l'Express* in France, which is widely available and has a special edition call *Thema*. This year it focused on the lost great civilisations. The article is called the Mystery of Vanished Civilisations. They include the Sumerians, civilisations from the Indus, from Babylon, Crete, the Etruscans, the Carthaginians (something shared by Mounir and myself), the Nabateans, the Romans, the Mayas, the Sassanids, the Easter Islanders, the Vikings and Angkor and it includes some food for thought papers on civilisations written by historian philosophers.

There is a really interesting article on Angkor called 'The Water Curse'. Let me read out the summary: 'Entangled in the jungle, the city of Angkor is quiet. How did this amazingly refined empire become an area that is both peaceful and teeming with fauna? Did the foundation of its power, the hydraulic network, cause its downfall?' You are aware that the end of Angkor is still a mystery. Some say the 13th century, but as Claude Jacques taught me, this is too early. There is a reclining Buddha that was built in the 16th century at Ba-

phuon; Angkor was still alive. Some Pali and even Japanese inscriptions in Angkor Wat are dated from the late 16th and early 17th centuries. Professor Ishizawa explained that Buddhists who visited Angkor engraved them. It remains a mystery how such a sophisticated civilisation could have vanished. This paper adds to the research on the history of civilisations.

I have another copy that I can give to the Centre and I will offer that one to the Minister, with your permission. This is all we have today. I hope that in September there will be more publications on Angkor. Professor Nakagawa told me that a book will be published and I will have the pleasure to present it."

Comment from the Co-chairman for France: "Thank you Professor. Maybe, we could actually take some time to listen to Ms. Luco and others who would like to briefly present their publications? I believe that it is perfectly acceptable to allow for a few minutes considering the time already spent. Please Ms. Luco."

c. Thesis on the* Inhabitants of Angkor *by Ms. Fabienne LUCO, anthropologist

"Excellencies,
Professors,
Colleagues,
Ladies and Gentlemen,

I would like to express my gratitude for letting me present my PhD in social anthropology and ethnology. I would especially like to thank Ms. Lemaistre, who made it possible. The thesis is entitled "Les Habitants d'Angkor: Une lecture dans l'espace et dans le temps des inscriptions sociales de populations villageoises installées dans un territoire ancien"(Angkor's people: a space and time reading of social inscriptions of villagers in an ancient territory); it was tutored by Yves Goudineau, Director of Studies at the EFEO and defended in March, 2016 at the EHSS, l'Ecole des hautes études en sciences sociales, in Paris.

The fieldwork supported by a participative and surveying anthropological approach was mainly conducted between 1994 and 1998 and 2004-2005. It focused on the village of North Srah Srang and was extended to villages more or less covering the Archaeological Zone I.

'Amnesia': this is the word often used by westerners – from the early days of colonisation until today - to talk about the difficulties encountered when trying to engage Cambodians with history and genealogical written or oral memory. Texts, mainly religious, are pretty scarce in Cambodia. Oral conveyance is difficult to engage with.

For some decades, researchers in various fields (architecture, urban planning, geography, history and anthropology) have conducted studies on space as a characterised subject.

In Cambodia, relationships between space and society have hardly been researched. Art historians or architects had already highlighted the significance of the cardinal points but mainly for religious buildings and notably major Angkorian temples.

I realised that to study the spatiality of the Cambodian society could bring new clues as to the understanding of a world reticent to any analyses. I started with the following question: How space, understood and represented, can serve as a medium to social and cultural conveyance?

The first part of my thesis is entitled *'social construction spaces'*, where I looked into how social organisation is expressed and conveyed in the domestic space. I began with the house and described how the aspect of the space of a nuclear family is the base to a symbolic world order for humans according to hierarchical and complementing rules. This social formulation through space has been studied looking at construction techniques for houses, rituals and how they live inside that space.

Beyond the house, I tried to understand how the feeling of wider community is forged, based on how families are spatially organised one to the other on a higher scale called 'hamlet' or 'village', included in the same expendable word, '*phum'*.

In the second part called *'territories shaping identity',* I have further enlarged the spatiality of the research by exploring the notion of '*srok*' in its traditional acceptance of 'small country' of 'terroir', where a cluster of families relate one to the other in terms of occupation of the territory, cultural identity and shared stories. Beyond this 'we', I tried to define what 'the others' are made of. I also started to think out the way these people benefited from an ancient urban fabric that is very pregnant in the landscape (the Angkorian remains) habitat, natural resources and social and religious practices.

In the third part called *'spaces organising the religion',* I researched the parallel world of deities and tried to fathom who they are, what are their roles, and study their spatial distribution. They have each their allocated space, one next to the other, in a system of composite belief.

With the study of the 'small countries' of the Angkor region, I showed how from the organisation of houses, temples and farming lands, the living and represented space could be apprehend as a sociomatrix, as a silent medium, of importance for conveyance whilst self-reformulating from social norms and cultural values.

Observing some construction modalities and house and temple occupation enabled me to establish that the organisation and life in these spaces mirrored the representations of the world inscribed for a long time in Khmer culture, the representation of perfect worlds where humans and deities each have their own defined place that must be respected, otherwise chaos could emerge (misfortunes or diseases). The mythical model of the centralised and hierarchised island/mountain is replicated in various structures: house, temple, stupa, sand or paddy mounds that shelter humans, deities and late ancestors.

Constructions, square for deities or rectangular for humans, are centred around a cosmic pillar, a pole, a statue, a stone or a tree linking the worlds of the underground deities, humans and celestial deities. In each of these worlds, harmony is kept as long as individuals find their place that is spatially distributed according to cardinal points. The height depends on their social status, elder/younger or female/male. I realised that a huge chunk of teaching and social rule transmission finds its position according to the cardinal points and the height in and around these structures where each has a defined place and knows the set rules.

On a daily basis in a home, these prescriptions are more or less respected; they take their full meaning during rituals. By enlarging the research outside of the house/temple by exploring the surrounding land, farmed or inhabited, other results emerged.

The study of toponyms and research identified an ancient spread habitat. The landscape of Angkor and its many higher lands is conducive to establishing settlements. Some small hamlets of two or three houses were in the past located on mounds called '*kok'*. In the early 1950's these hamlets were regrouped. The houses aligned on higher and contiguous lands, around barays, pathway/road dikes. This orthonormal fabric, east-west and north-south, matches the existing aspect rules of the houses. All houses' ridge purlins are aligned on these axes.

Beyond the house and family hamlet, another social space was revealed, that of the *srok* in the traditional sense of a terroir or 'small country'. The analyses of the composition of this territory and social ensemble unveiled the wealth of social cohesion and built identity. For example, beyond the administrative separation on paper, people in North Srah Srang village claim to be close to the villagers from Rohal, South Srah Srang and Kravan. They form a *srok*, 'small country' or terroir made up of people that are related and have shared common stories for a long time. Identity is also defined by the relationship with others: Who are they? The others, from other *srok*, means they speak differently. For example, words are pronounced differently in Srah Srang or Pradak, in Angkor Krau or Ampil.

Beyond these differences in the language, the toponyms and the narrations, the landscape revealed settlements and relocations of families. I have noted some nuclei of ancient settlements that are dating from at least the middle of the 19th century, when more settlers arrived. We heard stories dating back from grandparents and great-grandparents talking about exchanges with Khmer Loeu from former Cambodian provinces located on the other side of the Dangrek mountain range to the north. They mention tales of carts on the fish-abundant surroundings of the Tonle Sap and religious pilgrimages to honour the Buddha statues at Angkor Wat. Also tales of elephant hunters, the Kuy Leo, probably originating from Laos, and of gold diggers.

The traditional representation of the space with three stepped worlds is especially legible in today's Angkorean religious territory. The statues of the higher deities, Buddha, are located in high places in major Angkorian temples and Buddhist pagodas. At the level of humans, small deceased local people or powerful people, the *Neakta*, still play beyond death the role of leaders that protect and punish those who live in the territory they are responsible for. I drew a sketch map of the religious territory. Leading each *srok* is an important *Neakta* assisted by another that controls inferior *Neaktas*. *Neaktas* live in small huts, big trees or in the Angkorian ruins. Ta Reach found at the entrance of Angkor Wat is the head of this invisible territorial administration.

Let me also briefly explain how history or rather stories are told.

To evoke past stories, either legends or real and passed on orally, in Cambodia the narrative gets richer when it is supported by particular elements of the landscape. For example, the story of a young girl, Nean Kong Rei, whose body can be found in a mountain in Kampong Chhnang. What makes Angkor unique is that here, more than in any other places in Cambodia, human constructions have left highly visible traces in the landscape. They offer several 'media' where legendary stories can be located. Several legends are told that are found in the Royal chronicles. The book is a kind of landscape where stories that were orally transmitted have been put on paper.

Let me finish with a reflection on the notion of safeguarding 'intangible cultural heritage' or 'living heritage', framed by a UNESCO Convention.

Angkor is thus defined as 'a living heritage site' where the locals have a recognized place. To define the site as a living heritage does not mean to freeze it in time or to 'Disneyise' some of its practices. It is simply to admit that it is part of the evolution of Khmer society: the link within a dynamic transmission chain that continues through time and where daily practices of the locals' habitat, cultures or religions remain linked up although reformulated.

I also believe that it is of the utmost importance to continue to research this field to better integrate this new knowledge with the safeguarding, conservation and development policies of the site.

Thank you."

Comment from the Co-chairman for France: "Thank you Ms. Luco. Let us listen to Ms. Sisowath Men Chandévy and her thesis on the 'Khmer architectural vocabulary'."

e. Thesis on the "The vocabulary of Khmer architecture – Illustrated dictionary and French-Khmer and Khmer-French glossary" by Ms. Sisowath Men Chandévy, Director of the Heritage Training centre and Vice-Rector of the Royal University of Fine Arts

"Your Excellency Minister of Culture and Fine Arts and Chairperson of the APSARA National Authority,
Excellencies,
Ladies and Gentlemen,

[*slide*] "Allow me to present my research work entitled 'Vocabulary of Khmer Architecture - illustrated dictionary and French-Khmer-French glossary'. This work tries to tackle the present lack of knowledge in Cambodia of ancient architectural words, the use of imported words and of western concepts without taking into account the relationship between both architectures.

[*slide*] I would like to touch upon issues that are today found in works of safeguarding, restoration and development of buildings and surrounding areas. Following the Paris Accords of 1991 and the reinstatement of the monarchy, King Norodom Sihanouk launched an appeal at UNESCO for the safeguarding of the Angkor Archaeological Park. Since then, the international community has mobilised and taken actions to preserve the site against any threats. The site is now safeguarded, protected, restored and developed.

[*slide*] Beyond the symbolic site of Angkor, the post-Angkorian heritage and notably that religious was also destroyed, dismantled and looted. For example, some ancient pagodas were levelled to make space for new ones and ancient leaves and finial decors were dismantled and sometimes left to rot.

[*slide*] Vernacular heritage has faced the same fate, challenged by the dominance of manufactured new models and the fading of know-how.

[*slide*] Cambodian cities, even Asian cities, have developed very rapidly and the former caught up after decades of war. This strong growth had deep impacts on all types of urban structures. In these new configurations, the necessary transformations must be supported by a heritage-friendly and innovative town-planning policy. This is where I describe some examples in Phnom Penh.

[*slide*] Faced with sensitive issues, one can wonder what the future of heritage in Cambodia will be. The first step is to make sure that heritage is recognised and that conservation efforts are supported and motivations fostered. This is underlined in the goal of my research work contributing to the preservation and safeguarding of tangible and intangible heritage, with a view to preserving architecture but also the language that is part of the Khmer culture and national identity.

[*slide*] A study based on ancient EFEO produced documents allowed me to further the first stage of my work, despite the use of inappropriate words used on Khmer monuments. I am well versed in the architectural vernacular as I have experience on architectural worksites and other field work. The compilation of ancient, forgotten or lost words in interviews with masters, monks or former carpenters has been a precious foundation for the thesis.

[*slide*] The document is divided into three parts: that first is a general stocktaking of the condition of heritage in present day Cambodia and its level of protection. The second part is a French-Khmer bilingual dictionary organised on the logic of construction and the French alphabet.

For this section we decided to select words that are necessary to describe Khmer architectural elements. The definitions can be general or specific. The objective is to amass as much as possible any lost, abandoned or still in-use terminologies.

The accompanying text is simple and has no pretence to exhaustiveness. It looks at two notions: technique and use, supported by sketches showing concrete cases from Khmer architecture in order to understand such or such an element. We will try to provide an original sketch. For the third part, the glossary is in French–Khmer and Khmer-French.

[*slide*] The vocabulary follows the construction steps starting with the design, the project until the construction steps. The terminology is often faced with abandoned terms and techniques that were replaced by new technology and words. Some examples on Khmer words that have been dropped and sport a new term, such as moulding, for example, which meaning has changed.

Other words have appeared with the arrival of the French and accompanying new, imported techniques: Lintel, cement, model, kiosk and etc. These words are translated into Khmer when existing, otherwise the same pronunciation as the French is kept and a transliteration done in Khmer.

[*slide*] Vocabulary specific to Khmer architecture describes the temple, monastery, public building and traditional house. Most of the public construction vocabulary is similar to the part on general vocabulary.

[*slide*] With regard to religious buildings, the terminology mentions Angkorian temples and Buddhist monasteries. With regard to the temple description, I started by analyzing the outside of the building and then the inside, step by step. This methodology was deemed the most fitting for a spatial and informed, sequenced breakdown of the monuments.

[*slide*] The temple, or *Prasat* in Khmer, is the common term describing Khmer monuments. In middle Khmer, the texts show its sacred nature, as it refers to any ‘residence of sacred beings’, human or divine. In this section, I quoted some examples of previous terms used by EFEO researchers for the word 'enclosure' of the temple. The first term used by H. Parmentier is simple, using numbers as is common in western architecture and starting from the centre of the temple until the outside; one to five ‘enclosures’ for example.

The second term, that of P. Stern, is rather logical and adds the function and form, the outer enclosure is called: ‘the property enclosure delineating a large transitional space between the temple complex and the secular space located outside of the walls of the property’. Then comes ‘the temple enclosure’, the ‘gallery enclosure’ and etc.

Is there another word for cloister gallery? This raises the question of the function of the temple, whether it is an ancient Buddhist monastery or not. The vocabulary used is the outcome of a confused mix and raises discussion on these specific terms.

[*slide*] The word Gopura in Hindu temple architecture is a construction that gives access to the successive enclosures of the temple. I have kept the word Gopura, which has been commonly used for a long time to describe monumental doors marking the axes of the temples’ enclosures. This term is so widespread that even the workers of a site use it.

[*slide*] The word ‘tower’ is also commonly used by Cambodians although there exists a Khmer word. On this slide, I give some examples of erroneous terms for the word façade. For example the word ‘storey’ does not seem to be right when designating the different

level of the temple tower as the lower part is empty with no floor marking any separation. I prefer to use the word 'step', which seems to be more correct to call the superimposed levels of the façade, a word that exists in Khmer.

[*slide*] The same goes for another word used for pediment, profiled or successive pediment, half pediment or lintel. These words are specific to Khmer architecture, notably with the perspective created by using the different level of the façade.

[*slide*] This is a rather complicated element to give it an exact term, used in sacred temples which form changed depending on styles. Without any known references, I use for the moment the word 'layered', which I do not like; maybe the word 'doormat'? I hope that the experts working on the Angkor site will come up with a more accurate term.

[*slide*] The second section deals with the vocabulary of architecture used in Buddhist monasteries or *wat* in Khmer. This term, originating from Pali, describes a holy place where the monks reside. The Kmher Buddhist Wat is a property in theory delineated by a dual enclosure. That first is represented by fencing linking monumental portals surrounding the monks' private property and the second enclosure surrounds the pagoda or Preah Vihear, the main building of the monastery which hosts the great statue of Buddha.

The architectural components in the entire space are made up of several building annexes: Cells, prayer rooms, refectory, dormitories, school, crematorium, stupas and etc. The Khmer translation exists in specific terms for each.

[*slide*] The public can only visit the pagoda or Preah Vihear during major Buddhist ceremonies. Three different types exist, based on the roof construction; Preah Vihear with four *chavear*, six *chavear* and 12 *chavear* or Preah Vihear *Bosabok*. That last word is specific to Khmer traditional architecture. I have kept this term because there is no French equivalence. There are five types of construction, of which only one is left in today's Royal Palace in Phnom Penh.

[*slide*] The architectural decor of the monastery buildings is very rich, especially the pagoda. I give some examples of the pediment with Angkorian-style leaf motifs, the décor of the edge strip shaped like a Naga, the body with the spine and the tail called *chavear*.

[*slide*] Wooden decor techniques with painted or carved gold leaf have almost disappeared because of the loss of expertise. I find it very important to further this research by working with wall painting specialists or carvers in order to come out with more accurate words and representations.

[*slide*] As for the civil building, there are two types. That first is a colonial-period inspired style and the second is often inspired by Khmer traditional architecture. This vocabulary is also found in the general part and that specific. Professionals who work in urban heritage commonly use it.

[*slide*] Focusing only on the monumental architecture of the Angkor temples could make us overlook the rural constructions that are less impressive but have well-defined architectural features. In the Khmer countryside, villages have developed 'stilt houses' which structure has not changed for some since the late 19th century.

[*slide*] Depending on customs, the traditional house must be built in one solar day, which forces the future dweller to prepare all construction members years in advance. The roof is a fundamental component that can be subdivided into several categories as aforementioned. A model of typical roof structures exists and it gives its name to the type of houses: *phteas pit*, *phteas kantaing* or *phteas rong*, etc.

[*slide*] External influences and modern times have introduced modifications concerning the construction technique, the use of new materials or décor elements. The method and technique of ancient construction gradually disappear as the original model vanishes.

[*slide*] To conclude, this research is a first step towards urgent safeguarding of architectural heritage and its associated terminology threatened by extinction. The war destroyed the country's social structure; education now faces the modern challenge of stabilising the national identity around a shared memory, culture and language. Within this framework, my PhD endeavours to compile a new index of vanishing Khmer architectural words.

The word used must not lose its meaning and wealth; as if they are lost, then the architecture will also be lost. A language dying out is a culture dying out. One thing is for sure, words do not abound because I have encountered several challenges during years of research.

First, there is hardly any documentation in this field. A massive plus was collecting information from ancient masters, monks and achars in monasteries, schools and especially former traditional habitation builders.

The expected outcome is not very satisfactory, because people still alive from 'our living heritage' are very old and sometimes have memory problems. Despite all of this, initial work was done and this aims at a dual safeguarding and protection: That of the Khmer architecture and language and the participation in a programme to transfer knowledge from Cambodians to Cambodians.

[*slide*] I hope that this will be a 'tool' that will be used by those that need it: architecture students, teachers, professionals or researchers, institutions and etc.

I would like to cite the work of Mr. Olivier Cunin, who in his 2002 PhD at the Institut national polytechnique de Lorraine on the 'Comparative analysis of the architectural history of major monuments of the Bayon style' mentioned that the 'vocabulary used is often a mixture'. He added that 'the drafting of a dictionary similar to the 'principles of scientific analysis, architecture, methods and vocabulary', specific to Angkorian architecture was deemed necessary by him for the future of Khmerology.

Finally, for use by all heritage stakeholders, I hope in the near future to extend this research to the different types of architecture: Temples, monasteries and traditional houses, as words are scarce and the motifs of painted decors have not been researched in detail.

Thank you."

Comment from the Co-chairman for France: "Thank you for these very interesting presentations. Mr. Beschaouch, the floor is yours."

Mr. Azédine Beschaouch:

"Co-chair, Ministers, Ladies and Gentlemen, next December we will be delighted to listen to Dr. Chau Sun Kérya who will also present her PhD; I hope she is listening to me. I say this publicly, as I was the tutor of her thesis, so please present it here. It is called 'The Angkor myth and development' a topic at the core of the conservation and development dialectic."

IX- ICC-ANGKOR RECOMMENDATIONS

IX.1 Presentation of the recommendations by the Standing Secretariat Professor Azedine Beschaouch

"Let us move on to the recommendations which have already been circulated. Some observations and comments were made. As per usual, we will project them on screen so that you can see them, knowing that you have already the hard copy. We will proceed as usual; that is, not by reading the entire recommendations because you have had time to do that, but simply to ask you whether you had any observations on the substance and not the form.

We have of course revised the French and English texts but there may be some typos. When the recommendations are published we will correct those mistakes. Do you have anything to say or add, improve?

[*slide*] The first recommendations are on conservation. Page 1 is on the Churning of the Sea of Milk Gallery project. You had a detailed presentation and you saw the pictures. Are there any observations or suggestions? [*slide*] The text is in French and English. If you have no comments, we move on to number 2, with your permission, on the two north and south ponds that flank the western causeway of Angkor Wat. Once again in both languages and on the screen a picture for better understanding. This is a rather long text as it is very technical. I believe that there will not be any comment as it is very technical. But who am I to know? No observations or amendments on recommendation 2; let us move on to number 3 on Banteay Srei, once again in French and English. We talked about this and there is a whole set of recommendations. I believe it would be difficult to add anything unless you have a particular point to raise. This is not the case.

[*slide*] The next recommendation, number 4, is on *Prasat* Ak Yum. It is rather short and as there are no comments, we move on to recommendation 5 on Preah Pithu. The recommendation starts with the methods that the experts are satisfied with, on point 3 that there is a need for a land use plan and on point 4 that the monument and the landscape must be preserved. These are the four paragraphs on Preah Pithu.

[*slide*] No observations? The next point is recommendation 6 for *Prasat* Ta Oun. Eight short paragraphs starting with approval of the project, technical remarks on the support and tilts threatening the entrance gate, scattered stone blocks, the anastylosis and finally the signage to be set up. If there are no other technical remarks we move on to recommendation 7. [*slide*] Once again in French and English on Banteay Kdei, already subjected to a detailed analysis and many pictures. The recommendations of the experts are short; I do not believe that there are any observations.

[*slide*] We move out of the temples from the first part of the recommendations, those around Angkor Wat including Banteay Srei, to deal with traffic and access issues at Angkor Wat. Professor Bouchenaki made very detailed observations, especially with regard to direction of traffic, so I believe there will not be any remarks.

[*slide*] We move on to Ta Prohm that was presented by the ASI Deputy Director and two observations were made. One concerns the form not the substance; it is a typo. 'It is recommended to proceed to clear the passageway between the north wall…' It is not the north but that to the south. It is an accurate and important observation but it does not change the substance. Apart from this observation, for which we thank our friends from India, there are no others.

We move on to recommendation 10 on the Baphuon, where as you remember, water does not drain properly. You noticed that draining and maintenance issues are rather simple; technically speaking they are easy.

We move on to the Bayon and we did not receive anything from Professor Nakagawa of JASA; do you have any suggestions? They are welcome. There are none so we move on to recommendation 12.

It is on the workshop on the conservation of stone. This workshop was organised at the training centre and we heard very good presentations from our Cambodian friends and what is recommended and was presented by Professor Bouchenaki, is to repeat the workshop and continue training in this field. I do not think that there are any objections and we all agree on this.

We move to recommendation 13 on Angkor Wat and the Western Causeway Dike. We heard a long discussion on this item and also proposals, notably that of His Excellency Mr. Ros Borath and after of His Excellency the Minister of Culture and Fine Arts and Chairperson of the APSARA National Authority, with one additional intervention from His Excellency Sum Map to solve the issue. The discussion will not be reopened as a decision has been made.

Ta Keo now, where our Chinese colleagues from CACH are working on a project that should be completed in 2018. I think that the recommendations taken did not raise any objections from our Chinese friends. Finally, the West Mebon, where there are some sand transportation issues. In cases of high water level a boat is used, otherwise the ground needs to be consolidated. This is a technical matter that is recommended to the APSARA National Authority and their Excellencies the Director General and Dr. Hang Peou will find a solution. We inform Ms. d'Orgeval that all efforts will be undertaken so that the Franco-Khmer worksite continues under the best conditions.

These were the recommendations on conservation. Do you have any comments before we move on to the second part, the recommendations on sustainable development, we will follow the same methodology? No one seems to ask for the floor, so let us move on.

These recommendations begin with those on the Siem Reap River, brilliantly presented by our friend Professor Shinji Tsukawaki, including a map showing the locations and some pictures. I doubt that the first part would raise any objections on the substance.

Phnom Bakheng now and the South gate of Angkor Thom, a matter managed by the Tourism Management Plan with regard to the car park extension and the lighting and protection for the Bakheng ascent. We have asked them to further their thinking and not to act before a new proposal is submitted. I do not think anyone would comment against this.

Now the Tourism Management Plan *per se* with short recommendations, notably on the need to take a crosscutting approach. The Management Plan for Kulen that was clearly and thoroughly expounded on by Professor Bernard Hubert. There seems to be an observation from a representative of the Ministry of the Environment. Sir, you can either come to the podium or wait for a roving microphone."

Representative of the Ministry of the Environment: [*origK*] "Concerning Phnom Kulen, I would like to share some of my thoughts on a couple of points. First, with regard to the suggestion to develop a master plan for that site: I think that there is no need to highlight the role of the advisor we have hired, the person who authored [the document], because it makes it sound like the Ministry of the Environment did nothing in all of this. There should be another way to substitute the description 'who is the author of this document for both the content and the manner.' Such a description renders the Ministry of Environment as being

useless but capable only of hiring someone else to develop the document for it. In my view, this mention should be deleted."

Question from Mr. Azedine Bescahouch: [*origE*] "What is your suggestion? You are the representative of the Ministry; please, we will adopt your remark and our expert is here if we have any problem, tell us. What do you suggest?"

Representative of the Ministry of the Environment: [*origE*] "This is my wording: 'The Ministry of the Environment expresses its satisfaction with the external consultant sent by UNDP to co-operate with the Ministry of the Environment in order to elaborate the Phnom Kulen Management Plan'."

Question from Mr. Azedine Bescahouch: [*origE*] "We stop after that?"

Representative of the Ministry of the Environment: [*origE*] "In the second paragraph I would like to mention that in the Law on the protected areas it is strictly forbidden for people to carry out activities."

Question from Mr. Azedine Bescahouch: [*origE*] "What is your suggestion?"

Representative of the Ministry of the Environment: [*origE*] "Just to say that we agree with your point in the document. The third paragraph 'do not recommend that wooden (…) in the conservation area by the local community'. Well, actually we allow the community to collect dead wood and rattan or any roots."

Question from Mr. Azedine Bescahouch: [*origE*] "Please allow me: 'collecting dead wood etc.' is that sufficient or do you disagree?"

Interruption from Mr Shinji Tsukawaki: [*origE*] "I am sorry to interrupt, but unfortunately professor Bernard Hubert has left to take his plane which leaves at 6 p.m. I cannot thereby reply on this modification personally and I do not want us to modify this paragraph without his agreement, as he recommended it. Please do not delete or modify, simply indicate on this document clearly what you or we will modify it and please send him the document to get his opinion. I can only say this. Thank you."

Question from Mr. Azedine Bescahouch: [*origE*] "Do you understand his position?"

Representative of the Ministry of the Environment: [*origE*] "Yes I do."

Comment from Mr. Azedine Bescahouch: [*origE*] "Your statement is that you are not against the text, so why do you want to modify it? I do not understand."

Representative of the Ministry of the Environment: [*origE*] "Ok, you can keep the text."

Question from Mr. Azedine Bescahouch: [*origE*] "You agree to keep it as it is? Thank you very much".

Representative of the Ministry of the Environment: [*origE*] "You are welcome. Another remark on the relocation of the communities' old and ancient villages. It is on page 4. 'Recommend the status of old villages…' We will not relocate the old villages, only the illegal villages in the community. Could we correct the text?"

Comment from Mr. Azedine Bescahouch: [*origE*] "Let us be clear: In order to respect two important things, the text prepared and explained by the *ad hoc* experts is proposed. Your role as representative of the Ministry is to prepare on this text some remarks that we will send to our expert in order to have his point of view and etc. When we publish the final version of the recommendation, we will take into account your position and our expert wants to contribute to improve the situation. It is better to give us today, or later to the

Secretariat, your official position and it will be taken into account in the report. Ok?"

Representative of the Ministry of the Environment: [origE] "Thank you Professor."

Mr. Azedine Bescahouch:

"Thank you very much colleagues. We now move on to joint recommendations related to conservation and development on Preah Pithu. The issue there is on the immediate area surrounding the temple, the vendor stalls and their possible relocation. This is to inform the APSARA National Authority, and of course His Excellency the Director General and his colleagues will look into them with the presence of a representative of the Secretariat. We will make sure that the recommendations on Preah Pithu can be implemented as they have potential sensitive human aspects. This text should not be modified and implemented whilst communicating with His Excellency the Director General.

After the Angkor Wat *parvis*, there are some recommendations that are clearly explained. There was a presentation with regard to the road inside the Park where the most urgent repair work should be carried out and the general plan will be later on presented by the APSARA National Authority and studied by the two expert groups.

There are some additional recommendations on Kulen. We will better order the paragraph later. The wording of the new recommendations needs to be changed and this will be done when we have reviewed the texts for minor mistakes.

I turn to my colleague the representative of the Ministry of the Environment, as there is a recommendation on the road project and another on the archaeological remains, on the technical dossier and etc. Please if you have any observations, send them to us in writing.

Finally, on the management of the Angkor Park, let me quote: 'Congratulates the APSARA National Authority for the measures taken to control the illegal building construction'. This is an issue that went higher than our Committee, up to UNESCO. We congratulate the APSARA National Authority for the measures taken to control illegal building construction necessitating demolition measures. There are also some pictures to support this for those who may doubt it. 'Encourages the APSARA National Authority to continue to strengthen the protection of Zones 1 and 2 with the relevant regulatory provisions and related documentation and to hold a workshop on this subject with the *ad hoc* experts.' This will enable in the future the APSARA National Authority to be assisted in taking measures that will consolidate the ongoing activities undertaken by the Authority."

IX.2 Approval of the recommendations by the ICC-Angkor

"I believe that we have now finished. I do not think that anyone will feel coerced into doing anything. We have seen presentations, analysis and discussions on these texts and you have no observations to make. Our colleague from the Ministry of the Environment will send us a text that will be forwarded to the experts and it will reflect our common will to do our best. With the authorisation of the Co-chairs we adopt this text which will be cleared of any minor typos and mistakes and sent to you. If you agree, please give a round of applause. Thank you."

IX.3 Date of the next technical and plenary sessions

Comment from the Co-chairman for France: "Thank you Professor. The next item is the date of the next sessions."

Mr. Azedine Bechaouch:

"With the approval of the Co-chairs and of the APSARA National Authority, we took account of the fact that in a few days the World Heritage Commmitte session will convene. In October and November, it is the UNESCO General Conference, which this year is of importance as it is election time. All countries will attend and not only the nine presenting a candidate, including France. Her Excellency the Minister of Culture and Fine Arts will attend not only to vote but also to renew the membership of the World Heritage Committee later on during the General Conference.

This makes the months of October and November unavailable to us. We need to organise for December, before the Christmas holiday and after the 3rd or 4th, when the conference should be over at UNESCO. Looking at the calendar, I believe, Co-chairs, that the week from 11th until the 16th of December is the most appropriate, as it is after the UNESCO General Conference and before Christmas. One bonus is that on the 14th of December it is the 25th anniversary of the inscription of Angkor on the World Heritage List. It would be fantastic to convene on the 13-14th or 14-15th of December to allow for celebration on the exact day this endeavour was launched by the Tokyo Conference and confirmed by that of Paris. We have been here for 25 years and we will pencil in the 13-14th or 14-15th of December. Do you agree with these dates, Co-chairs?"

Comment from the Co-chairman for France: "This seems fine to us, of course, as long as the APSARA National Authority approves but it looks like the planets are aligned."

Comment from Mr. Azedine Bescahouch: "I now turn to Her Excellency the Minister and her delegation. We know that you will be busy in October and part of November with the elections. So, no dates in October and November, so December the 14th seems to be the right date as it corresponds with the 25th anniversary of the inscription of Angkor. It will be an Angkor celebration and to celebrate on the exact day is a must. These are the days we suggest. No decision is taken today, but the minutes of the proceedings will include the dates of the 13-14th or 14-15th and you will tell us which you prefer. Japan and France seem to agree."

Comment from Ms. Phoeurng Sackona: "If these are the dates for the Plenary Session then the 13-14th of December sounds good."

Comment from Mr. Azedine Bescahouch: "Great. Co-chair**,** I conclude and thank you for your patience and I hand over the floor to you for today's closing session."

X- CLOSING SESSION

Comment from the Co-chairman for France: "Thank you Professor. The dates have been quickly pencilled in. Thank you all. Before closing, I give the floor to Ms. Anne Lemaistre, representative of UNESCO in the Kingdom of Cambodia. You have the floor Anne."

X.1 Speech by representative of the UNESCO Director General, Ms. Anne Lemaistre, UNESCO representative in Cambodia

"Your Excellency Phoeurng Sackona, Minister of Culture,
Excellency, Mr. Sum Map, Director General of the APSARA National Authority,
Excellencies,
Ladies and Gentlemen,
Colleagues,
Friends,

I can only begin this closing statement by paying once again tribute to the memory of *Samdech Vibol Panha* Sok An whose 100 day ceremony since his passing has been commemorated. He was a passionate defender of the safeguarding of heritage and encouraged the World Heritage status of the Angkor and Preah Vihear sites. The UNESCO Director General paid him an emotive official tribute.

UNESCO would like to express its congratulations to Her Excellency Phoeurng Sackona, Minister of Culture and Fine Arts to have accepted the responsibility to oversee the two sites of the World Heritage, Preah Vihear and Angkor. UNESCO guarantees its full support to Her Excellency.

I am happy to inform you that on the 5th of May, 2017, His Majesty the King received an ICC-Angkor delegation made up of the Minister of Culture and Fine Arts, of the Japanese and French ambassadors and of all the members of the ICC-Angkor Secretariat. During this royal audience, the ICC delegation shared with His Majesty the latest developments in restoration undertaken by national and international teams, the ICC proceedings, and the findings of the latest archaeological research, in particular with the help of LiDAR. His Majesty expressed His satisfaction and congratulated the APSARA National Authority, France, Japan, UNESCO and all national and international partners for their unwavering support to the conservation, restoration and development of the Angkor Park. Next week and for your information, His Majesty the King will also accord an audience to Claude Jacques.

We told His Majesty of a recurring concern for the two co-chairs, the *ad hoc* experts and UNESCO on the illegal construction in the Angkor Park, as was mentioned during the last ICC session and repeated in the statement read out by Ms. Francine d'Orgeval. We express our gratitude to Her Excellency the Minister of Culture and to our Co-chairs, who directly informed *Samdech* Hun Sen. The Prime Minister took energetic action and put an immediate halt to illegal constructions up to ordering the demolition of illegally built structures.

The *ad hoc* experts, UNESCO and also France strongly desire that efficient monitoring measures are taken based on reliable documentation in order to put a definitive halt to this unbridled proliferation that would condemn Angkor. It is necessary to monitor using maps, satellite images or GIS to provide solid and reliable social and land use data. Documenting this threat takes special importance as the Angkor site will have to send a report on the state of conservation of the site next year, within the framework of the periodic report of the World Heritage Centre's Asia-Pacific region.

This great and very interesting session was conducive to animated discussions on different projects inside the Angkor Park and also Kulen National Park. It also reminds us, as did Ms. Francine d'Orgeval when talking about the future, that we must think out and contribute to the strategic vision for Angkor that the Cambodian authorities will define. With the sustainable development goals for 2030 in sight we must question the following: How do we conceive of Angkor in 2030? What do we want for Angkor? A living site with a larger green canopy, with zero pollution and traffic, which type of energy would we like to use?

This is an important process to conduct especially for tourism, as this vision can draw up strategies, road maps and start implementing activities based on this vision.

Changing subject, I have to inform you that within the framework of the Recommendations for Museums and Collections adopted by the UNESCO 2015 General Conference and that was presented at the ICC, the Museum section of the Department of Culture of Paris suggested organising with the Phnom Penh office a national seminar on the documentation of heritage objects in late 2017. This seminar will take stock of the activities of the Royal government in the field of Museum inventory techniques and potentially on archaeological depots. It will also be a platform for disseminating the recommendation. The proceedings will be published in the implementation report by State members of the 2015 recommendation. A preparatory meeting has been planned for the 27-28th of July and we strongly hope that the APSARA National Authority and Angkor Conservancy will attend. The Ministry of Culture and Fine Arts will be fully reported on.

Finally, great news, although this was already mentioned. In March of 2017, the Japanese government approved the fifth phase of the JASA project for 2018-2020 for a sum of one million US dollars, contributing to the UNESCO Japanese funds-in-trust for the protection of cultural heritage. As was said today, this project started in 1994, spearheaded by Professor Nakagawa, in close co-ordination with the APSARA National Authority and UNESCO. We would like to publicly express our gratitude to the Japanese government for this major contribution that will allow for the continuation of this leading activity at the Angkor Park.

[*origE*] I wish now to switch to English to inform you about Jay Raman's last ICC after three years in Cambodia. Jay, Public Affairs Officer at the US Embassy in Cambodia, also the spokesperson, sitting here in the first row, will be heading back to Washington to work at the Bureau of Educational and Cultural Affairs at the Department of State. So we wish him well and hope to have the pleasure of working with him again, as cultural preservation issues have been close to his heart, and he has done a lot over the past three years to make this a priority for the US Embassy.

I take this opportunity once again to thank you, Minister, for your active participation, our Co-chairs, Professor Beschaouch, *ad hoc* experts, the ICC Secretariat and the APSARA Team and Director General, the international teams and the interpreters for this excellent session and the collaborative spirit that has prevailed in our debates.

I will be delighted to see you again in December to celebrate the 25th anniversary of the inscription of Angkor on the World Heritage List.

Thank you for your attention."

X.2 Speech by the French Co-chair, Mr. Guillaume Narjollet, Counselor for cooperation and cultural affairs, Embassy of France in Cambodia

"Excellency Minister,
Excellency, Director General of the APSARA National Authority,
Distinguished representative of UNESCO,
Distinguished Permanent Secretary,
Experts,
Ladies and Gentlemen,

I am honoured to close this 28th Technical Session of the ICC: A dense session stretching over two full and informative days with presentations and discussions. I think that this evidences the need for two technical sessions per year.

Initially and on behalf of all of us here, I would like to pay tribute to *Samdech Vibol Panha* Sok An. This was the first session since he left us one hundred days ago. His investment in and contribution to the ICC, as head of the APSARA National Authority, are known and acknowledged by all, as was stressed by Anne Lemaistre.

I would also like to thank the APSARA National Authority for its hospitality and the smooth organisation of these two packed days. Her Excellency the Minister of Culture and Fine Arts is now the head the APSARA National Authority. We all know her attachment and engagement for the Kingdom of Cambodia's culture and heritage and we are convinced that her actions as Chairperson will bear results very soon and will meet the challenges that represent the daily conservation, restoration and development of Angkor.

She rightly mentioned, as also underlined Professor Beschaouch, that we are celebrating at the end of the year the 25th anniversary of the inscription of the Angkor site on the World Heritage List. The scheduled dates for the Technical and Plenary sessions of the ICC for December should coincide with this anniversary and we should already be planning how this anniversary will be commemorated, even if only symbolically.

On behalf of the co-chairmanship of the ICC I would also like to thank the experts that voluntarily and mandated by the ICC come on site and show great dedication and unwavering engagement. Among them we have Professor Claude Jacques, who has visited Cambodia since 1961 – it gives me vertigo - and it is his last assignment. May he receive our gratitude as well as his colleagues that have continuously worked to disseminate Khmer culture.

This brings me to talk about the role and operation of the ICC. I noted on several occasions that the experts express the need to receive the necessary documentation or explanations related to past recommendations. I will simply recall - I judge this important – an extract of the ICC-founding Tokyo Declaration that states: 'We agree to establish a coordinating committee (the Committee) at the ambassadorial level in Phnom Penh as the international mechanism for coordination of assistances to be extended by different countries and organizations as referred to in the previous paragraph. In order to assure its coordinating role, the Committee will be systematically informed of the details of work being undertaken on the site and in the region. It will ensure the consistency of the different projects, and define, when necessary, technical and financial standards and will call the attention of the concerned parties when required.'

The experts repeated this and as Co-chair, and I know that my Japanese colleague share my point of view, I have to stress the following: National and international teams work within the framework of the ICC and dialogue, information exchange and expertise are vital. Teams presenting follow-up on recommendations reports must present at the ICC and bring answers that are well-argued and scientifically supported. The ICC's role is to advise and technically and scientifically assess the conservation, restoration and sustainable development and its recommendations must be heeded.

Forthcoming projects must also be submitted to the ICC Secretariat, which must not be informed on once implemented.

Nevertheless, during this session almost all teams have presented their reports on the podium, something we should be satisfied with. We are heading in the right direction and maybe we will have to formalise reports and follow-up on recommendation presentations. On that matter, the Co-chairmanship could make some recommendations.

Although it already exists, scientific interactivity among teams should also be consolidated through seminars, general interest topic discussions and presentations of highlights and findings of the previous year.

We are also satisfied with the overall concern for the preservation of the site while improving infrastructure for increasing visitation and of course taking into account the interest and needs of the locals.

The willingness of the Ministry of Culture and Fine Arts and of the APSARA National Authority to give the status of sanctuary to areas where construction is prohibited, to safeguard Kulen and its ecosystem have all been noted and are important for the site's future, to preserve the site, its image and attractiveness. This is a virtuous circle that could turn nasty.

Angkor is a unique jewel and draws visitors as it is. Tourism brings potential revenue but is also a threat for the site. One of the challenges will be to combine the overall approach of the site with that of tourists, of locals and of all those that love, preserve and promote heritage.

The willingness of all the stakeholders, the APSARA National Authority, UNESCO, the ICC and teams in the field, exists. Let us make sure that we will succeed over the next 25 years of Angkor, for the World Heritage for Cambodia.

Thank you."

Comment from the Co-chairman for France: "I declare officially closed this ICC-Angkor 28th Technical Session."

****Conclusion of the 28th ICC Technical Committee Meeting ****

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28TH TECHNICAL SESSION OF THE ICC-ANGKOR
APSARA NATIONAL AUTHORITY, SIEM REAP, 21-22 JUNE 2017

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48	H.E. Mr. SAY Samal	Minister	Ministry of Environ-ment	
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