Strengthening the Future of Southeast Asian Archaeology:

Investigating Prehistoric Settlement of the

Middle Mekong Basin

Part of the

Henry Luce Foundation's

Initiative on East and Southeast Asian Archaeology and Early History

Report on Year One



Submitted by the

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of

Archaeology and Anthropology

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In collaboration with

Department of Heritage, Laos

University of Washington, Seattle

Sirindhorn Anthropology Centre, Bangkok

Executive Summary

Year One of the University of Pennsylvania Museum's (Penn Museum's) collaborative research program in the Middle Mekong River Basin has achieved several objectives. It has:

- Built upon research previously undertaken by Penn Museum in this geographic region, particularly the Ban Chiang and related research begun in the 1970s in northeast Thailand, and the Luang Prabang, Laos, area research begun in 2001 in northern Laos
- Substantially advanced the physical and intellectual infrastructure needed to carry out modern archaeological research in Southeast Asia through a multinational training program in Luang Prabang
- Implemented a border-crossing research design that lays intellectual and logistical foundations for future regional archaeological development
- Produced several tangible products that will have long term usefulness in regional archaeology, including recording methods for excavation and survey, databases of archaeological data, trilingual vocabularies for archaeology and related disciplines, storage facilities, and exhibitions
- Laid foundations in terms of personnel, facilities, and research objectives for field and laboratory research for the next three years of Luce support and beyond
- Added materially to previous archaeological knowledge of the region by expanding the settlement survey in the Luang Prabang region

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Background

In June of 2008, the University of Pennsylvania Museum was deeply honored to be named a recipient of a four-year institutional research grant from the Henry Luce Foundation, as part of its Initiative on East and Southeast Asian Archaeology and Early History. The grant supports strengthening our decades-long research program in Southeast Asian archaeology. Year One of our Luce-funded program has been extremely full of activity, particularly preparing for and conducting our initial objective, namely a training program in Laos in basic archaeological skills. Part 1 of this training took place in February and March of 2009. Part 2 will occur in July 2009. As this report outlines, Year One is laying critical infrastructure foundations at Penn and at other collaborating institutions for the next three years of the program.

Year One of our program builds upon the Museum's previous work in Thailand and Laos, particularly the Ban Chiang Project, begun in the mid 1970s, and the Middle Mekong Archaeological Project (MMAP) in Luang Prabang, first conceived in 2001. MMAP is an ongoing collaborative research program of Lao, Western, and Thai scholars, students, and heritage management officials. The Lao program is co-directed by Joyce White and Bounheuang Bouasisengpaseuth. The project has two aims. The first aim is to investigate the prehistory of the middle reaches of the Mekong Basin, with particular attention to the Middle Holocene (6000-2000 BC), during which agricultural societies and later metallurgy came into the region. This research should help archaeologists better understand a key and under-explored region of prehistoric Southeast Asia, and will throw light on the origins of the Ban Chiang cultural tradition. The second aim is to provide archaeological training and institutional capacity building for Lao, Thai, and Westerner researchers working in mainland Southeast Asian archaeology. The Luce funding is enabling the Penn Museum to pursue both overarching objectives with greatly enhanced rigor and speed, which in turn will inevitably positively affect the future of Asian archaeology at collaborating institutions and in the region generally.

People, Time, and Facilities

Effective modern archaeology in Southeast Asia requires bringing together archaeologists and heritage managers of diverse backgrounds and interests in rich interactions for long enough periods of time so that all participants can learn from each other. Sufficient technical and other equipment, space, proper storage and other physical resources are needed as well. The Luce grant is enabling Penn Museum to help create just such contexts that foster interactive learning and the expansion of knowledge of the ancient past in innovative ways. The full fruits of this effort will emerge over the next three years and after, but the foundations are clearly being laid in Year One.

Trainees

Although the MMAP belief is that all participants are both trainees and trainers, in that each person has things to teach and things to learn, the structure of the Luce-funded program is shaped in part by the absence in Laos of any in-country formal university-level training in archaeology. Less than a handful of Lao individuals have received formal archaeological training outside of the country. There does exist, however, a cohort of heritage managers whose numbers are increasing because of the Lao government's interest in developing tourism. Archaeological research in Laos takes place within the Department of Heritage, Ministry of Information and Culture. Most heritage managers in Laos who have become involved in the few archaeological projects that have been undertaken in the country have been educated in disciplines such as history, fine arts, and architecture. The lack of formal archaeological training combined with the very low technical infrastructure in Laos, the poorest country in Southeast Asia, means that the most fundamental aspects of archaeology need to be taught in our program.

In February and March of 2009, thirteen Lao and two Thais participated in a six-week training season organized by Penn Museum's Joyce White, now Associate Curator in the Asian Section. The Laotians were from offices of the Ministry of Information and Culture in three different provinces, as well as several separate branches of the Lao National Museum; the Thais included a lecturer in a cultural management program at Thammasat University and a researcher from the Sirindhorn Anthropology Centre (see Appendix 1). The goal of the training program was to provide the participants with a basic foundation in non-excavation archaeological skills that can be drawn upon both in future MMAP seasons and in their own work. The training program covered a wide range of topics, including computer maintenance, database entry and construction, GIS, survey strategies in the field, artifact drawing, metrical analysis of stone tools, flotation and botanical analysis, rock identification, shell analysis, public communication, and exhibit design.

Trainers

Joyce White designed the February-March training program and recruited instructors from the United States, Britain, Thailand, and Laos. She also asked some of the trainees to do presentations on areas where they had special knowledge. PowerPoint lectures were presented nearly every morning and sometimes in the afternoon as well. Lecturers and lecture topics -included:

Dr. Joyce White Mr. Bounheuang Bouasisengpaseuth Mr. Shawn Hyla General archaeology, survey, illustration Local/village relations; Lao heritage law Computer safety and maintenance Dr. Katherine Arrell Mr. Peerayot Sidonrusmee Dr. Gillian Thompson Dr. Elizabeth Hamilton Dr. Julie Van Den Bergh Mr. Phonepeth Joumlamounty Ms. Elizabeth van Horn Dr. Huw Barton Mr. Korakot Boonlop

GIS

GIS and cultural resource management Flotation and botanical analysis Database creation and use Applied heritage management of Plain of Jars Geology and rock identification Public communication and exhibits Stone tools and organic residues Skeletal analysis

Hands-on tutorials, exercises, and practicums were conducted in the laboratory and the field. When individuals showed special aptitude or interest, additional instruction and experience was provided on a case-by-case basis. Although some of the trainers could only participate for a few days, several of them (e.g., White, Hamilton, van Horn, Hyla, and Arrell) were present for four weeks or even the entire six weeks of the training. Such continuity of involvement enabled a close camaraderie and team spirit to develop among trainees and trainers. Reports from several of the trainers begin on page 22, and these reports give more details on the scope of the training season.

Facilities

The governmental Culture Section of Luang Prabang gave MMAP the use of a spacious building (Figure 1). Two large rooms were suitable for computer work and laying out and recording artifacts. Lectures took place in a separate seminar room, and large porches in the front and back of the building provided additional space for projects. A storage room, kitchen, and bathroom completed the layout. Luce funds purchased many technical items, from laptop computers to hard drives for backup, to a small USB microscope, as well as the extremely useful projector. Upgrades to the building's electricity and lighting and a 30-day contract with a wireless node allowed a satisfactorily up-to-date setup for developing the basic computer skills so important for today's archaeologists.

Luce funds enabled the purchase of several pieces of technical equipment to assist in data collection and analysis. For example, the Nomad PDA allowed us to collect survey data efficiently; paperwork was eliminated, data-entry errors reduced, maps produced, and data analyzed quickly. Using this system was also a significant part of the training; most of our Lao colleagues have limited access to and familiarity with computers of any kind. For them, learning how to use the mobile GIS was an unusual challenge and made a strong impression of how technology can assist the organization and analysis of heritage data.



Figure 1. MMAP is allowed to use much of this building for its work.

Research Materials

The Luce-funded program is designed to study data and materials previously collected in Penn Museum research programs as well as to collect new data to add to our knowledge of the prehistory of the middle Mekong River Basin. Thus in their practicums in the February/March training, participants processed materials that had been collected by MMAP in the Luang Prabang area in 2001-2008, as well as new data they themselves collected in 2009.

Survey materials collected in MMAP 2005 comprise our basic settlement data. In that year a joint Western-Lao-Thai team conducted surveys along the Khan, Seuang, and Ou rivers in the vicinity of Luang Prabang; 57 sites were discovered in an area that until now had had almost no known archaeological record. Twelve more sites were found in 2009 for a total of 69 sites in the MMAP database.

Materials excavated from two sites in 2007 and 2008 provided thousands of artifacts for analysis. The site of Phou Phaa Khao Rockshelter (Figure 2), test-excavated in 2007 with a 1m by 2m trench, produced portions of seven burials, along with over 2000 stone flakes and tools and almost 400 potsherds. We concluded that iron age burials had been cut into earlier (Early to Middle Holocene) Hoabinhian cultural deposits. One AMS date from a tooth had been obtained, indicating the burials came from the late iron age (AD 130-350).



Figure 2. Excavations at Phou Phaa Khao Rockshelter, 2007.

In 2008, the joint team test-excavated Tham Vang Ta Leow, a cave site that overlooked both swidden fields and wet-rice fields (Figure 3). Two test pits were excavated to a depth of about 1 meter; one was 1x2m and, the other was 1x1m. Over 6000 Hoabinhian stone cores and flakes were recovered, along with 83 pottery sherds. A rich collection of shell was recovered as well. Three radiocarbon dates from the bases of the two pits demonstrate that the earliest deposits come from about 9000 B.C., the end of the Pleistocene and the beginning of the Holocene.

The thousands of artifacts recovered from the 2005 survey and 2007 and 2008 test excavations provided ample materials for the Luce-funded 2009 training season. The heritage managers, while not becoming specialists themselves in trainings of three to six weeks, see the possibilities of science-based approaches, and gain skills in data organization and recording as they engage in tasks such as sieving sediments and sorting residues. By using the project's previously collected data and collections, MMAP trainings involve participants in real projects headed toward publications, not just abstract exercises.



Figure 3. View downhill from Tham Vang Ta Leow, showing typical landscape.

Products

In addition to providing several Lao and Thai (and others) with experience in handling archaeological materials of the nature found in northern Laos, and establishing a nicely developed working space in Luang Prabang, MMAP 2009a produced several tangible results that provide foundations for future development of archaeology in this region. These results include:

- recording methodologies for survey, excavation, and finds;
- a trilingual (English, Lao, Thai) vocabulary for archaeology and related disciplines;
- a database with modules for bags, artifacts, sites, including a GIS with our 69 sites;
- an organized storage facility in which lithics, ceramics, plant remains, bone, shell and other materials recovered during two excavations and two surveys are cleaned, sorted, organized and ready for more specialized study;
- keys for lithic and shell identification; and
- exhibits on MMAP at both the Lao National Museum in Vientiane and the Culture Section of Luang Prabang. Some of these products will be further explained below.

Recording methodology

MMAP recording methodology has implemented aspects of the Ban Chiang recording system suitable to Lao archaeology and developed new tools as well. Many recording components developed at Ban Chiang (e.g., bag logs, provenience labeling systems) have been found to be suitable for sites in northern Laos, probably because the methods work well in sites with no architecture and ambiguous soil stratigraphy. We have also devised new field forms and recording elements that incorporate updated approaches to excavations such as Harris Matrix contexts and geoarchaeology.

MMAP has also consistently emphasized the use of digital technologies and new modes

of data collection. The 2005 survey was aided by the use of a mobile geographic information system consisting of a small PDA running ArcGIS software and connected to a separate GPS tool. Basic database and field recording systems had been established in previous MMAP seasons, but needed modification and expansion. For the 2009 season, we decided to combine all the data collection tasks into one handheld device, the TDS Nomad (Figure 4). The Nomad is a rugged PDA that collects GPS point data, but also



Figure 4. Data are entered into the TDS Nomad.

allows the entry of large quantities of data into ArcGIS forms that are downloadable to PCs. Dr. Katherine Arrell, Lecturer in Physical Geography at the University of Leeds, came to Philadelphia in September and November 2008 to reconstruct the old data entry forms and to work with Dr. Elizabeth Hamilton to create new forms for the Nomad, using the current version of ArcGIS software. Work on these forms and upload to the Nomad continued into January 2009.

Databases

MMAP has worked on developing a relational database of our finds in Luang Prabang since 2005. Drawing from experience with the Ban Chiang artifact database and striving to make them compatible, we now have a database with a bag log, artifact log, site log, and other components, populated with the data we have collected from northern Laos since 2005. Dr. Elizabeth Hamilton has put in a great deal of time and thought into this database, and we have instructed MMAP team members in its use and data entry. Part two of Year One's training during July 2009 will include intensive data

entry on lithic artifacts. There are many refinements we plan to undertake over the course of the Luce Program.

Coding Keys

In the course of the trainings, it became apparent that trainees could develop keys for coding rock types and shell types. Rock identification practicums were provided by Mr. Phonepeth Journlamounty, Deputy Director of the Department of Geology and Mines, Vientiane. These keys assist in data entry and the resulting data will be organized and analyzed. Papers given by the trainees at the Indo-Pacific Prehistory Association meetings in Hanoi in late November 2009 will use these data.

Collection of new data

The trainees' participation in field surveys and artifact measurement and artifact data entry materially advanced the Year One goal of extending the collection of new field data. Survey teams went out six days a week for four weeks and twelve new sites were discovered in the 2009 season, at least two of which have the potential for productive excavation (Figure 5). The 2005 and 2009 surveys together discovered a total of 69 sites, enough to form hypotheses about land use and how sites are distributed in the landscape that can be tested in future seasons.



Figure 5. Sites discovered in 2005 and 2009

MMAP archaeological vocabulary lists

International collaboration requires communication in a common language, and this has been a particularly challenging aspect of MMAP work in Laos. Not only are the Lao participants not fluent in everyday English, but with no academic tradition in archaeology in the country, there is no recognized archaeological vocabulary in Lao. Some but not all of the western participants know some Thai, a language related to Lao. Most MMAP seasons had Thai archaeologist participants, and this has proved essential to one of the most important and far reaching products of MMAP – trilingual word lists for archaeology and related disciplines. Thai participants determined Thai equivalents for standard English terms in archaeology, which often (but not always) could suggest suitable translations in Lao. This effort started on a small scale in 2006, which was a short training season to process the survey material collected in 2005. We began with word lists for stone tool analysis, photography, and databases (Figure 6). We pioneered new words in Lao and Thai for attributes such as 'bulb of percussion' and 'feather termination.' The vocabulary development proved essential in artifact illustration, data base entry, and photographic training, providing words to describe the important points to observe on specific artifacts.

Vocabulary for Computer protection	ຄຳສັບກ່ຽວກັບການປ້ອງກັນຄອມພືວເຕົ້	คำ ตัพท์เกี่ยวกับการป้องกันคอมพิวเตอร์
English	Lao	Thai
Protection	ການປ້ອງກັນ, ການຮັກສາ	การดูแล ป้องกัน
Attachment	ການຕິດຄັດເອກະສານມານຳ	การแนบไฟล์เอกสาร
Infection	ການຕິດເຊື້ອໄວຣັສ	การติดไวรัสคอมพิวเตอร์
USB drive	ເຄື່ອງບັນທຶກຂໍ້ມູນ	เครื่องบันทึกข้อมูลพกพา
Antivirus	ການປ້ອງກັນໄວຣັສ	การป้องกันไวรัสคอมพิวเตอร์
Download	ໂອນຂໍ້ມູນ	ถ่ายโอนข้อมูล
Update	ທັນສະໄໝ	ทันสมัย
Scan	ຄົ້ນຫາ, ກວດຫາ	ค้นหา, ตรวจ
Quarantine	ການກັກບໍລິເວນ	กักไว้

Figure 6. Sample page from the trilingual archaeological vocabulary lists

This effort proved essential for further development of work in the country, and in Year One, a major trilingual compendium of words on topics ranging from GIS to computer hard drive management was undertaken by MMAP participants. Sureerathana Bubpha

from Thammasat University in Bangkok took on the lion's share of the work of compiling and editing the compendium. It is anticipated that this compendium, by now the size of a book, will be a basic reference in an archaeology curriculum currently under development at the National University of Laos.

Storage

Archaeological collections are studied and restudied over many years, and thus their storage and organization are critical components to their contribution to knowledge of the past. We were fortunate in Luang Prabang that a small room in our facility could be dedicated to storage. Luce funds enabled purchase of sturdy shelving and plastic containers that keep dust and moisture away from artifacts and that can be labeled. The storage set-up allows team members and visiting specialists to easily retrieve exactly the boxes they need and return them to their proper location when done.

Public communication and Exhibits

The Luce Program, along with the government of Laos, places a high priority on the communication of MMAP results to the public. In 2005, the members of MMAP set up in the Lao National Museum a small exhibit of photographs and text describing its work. In the last week of the 2009 season MMAP created a much more ambitious exhibit of photographs, text, equipment, and artifacts that was mounted in both Luang Prabang and the Lao National Museum in Vientiane. This bilingual exhibit was prepared by



Figure 7. MMAP Co-Director Bounheuang Bouasisengpaseuth explains a panel of the MMAP exhibit to official visitors

MMAP staff and trainees and not only communicated the work of MMAP to the government and the public but was a significant learning experience for the trainees, most of whom work in the area of cultural resource management.

Beth van Horn, who has had a career in marketing and development at Verizon, took the lead in teaching the principles of public communication

and in designing an effective exhibition.

The opening of the exhibit, which

attracted a great deal of official attention and praise, was attended by high government officials, including the Director General of the Lao Department of Heritage, Thongsa Sayavongkhamdy, the deputy governor of Luang Prabang Province, the Director of the

National Museum in Luang Prabang, along with school students, and other members of the public (Figure 7).

The exhibit consisted of six large panels (Figure 8), each with bilingual text and photos. The subjects of the panels were:

About the Middle Mekong Archaeological project

Why does MMAP do its work in Luang Prabang?

How does MMAP learn about prehistory?

What is MMAP learning about prehistory?

Who studies the prehistory of Lao PDR?

Preservation of Lao cultural heritage—What can YOU do?



Figure 8. One panel of the MMAP exhibit.

In addition, the trainees constructed displays of shells, stone tools, and human bones discovered in the excavations and surveys, along with explanations of their meaning (Figure 9).



Figure 9. Trainee Phousavanh Vorasing of the World Heritage Center, DOIC, Xiengkuang Province, explains to a group of interested schoolchildren the shell key he constructed.

At the end of the formal training, many of the team returned to Vientiane. Two special occasions occurred in the week following the training. First Joyce White took more than twenty staff members of the Lao National Museum and several additional MMAP team members to visit the Ban Chiang National Museum in Thailand. This visit provided for many of the Lao their first visit to a world-class museum that focused on presenting archaeology to the public. The second occasion was a lecture that White gave to upper level government officials invited by the Director General of the Department of Heritage. White's topic was "Why should Laos invest in archaeology?"

Institutional Development and Collaboration

The four collaborating institutions are participating in Year One of the Luce grant and through this process have expanded and strengthened their commitment and capacity to undertake archaeology in Southeast Asia.

Penn Museum

Under Director Richard Hodges, Penn Museum restructuring includes the designation of Ban Chiang as one of the Museum's 'five key long-term research locations.' With this designation, Penn Museum's research in Southeast Asia has achieved greater recognition and stability. Joyce White's title has been changed from "Senior Research Scientist" to "Associate Curator" in the Asian Section. The Museum supported the February-March training by lending its IT head, Shawn Hyla, to set up the program's technical side, and give numerous lectures in Luang Prabang on computer use and maintenance. In December, Joyce gave the talk "New Surprises from Ban Chiang" in the Museum's Great Sites Series. The Ban Chiang Project itself has put out a new issue of The Ban Chiang Update – a newsletter for the Friends of Ban Chiang featuring several short articles on receipt of Luce funds, fieldwork in Laos, and the beginning of the Ban Chiang photo archive. Since July 1, 2008, \$50,067^{*1} has been raised to match the Luce grant, and the Museum is looking ahead to Year Three in terms of suitable space for the internship program on ceramics analysis, as well as programmatic development (a year-long course in ceramics analysis), and raising the additional funds needed to support that particular year.

¹ An annual appeal to past supporters of Ban Chiang has just recently been made, and contributions from this appeal are still being received. In addition, the Museum currently has a proposal pending for three-year support for staffing of digital archives or databases for several of our key long-term research locations. If funded, this grant will include support for staff working on the databases referenced on page 10 of the report. As the Museum moves into the quiet phase of its capital campaign from fall 2009 through fall 2010, key past supporters will be asked for multi-year major gift commitments in line with their interests. Two key supporters for the Museum, both of whom are close to the MMAP project, will be asked to make a multi-year project commitment as their Museum Campaign gift during the coming year.

Department of Heritage, Lao P.D.R.

The Department of Heritage (DOH) in Laos has always been a partner with Penn in all previous seasons of MMAP. It contributes staff, space, time, access, use of buildings, and much assistance in helping to meet governmental regulations. Our Lao counterparts in particular bring the legal knowledge, social and governmental networks, and interpersonal skills necessary for effectively conducting complex projects in one of Asia's least developed nations.

This year Luce funds enabled thirteen DOH staff members to participate in the training, three from the National Museum, including MMAP co-director and National Museum deputy Director Bounheuang Bouasisengpaseuth, two staff members from the Division of Archaeological Research, two staff members from the World Heritage Centre, Department of Information and Culture, Xiengkuang Province; two staff members from the National Museum, Luang Prabang; and three staff members from the Department of Information and Culture, Luang Province. Having the training cross-cut five normally independent DOH offices from three provinces in Laos has the effect of bringing the new skill sets and knowledge into several offices of Lao culture heritage management simultaneously. Thus "capacity building" in heritage management such as scanners and printers for use of the offices in between field seasons.

University of Washington

The Department of Anthropology of the University of Washington (UW) is contributing expertise and funds for the July 2009 training in excavation. Ben Marwick, assistant professor at the Department of Anthropology at the University of Washington (UW), will be taking the lead during the test excavation at Tham Sua in the second part of Luce-funded Year One training during July 2009. Marwick plans to bring several technically advanced analytical procedures to bear on the MMAP excavation this year, including geochemical and geophysical analysis of archaeological sediments, elemental analysis of ceramic and stone artifacts, and thermoluminescence dating of ceramics. He is also bringing one UW graduate student who anticipates doing dissertation research in Lao archaeology. Other UW graduate and undergraduate students will be involved in laboratory research projects in Seattle. These developments in themselves contribute to the Luce objectives of training the next generation of archaeologists, strengthening institutional programs, and promoting scholarly links between Asian and North American scholars.

Sirindhorn Anthropology Centre

The Sirindhorn Anthropology Centre (SAC) participated in the Year One training by the involvement of Korakot Boonlop, a SAC staff researcher. Boonlop has had many years of experience as an archaeologist in Thailand, emphasizing investigation of the Ban

Chiang cultural tradition. He also specializes in analysis of human skeletons. The February-March training was his third season participating with MMAP. Boonlop contributed in countless ways to the Year One program, from conducting and lecturing on care and analysis of human remains, reconstructing a skull MMAP excavated in 2007, helping with the massive translation effort in the vocabulary, bilingual exhibit, and daily lectures. His ongoing participation has greatly assisted the "border-crossing" objectives of the MMAP program, helping to transmit knowledge across national and linguistic boundaries, and enhancing his own experience which he bring back into the milieu of professional Thai archaeology.

Summary and the Next Steps

The Henry Luce Foundation funding of a collaborative research program in the Middle Mekong Basin is enabling Penn Museum and our partners simultaneously to explore a keystone region in Asian prehistory and to develop the human and institutional resources to sustain archaeological investigation for years to come.

MMAP research done to date in Luang Prabang Province demonstrates that humans have lived in this landscape at least since the terminal Pleistocene. We have identified several deposits that date to the early Holocene and probably earlier. With continued excavation and analysis the research program should contribute much to learning about the little-known hunter-gatherer, stone, and metal ages of mainland Southeast Asia.

The Luce funding of a four-year expansion and enrichment of the Penn Museum's research in this part of Asia is enabling both the training of regional archaeologists and the incorporation of methodologies that would otherwise have been impossible. Techniques that have rarely been attempted in mainland Southeast Asia, such as residue analysis and palaeoethnobotany, promise to address important questions in the area's prehistory, including the origins of agriculture and the nature of hunter-gatherer adaptation to tropical environments. Although it is not yet clear if we will be able to resolve conclusively such questions as the nature of societies during the middle Holocene (6000-2000 BC) and how the Ban Chiang cultural tradition emerged, this Luce-funded work will inevitably expand knowledge of the human occupation of one of the world's great rivers.

The building of "human capital" in Laos and Thailand in the areas of cultural research management, archaeology, and museum studies through our training programs will also have a long-term impact. Year One of the Luce grant was designed to establish field methodology and techniques, add new data both from survey and laboratory analysis of already-excavated material, and train the core team of Lao and Thais in basic survey and post-excavation skills. All these goals were achieved. We designed and tested survey technology and created new database structures for recording metrical and non-

metrical data. Our surveys led to the discovery of 12 new sites, some of which are suitable for future excavation. Stone tools, shells, and other botanical remains were analyzed or prepared for future analysis. The results of the stone tool rock identification were remarkable, demonstrating variations in raw material choice not before seen among Hoabinhian assemblages. These data will be discussed in future scholarly papers.

The training program produced notable results. Team members received hands-on training in computer maintenance, survey, GIS and other technologies, databases, illustration, and artifact and residue analysis. Our strategy of combining collaborative research with progressive training has proven successful in developing and maintaining productive relationships among Lao, Thai, and Western team members. This training in basic skills, however, is only one part of our objectives for collaboration. The second part is engaging our Lao colleagues in the conventions and culture of international academia by creating substantial opportunities to contribute to publications and participate in international conferences, including seeking financial assistance and helping to draft presentations. As a result of the analytical work they performed during the training season, several of the trainees will have the opportunity to participate in an upcoming Indo-Pacific Prehistory Association Congress in Hanoi, Vietnam.

Perhaps the most concrete result of the season was the trilingual Archaeological Vocabulary list, which we anticipate will be a basic reference in an archaeology curriculum currently under development at the National University of Laos. The public exhibition in Luang Prabang and the National Museum in Vientiane, which was a major effort to disseminate the results of MMAP work in Laos to the government and to the public, continues the tradition established by the Ban Chiang Project of presenting our work in a timely fashion.

The rest of 2009 will be full of activity for MMAP. Part two of the Year One training will take place in July 2009. Emphasizing excavation, a new rockshelter site, Tham Sua along the Seuang, will be tested. For this training excavation, partner institution University of Washington will be contributing personnel, financial, and technical resources. In addition to Ben Marwick from the University of Washington, Helen Lewis from University College Dublin will continue from previous seasons as our cave soil expert. Several of the trainees in the February-March 2009 training will take part in the July excavation, and will bring to the excavation training familiarity with several components of the finds recording system, ensuring continuity and progressive development of skills.

The Year One two-part training program lays the groundwork for Year Two's excavation to begin in December 2009, a program which will be more ambitious (i.e., a larger excavation) since basic archaeological skills will be in place among the participants. There are a couple of sites under consideration for Year Two's program, and one likely location is Tham An Mah located fairly close to Luang Prabang town. We expect several of our specialists to participate again, and add new ones, including Ken Aplin, our faunal expert.

Prior to the Year Two excavation program, many of the MMAP team will participate in the 19TH Congress of the Indo-Pacific Prehistory Association, 29 November to 5 December 2009 in Hanoi, Vietnam. Luce funds will assist several Lao and Thai MMAP team members to attend and present papers using MMAP data, which for many will be their first participation in an international conference. The conference experience and the opportunity it provides for moving MMAP archaeological data toward publication contributes to Luce objectives of strengthening the next generation of regional professional archaeologists while simultaneously fostering dissemination of new data.

APPENDIX 1: Middle Mekong Archaeological Project (MMAP) Team – February/March 2009 Training

Name	Institution	Title (MMAP Role)
Dr. Joyce C. White	University of Pennsylvania Museum of Archaeology and Anthropology (Penn Museum)	Senior Research Scientist; Co-Director MMAP; Director of Ban Chiang Project (MMAP trainer: Overall)
Mr. Bounheuang Bouasisengpaseuth	National Museum, Department of Heritage (DOH), Vientiane	Deputy Director; Co Director MMAP (MMAP trainer: Local/village relations; Cultural Resource Management, VT Museum)
Dr. Katherine Arrell	University of Leeds, U.K. School of Geography	Lecturer in Physical Geography (MMAP Trainer: GIS)
Dr. Huw Barton	Leicester University, U.K.	Lecturer in Archaeobiology (MMAP trainer:Lithics/organic residues)
Dr. Elizabeth Hamilton	University of Pennsylvania Museum of Archaeology and Anthropology (Penn Museum)	Research Coordinator, Asian Section (MMAP trainer: Database)
Ms. Beth Van Horn	University of Pennsylvania Museum of Archaeology and Anthropology (Penn Museum)	Volunteer (MMAP trainer: Public Communications)
Mr. Shawn Hyla	University of Pennsylvania Museum of Archaeology and Anthropology (Penn Museum)	Senior IT Specialist; Leader of Museum IT Projects (MMAP trainer: Computers)
Mr. Phonepeth Joumlamounty	Department of Geology and Mines, Vientiane	Deputy Director (MMAP trainer: Rock identification)
Mr. Peerayot Sidonrusmee	UNESCO, Bangkok	GIS Programme Assistant (MMAP trainer: GIS and Cultural Resource Management)
Dr. Gillian (Jill) Thompson	University of Bradford, U.K. Division of Archaeological, Geographical and Environmental Sciences	Lecturer in Environmental Archaeology (MMAP Trainer: Archaeobotany/ flotation)
Mr. Caultaamana	National Museum DOU	
Sonethongkham	Vientiane	Researcher (MMAP participant)
Mr. Sangmany Sananekhom	National Museum, DOH, Vientiane	Conservator and Restoration (MMAP participant)
Mr. Souliya Bounxaythip	Division of Archaeological Research, DOH, Vientiane	Researcher (MMAP participant)
Mr. Souliphan Bouaraphan	Division of Archaeological Research, DOH, Vientiane	Researcher (MMAP participant)

Mr. Norseng Sayvongdouane	Department of Information and Culture (DOIC), Luang Prabang	Deputy Director, Provincial Cultural Section (MMAP participant)
Mr. Onchan	Department of Information	Chief of Culture (MMAP participant)
Samone	and Culture, Luang	
	Prabang District	
Ms. Kongkeo	Department of Information	Staff, Provincial Cultural Section (MMAP
Phannasy	and Culture (DOIC), Luang	participant)
	Prabang	
Ms. Xaysy Sandala	DOIC, Luang Prabang	Researcher (MMAP participant)
	Province	
Mr. Nouphanh	National Museum, DOH,	Researcher (MMAP participant)
Keosouda	Luang Prabang	
Mr. Sengphone	National Museum, DOH,	Collection Manager Assistant (MMAP
Keophanhya	Luang Prabang	participant)
Mr. Phousavanh	World Heritage Centre,	Researcher (MMAP participant)
Vorasing	DOIC, Xiengkuang	
	Province	
Ms. Khammeung	World Heritage Centre,	Researcher (MMAP participant)
Boudthavixay	DOIC, Xiengkuang Province	
Ms. Sureeratana	College of Innovation,	Archaeologist and Lecturer, Cultural
Bubpha	Thammasat University,	Management Programme (MMAP
	Bangkok	participant; vocabulary editor)
Mr. Korakot	Princess Maha Chakri	Archaeologist; Researcher (MMAP
Boonlop	Sirindhorn Anthropology	participant, skeletal analyst)
	Centre, Bangkok	

APPENDIX 2: Specialist Reports

Katherine Arrell, Ph.D.

Lecturer in Physical Geography School of Geography University of Leeds LS2 9JT



Primary activities during the MMAP 2009 season

Most of my activities during the 2009 season were concerned with mobile GIS and mapping. This led to my involvement in the following tasks:

- Hard drive organization and data backup
- GIS and teaching equipment lists
- GIS and GPS training in the field while leading survey teams
- ArcPad forms design and training on how to create them
- Data editing, cleaning and maintenance
- Datum and coordinate system adjustments
- Transfer and packaging of data between mobile and lab GIS.
- Creation of basemaps (templates containing basic geographic information of the Luang Prabang region) to facilitate future mapping

Lectures given

I gave a lecture on the motivations for and benefits of mapping. This introduced the trainees to mapping and the importance of spatial organization of sites and settlements. The lecture also included a discussion of the types of queries and questions we can ask relating to spatial organization and patterns.

I also created the slides for a lecture detailing the information collected and stored within the ArcPad Nomad forms.

Resources created

As a learning and teaching resource I created a comprehensive 'How-to Guide for ArcGIS and ArcPad' to be used by the MMAP team both in this season and in the future. This comprised the following:

Contents

- 1. Top Tips
- 2. Data management and backing up
- 3. Editing data
 - a. In ArcPad
 - i. Changing attribute information
 - ii. Adding data
 - b. In ArcGIS
 - i. Changing attribute information, adding and deleting fields and deleting records
 - ii. Adding data
- 4. Adding X and Y coordinates
- 5. Exporting data from ArcGIS
- 6. Putting data onto the NOMAD
- 7. Making maps with all data
- 8. Making maps based on data attributes
- 9. Labeling features
- 10. Creating a more complex map based on attributes
- 11. Editing legends

Trainings conducted

The training I conducted can largely be categorized into the following seven categories:

- Cleaning and maintaining spatial data
- Designing and creating ArcPad forms
- Editing data in ArcPad and ArcGIS
- Importing and exporting data to and from ArcGIS
- Adding and collecting data using the Nomad
- Creating maps in ArcMap
- Querying data in ArcPad and ArcGIS

These were carried out both in the laboratory and in the field.

Methods implemented

The teaching component was conducted both in the field (survey team leading and Nomad instruction) and in the lab (lectures and one-on-one training in database and map construction, and general instruction in GIS). The research component was also both in the field (survey to add new sites) and the lab (mapping of MMAP sites according to different criteria; for example, mapping all cave sites or sites near permanent water). Survey and GIS mapping and database are key to achieving the goals of the MMAP.

Results attained

The survey component of the MMAP field season in 2009 resulted in the discovery of 12 new sites, some of which would be suitable for future excavation. Adding these 12 sites to the 57 discovered in previous survey seasons has allowed us both to provide a more representative distribution of sites in the area directly surrounding Luang Prabang and to extend our understanding of the regional trends and patterns of habitation within the MMAP area.

Expectations for future MMAP collaboration

The MMAP 2009 season was very productive not only in regard to the training and collaboration of all members of the team but also in regard to the potential achievements with further field seasons. At the end of the field season a number of the Lao and Thai MMAP team members were able to collect, edit and map spatial data relating to archaeological sites and their surrounding environment. It is hoped that this data collection and analysis will allow us to better understand the geographical distribution of prehistoric and historic sites and their relationship to land and water resources and to other sites in the middle Mekong region.

Huw Barton, Ph.D.

Wellcome Trust University Award in Bioarchaeology University of Leicester, LE1 7RH UK

The primary objectives of my research work with the MMAP project in early March 2009 was to assess a sample of the excavated lithic assemblage for potential usewear and residue analysis and to conduct a limited technological analysis of the material.

Training

An important aspect of MMAP is to increase awareness and exposure of Southeast Asian archaeologists to new 'state of the art' scientific techniques in archaeology. In

part this was achieved simply by ensuring that visiting specialists and local archaeologists work together in the same space. This allows people to observe, question, and participate in the ongoing analysis of material. Using both lectures and hands-on demonstration with smaller teams I worked to:

 raise awareness across members of the team of different research agendas on prehistoric subsistence strategies, and discuss new methods developed to tackle issues specifically relevant to tropical prehistory. Particular attention was paid to the new techniques of 'ancient starch' analysis, organic residue analysis, and usewear analysis.



- explain why we might curate artefacts in different ways for different research techniques. For example, keeping a sub-sample of some artefacts aside from normal washing and scrubbing for techniques like 'residue analysis.'
- encourage conservative artefact labeling to keep paints and varnish away from artefact edges and areas with technological information, as this may obscure future analysis of the material.

In addition, I worked with MMAP members to supply and interpret a list of technical terms on environmental archaeology in Lao, Thai and English languages, as part of the project to product a trilingual database of archaeological vocabulary.

Research conducted

A general artifact analysis was conducted in association with the assessment of material for a potential study of organic residues including analysis of 'ancient starch'. A sample of broken fragments of three sumatralith-type lithics (PPKR-71-C1, TVTL-38-F56; TVTL-26-F22) was brought back to the University of Leicester for further testing. Additionally, a total of 26 micropipette samples were taken directly from the surfaces of 13 artefacts (two per tool) to further assess the possibility that the artefacts may contain organic residues.

Results and possibilities for future work

The analysis of possible organic residues will be performed later this year. The preliminary assessment of the flaking technology employed at Phou Phaa Khao Rockshelter and Tham Vang Ta Leow revealed a number of interesting trends. In particular, there appear to be two distinct reduction sequences utilized, one associated with tool production and the other with core reduction. Both sites produced a number of exhausted core forms (mostly of the sumatralith type), and a particular form of flake debitage, often with a diffuse bulb and pronounced ventral lip, that is not characteristic of several other Southeast Asian flake assemblages I have examined.

Both sites appear to show good potential for a more complete technological analysis that may reveal much about the strategies of tool production, curation, and discard in this region.

Korakot Boonlop

Researcher in Archaeology & Anthropology Department of Research The Princess Maha Chakri Sirindhorn Anthropology Centre Bangkok, Thailand



Activities for MMAP 2009A season:

During the 2009 season (February – March), there are several of activities were involved under my responsibility as following description;

- Lectures given; introduction to Physical Anthropology and Bioarchaeology
 - the excavation and curation of human skeleton ; burial register and recording, packaging for transportation from site to laboratory, cleaning and reconstruction, packaging for storage,
- Archaeology and related disciplines vocabulary lists as trilingual edition
 - translation of English term to Thai and Laos
 - list of basic terms and orientation of body and human skeleton
 - additional list of other fundamental terms; GIS, cultural heritage management, geology, environments, and archaeology
- Classification of bone remains uncovered at Phou Phaa Khao Rock Shelter (2007) and Tham Vang Ta Leow Cave (2008);
 - classification of bones; to separate human bones from other faunal remains
 - primary classification of faunal remains; aquatic animal, terrestrial animal
- Preliminary investigation of human skeletal remains unearthed at Phou Phaa Khao Rock Shelter (2007) and Tham Vang Ta Leow (2008)
 - cleaning, fixing, and reconstruction
 - recording of significant traits which be observed obviously on human bones in order to provide a data for interpretation of human social and

culture in the past such as palaeodemography, health, growth, age at death

- Assistance of exhibition
 - produce text panels
 - set up and installation a display of exhibition about the human bones

Main results

- Lectures given to MMAP participants lead them for getting better understanding of basic human anatomy, how to identify, basically, the difference between human bones and animal bones especially during the field work of excavation on site, the attendances also discussed comprehensively about the curative processes of human bones both of field and laboratory procedures.
- For archaeology and related disciplines list of vocabularies as trilingual, in particular of basic terms and orientation of body and human skeleton, there are 5 category as;
 - Anatomical position or Standard Erect Position
 - Principal directions for parts of : Body , Limbs
 - Composition of human skeleton (the solid framework of the body) : Bone, Articulate, Cartilage
 - Four classes of bones : Long bones, Short bones, Flat bones, and Irregular bones
 - Bones of the adult skeleton : Cranial Bones (Single & Paired), Postcranial Bones (Single & Paired ;Upper - Lower extremities)
- Attainable results of human skeleton investigation;
 - A human skeletal remain of burial # 5 from Phou Phaa Khao Rock Shelter (PPKR 07, B # 5) has already been cleaned, fixed and consolidated, as well as reconstructed completely,
 - According to curative human skeleton of (PPKR 07, B # 5), it is able to investigate of some significant data as following;

1) Age at death of the skeleton rages from 12-15 years, according to teeth eruption and long bones ossification (the developmental process of bone formation)

2) Ancient disease; "Cribra orbitalia" ; a kind of bone changes associated with blood disorder, can be observed on the surface of the eye socket as rough tiny pits. Scholars assumed that this trait is probably a sign that the person had anemia or anemic reactions in terms of blood disorder as mentioned.

3) Craniomorphology, special traits included "Wormian bone" and "Inca bone", shown at the back of the skull. These kinds of additional bones in the sutures of the cranial skull as triangular bones called "Inca bone", after its first discovery in skull in Peru. Another small bone along lambdoidal suture are called "Wormian bone". However, scholars do not know exactly whether these bones develop from gene defects or from environmental stress.

4) The lingual (inner) surface of the crown of the maxillary incisors has a concavity with a central fossa, this dental characteristic is resemblance to a shovel, so the term "Shovel-Shaped" was raised. Such incisors morphology have been found both in modern and early populations. High frequencies over 80 % have been found in Mongoloid (East – Southeast Asian) groups. The incidence of Shovel-Shaped teeth are far lower in Europe or Caucasoid populations. Moderate Shovel-Shaped also investigated at the maxillary incisors of the Phou Phaa Khao human skeleton.

 Classification of miscellaneous bones; besides identification of exact fragment of human bones, indicated that various kinds of both aquatic and terrestrial animals; e.g. turtle, crab, large fishes, cattle, were supplied. Cutmarked and burnt are important clues for identification that these faunal remains were hunted and consumed by foraging people in the past.

Ideas for future MMAP

The MMAP 2009 A season during February – March provided me an invaluable opportunity for learning, sharing in different ways of technique and theoretical frame - work from our colleagues, as well as the way of learning by doing.

Hopefully, MMAP is a collaborative research project to make a connection not only for both Laos-Thais scholars, but also for various parts of the world; American, Irish, British, Australian, as the contributors so that add more clarity about the human history of this geographical area.

Importantly, from my point of view based on my own interest and archaeological background in Ban Chiang cultural tradition on the right bank of the Mekong, I hope more data and information will be gained by MMAP members as multidisciplinary approaches. Major puzzles since at least 4,000 years ago, such as how the emergence of cultivation at Ban Chiang and adjacent area was, where is the original home of the early inhabitant of Ban Chiang, these issues would be answered by looking at the evidences collected by MMAP activities. In particular of human skeletal remain; which is the evidence that I am interested in, I would like to study systematically more and more in details, methodologies of analysis are proposed to be trained to our Laos colleagues. Data comparisons, correlations, will also be done for human skeleton discovered along both side of the middle Mekong boundary. In addition, it is hoped that we are able to set up a database of prehistoric skeleton.

Elizabeth Hamilton, Ph.D.

Ban Chiang Project, Asian Section

University of Pennsylvania Museum of Archaeology and Anthropology Philadelphia, Pa. 19104

I went to Laos on January 26, 2009 with three main tasks. The first was to instruct the Lao and Thai trainees in database design, use, and data entry, specifically using Microsoft Access. The second was to clean, update, and otherwise make more useful the preexisting MMAP databases of sites and artifacts, not only for the purposes of MMAP but also as the starting point for building a flexible and easy-to-use database structure that can be adapted to the requirements of museums and archaeological



projects throughout the country. The third was to lead one of the survey teams as the backup GIS (geographical information system)/site entry specialist. (Dr. Katherine Arrell was the true GIS expert.) Microsoft Access was chosen specifically because it was compatible with ArcGIS, the leading GIS software program.

Database Training

The lectures on database use and design served as very basic introductions. Some

of the trainees had had experience with Excel, but none had ever used a full database program like Access. Using PowerPoint and a projector, I described tables, fields, and forms, along with ways to organize and extract information from databases. Many of the trainees were museum professionals, so they were genuinely interested in learning how to make databases for museum cataloging. In subsequent lectures, I presented the basic principles of designing databases and we practiced setting up and using a database designed to record information about the numerous fragments of resin Buddha statues found during the surveys. After this lecture, I designed a new form so that trainees could enter data about artifact bags collected by the 2009 teams, as well as more specialized data about stone flakes collected in previous seasons.

Results

Trainees learned the basic principles of database design: setting up tables and forms, and decided what information needed to be recorded.

Trainees learned how to enter data into forms.

The stone flake data entered in 2009 will form the basis of at least two papers presented by trainees at the Indo-Pacific Prehistory Association meetings in December 2009.

Survey and field data collection

In the weeks before leaving for Laos, Katherine Arrell and I constructed new forms for the Nomad, a device that combines the attributes of a GPS recorder and Palm Pilot. The Nomad automatically records the GPS coordinates of a site, and the field worker enters data about the site into the form on the device.

The trainees were divided into three teams; each team went out to conduct survey about twice a week. My team went out to local villages, talked to village leaders about potential sites, and visited sites and areas suggested by the villagers. The sites were surface-surveyed, with all types of cultural finds recorded, dimensions defined, and over a hundred pieces of information entered. In all sites, the primary data entry was performed by one of the trainees under our supervision, thus giving them exposure to GIS and modern archaeological survey equipment. At the lab, the trainees practiced classifying, measuring, and entering data about the finds into a database.

Results

- The survey teams found 12 new sites to add to the 57 located in earlier years.
- The trainees learned about site survey procedure and the kinds of data that archaeologists need.
- The trainees learned about Geographic Information Systems (GIS)
- The trainees learned how to use up-to-date survey technology.

MMAP databases

I spent a great deal of time revising and updating the MMAP database from previous years, adding new data, constructing new tables and forms, and regularizing procedures to add the voluminous site data collected by the Nomad. The process is not finished, but I expect to have workable and long-lasting database architecture this year

that can form the basis of a system that can be extended to other archaeological projects in Laos and to the Lao National Museum.

Results

The production of usable and updated database tables with corrected data.

• The production this year of a database structure that can be offered to the Lao National Museum and other archaeological projects as the beginning of a country-wide compatible database and recording structure.

The future

Much remains to be done, both in training and in the production of a database structure that can be used by Lao museums and archaeological projects. This season was a good start; the students can begin to experiment with creating their own institutions' tables and database design, and I have learned more about what kind of database structure can be adapted to the needs of museums and other projects. The trainees have a foundation for planning their own survey projects and how the artifacts from survey should be classified, entered, and curated.

Shawn Hyla

IT-Senior Support Specialist

University of Pennsylvania Museum of Archaeology and Anthropology

MMAP Project IT Support and Trainer

USA

For me the MMAP 2009 season had three parts: preparation for the season in the US, assessing and repairing computers at the Lao National Museum in Vientiane, and

supporting and training team members on technology of the project in Luang Prabang.

In order to accomplish our goals for this season a great deal of technology and software had to be gathered and configured. For my part I focused on consolidating systems and insuring inherent redundancy between them. My previous season in Laos taught me that if just one of the components failed it would hamper the project to a great degree. We agreed that the project



laptops should virtually mirror, so the critical software was installed on at least one other laptop in case one failed. The same logic was applied to the Nomads (portable GPS and data collectors). Both units needed to be identical in case one was damaged in the field.

All software for the project was centralized into a portfolio. In case a device needed to be rebuilt or a program needed to be re-installed any member of the team would know where to go. A relatively simple backup plan was agreed on to ensure there were copies of the data going to and generated in Laos. Pictures, databases, documents, etc., would be mirrored on two 320GB "rugged" external hard drives. The humid but dusty environment in Laos increased the chance of damage to the devices, especially laptops. Viruses, power fluctuations, and hard drive failure were all everyday threats, so we had to make sure the data was backed up at all times.

Vientiane

We started the season in Vientiane by visiting the Lao National Museum. There I conducted a two-day survey and evaluation of the Museum's computing capabilities. My findings were not altogether good. Though the eight computers worked, many of them had serious hardware and software issues. Problems with the hardware included low memory, low hard drive space, or component failure, i.e. broken CD-ROMs. Many of these issues could be provisionally fixed by upgrading the computers, but ultimately all of them will need to be replaced. My suggestion would be to replace all the computers with new computers from a manufacturer that offers a three-year warranty on parts and labor.

Many of the computers were not equipped with legal versions of the Windows operating system. Without a legal copy of Microsoft Windows the end user cannot get the security updates that protect the computer and its data. It would cost about \$80.00 (US) per computer to get them legal again. Another shortfall of these computers is their virus protection program. Though most of the computers had virus protection software, the virus protection was of the free variety which is not very effective. Work computers handling critical Museum data should be armed with industrial grade software such as Norton End Point, which costs about \$60.00 per computer.

Of course, none of the computers can be fully protected unless they are getting the latest Microsoft and virus protection critical updates. This is only possible if the computer is connected to the internet. The Museum did have service with a local internet provider at one time, but the contract lapsed. On the plus side, networking cables were run to various parts of the Museum where many of the computers are now located. To ensure that the computers are getting the needed updates they should be connected to the internet indefinitely. A new contract with maintenance support must be established with a local provider and the provider contract should be reviewed on a yearly basis to ensure competitive pricing.

Luang Prabang

The team and I then moved on to Luang Prabang where my duties mainly revolved around maintaining the computer equipment and training the team members. We immediately organized and labeled all of the computer equipment and software. We assigned the computers specific names and duties and tracked their backup frequency, update version, and maintenance. Our greatest challenge was securing the computers against viruses and other invasive software. To aid with this we established a contract with a local internet provider for wireless internet service so that the computers could receive updates. We also put together a virus update list that displayed each computer and the last time it was updated. The main source of the viruses was personal flash drives. To insulate the group from this threat I nominated my computer as the flash drive virus scanner. Any flash drive introduced to the group had to be first scanned by my computer. This system also allowed me to track who was getting what virus and from where.

I gave several presentations on general computer maintenance, how to organize data, and how to protect against viruses. The presentations were geared not only to the project, but also for real world post-season use. For trainees who took a special interest in technology I provided additional sessions on networking, peripherals, and advanced computing. The additional training enabled at least one team member to continue my duties after I had gone.

Results

Unfortunately, there was not much I could do for the National Museum. Many of the tools and updates technicians use to fix software or operating system problems are downloaded from websites such as Microsoft. The security and productivity of the computers will increase if they are reconnected to the internet.

The project in Luang Prabang was a huge success. Our Luce grant proposal had as a goal for the first year the training of the core team in basic skills, including vital computer management skills. The team members made significant steps towards understanding the technology of the project and computing in general. By the time I left many of the team members were using the techniques I taught them without being reminded.

The future

Plans for the second grant year include training our Lao and Thai cohort in the use of excavation-related electronics, particularly total stations and field computers. Building on the fundamental training in computer maintenance, hard drive organization, and computer hygiene received in this first season, I think the trainees will be able to absorb and use these new technologies, thus materially improving their competence to conduct archaeological fieldwork on their own.

I was honored to contribute to this project and look forward to helping in the future.

Peerayot Sidonrusmee

GIS Programme Assistant Office of Regional Advisor for Culture in Asia and the Pacific UNESCO, Bangkok

Peerayot Sidonrusmee graduated from Assumption University with a Master's degree of Science in Information Technology and has worked for UNESCO for the last five years. In this job, he uses his computer knowledge to develop and improve GIS software applications, databases, and internet-based information. These projects, in addition to heritage management, include tracking HIV/AIDS prevalence. His special interest is using community-based participatory data collection and management, combined with



GIS mapping, in ways that can help identify and preserve cultural heritage resources. He has shared his expertise in many workshops and training sessions for universities, government organizations and several international organizations. In 2009, he joined the MMAP team as a consultant for GIS and Cultural Resource Management.



Figure 10. Sample slide from Mr. Sidonrusmee's lecture.

In early February Mr. Sidonrusmee presented a lecture to the trainees on the subject of GIS and Cultural Resource Management (Figure 10). In the lecture he stressed the applicability of GIS to cultural resource inventory, protection planning, development control, impact assessment studies, tourist site facility management, and archaeological research. Because most of the trainees work in departments of culture and information, which has authority over historic sites and archaeological research, this information is important for their day-to-day work.

Gillian Thompson, Ph.D.

Lecturer in Environmental Archaeology Archaeological Sciences University of Bradford, UK

One of the aims of the MMAP project has been to increase the capacity of Southeast Asian archaeologists in scientific approaches to research and this was the focus of the archaeobotanical work undertaken in Luang Prabang in February 2009. This was achieved by



- working with colleagues to produce an extensive list of technical terms on environmental archaeology in Laos, Thai and English languages
- raising the awareness across members of the team of the research agenda on prehistoric subsistence strategies, and the rationale for collecting soil samples during excavation, to recover archaeological evidence for past vegetation and plant use
- delivering practical training in the recovery of plant and animal remains from soil samples by the simple technique of bucket flotation
- starting to develop a reference collection of modern, voucher specimens of economic plants which will later be used to help identify the archaeological plant remains; and by
- encouraging the team members to recognize that they are already knowledgeable ethnobotanists, in understanding where plants currently grow and how they are collected / harvested, processed, cooked and eaten – and that this expertise is of value from an archaeological perspective.

In order to help disseminate information about the MMAP and about environmental archaeology, we documented the flotation process photographically to contribute to a website and for the exhibition subsequently curated in Luang Prabang.

In conjunction with the training aspects of the project, we

 processed all the soil samples collected from the 2007 excavations at TVTL and PPKR, to separate the flot (the light fraction containing microscopic seeds and micromolluscs) from the residue (heavy fraction containing larger fragments of plant and animal remains, including mammalian and fish bone, and some ecofacts)

- evaluated the plant remains (mainly mineralized fruits and charcoal samples) which had been recovered by dry sieving during the 2007 excavations and confirmed their value for future analysis and identification
- started to create a photographic record of the archaeological plant remains, and
- collected modern plants while out on survey and in the markets of Luang Prabang, and began to char these to create a comparative collection.

Much was achieved in a very short time, and the basic skills in archaeobotanical recovery are now in place in the team for the 2009b excavation season.