DIGITIZATION AND CONSERVATION

Martin C. Jürgens

Text from: **The Lao Sangha and Modernity** Research at the Buddhist Archive of Photography, 2005-2015
ISBN: 978 - 1 - 941811 - 02 - 390000

Available at: www.ananthabooks.com

The Buddhist Archive of Photography: Archival Organization, Digitization and Conservation in the Context of Research Projects of the British Library (2006–2014)

Martin C. Jürgens[1]

Introduction

Since almost a decade, the historic city of Luang Prabang in northern Laos has been witnessing exciting activities in the field of the preservation of photographs. This activity is centered around the Buddhist Archive of Photography, situated in the monastery of Vat Suvannakhili. Holding roughly 35,000 photographs today, the archive covers a century of Buddhist photography, and as such it is a significant treasure trove of the photographic history of Laos.

Since the late nineteenth century, the royal city of Luang Prabang fostered an elite of learned people who loved creating and collecting photographs. From his young age, the Venerable Abbot Pha Khamchan Virachitto had been one of them, and he was in a position to uphold his collection even during the times when the possession of images linked to the past, royalty, or certain religious practice represented a danger – and when most members of this elite perished or went into exile. The photographs have escaped loss, dispersion and arbitrary destruction that have afflicted many historic collections of photography in Southeast Asia as a result of this region's extraordinary political and social changes in the twentieth century, only because the Venerable Abbot, who for more than 70 years had been a collector of photographic documents, found ways to astutely gather, protect and, for many years, hide the archive from any intrusion and inspection by outsiders.

A particular quality of the archival material lies in the fact that it offers a view from the inside: All photographs were taken by Buddhist laypeople involved in the ritual life of the city or by monks who documented their own world with a camera. The archive therefore shows a perspective that differs considerably from western ethnographic photography of the past or from the type of photographic reportage we know of today.

The important and vulnerable material found in the monastery has always been highly endangered. The fact that few people knew about it in the past represented both a threat and a promise: In the past, laypeople and monks of the monastery did not know how to deal with the material or how to resist possible commercial interests in the older photographs, and much material was lost. The photographs have also suffered from the ravages of a tropical climate and excessive handling over the years. On the other hand,

1 Acknowledgements: Phra Khamchan Virachitto, former Venerable Abbot of Vat Saen Sukharam, Luang Prabang; Hans Georg Berger, Berlin; Prof. Volker Grabowsky, Hamburg; Khamvone Boulyaphonh and his archive staff in Luang Prabang; Brian Lingham and Peter Markus Richi, Luang Prabang; the Endangered Archives Programme (The British Library, London); Rijksmuseum Amsterdam.

it was only by keeping many of the photographs unknown – essentially by hiding them – that many images have survived until this day.

Aware of the significance of this collection and the imminent dangers facing it, in 2005 photographer Hans Georg Berger gained permission from the Venerable Abbot to apply to the Endangered Archives Programme (EAP) of the British Library, London, for funding to protect the photographs from their sure destruction. A pilot project was approved by the EAP, and two initial field research periods (July/August 2006 and January/February 2007) were carried out, during which the situation of the many thousands of photographs was examined, talks were held between the organizers, relevant Lao government agencies, and the monks, and a small team was formed. The pilot project team started to interview the Venerable Abbot on the contents, age, and significance of the photographs during the research periods. He was able to identify most of the depicted persons and readily communicated his knowledge to the members of the team, all of whom were former monks who had been ordained by him. Part of the urgency for this work related to the extraordinary chance to conduct these interviews, since it would become increasingly difficult to acquire this contextual information at later occasions.

With the success of the pilot project, the EAP awarded funding for a first Major Research Project to Hans Georg Berger for the period of July 2007 to June 2009. Shortly before this first project ended, funding for a follow-up EAP Major Research Project was procured by Mr. Berger. This new situation enabled the archive to function and continue to grow until mid 2011. Further grants have enabled the archive to remain functional until the present.

Apart from securing the original material from loss, theft, and deterioration, the archive has focused on the digitization of the photographs as a measure of preserving at least the images through reformatting. Digitization will also allow for accessing the photographic images without having to touch the originals, many of which are quite fragile. Access to the digital images and to information on the archive's holdings is given through the Buddhist Archive and its partners: The National Library of Laos in the capital, Vientiane, the project's official partner from the side of the Lao government, and the British Library's Endangered Archives Programme hold full sets of digital copies and listings of all of the catalogued photographs. The British Library is responsible for the long-term caretaking of the digital data.[2]

One of the most important aspects of the research project has been the involvement of abbots and monks of the other monasteries; it has thereby found acceptance within the Buddhist community of monks, the Sangha. As it turned out over the years, photographs were present in many of Luang Prabang's monasteries in large numbers, and some of these prints could also be secured in the archive. An important outcome of researching the photographs has been the preparation of biographies of the collecting monks and abbots and of histories of the respective monasteries. Finally, the images have

2 A starting point for researchers is the EAP's website at http://eap.bl.uk.

been and will continue to be used to educate novices and laypeople in Laos on their heritage through a calendar and other publications such as schoolbooks.[3]

At the beginning of the pilot project, in 2006, the Venerable Abbot was 86 years old. He hoped that the activity of the research team would enhance the sensibility of local townspeople for the significance of the collection, thereby making it more difficult to neglect or disperse his collection after his death. The Venerable Abbot's own intentions for the future use of the archive matched those of the EAP project. On several occasions, he indicated that he had two motivations for the establishment of the archive: to preserve, in highly difficult times, the spiritual strength, uniqueness and beauty of Lao Buddhism for the Lao people of future generations, and to communicate the singularity of Lao Buddhism to people all over the world.

As a photograph conservator, I was first asked to participate as a consultant in the conservation efforts in July 2007, and, over the course of the following seven years, I returned to Luang Prabang six times to help organize and build up the archive. This report relays my trips to Laos following a more or less chronological scheme, and, given the strong personal involvement that quickly grew between the project and myself, my account attempts to transcend a dry listing of numbers, facts, and achievements.

A Setback and an Incentive

In 2007, I was honoured to have an audience with the Venerable Abbot Pha Khamchan on my first day in Luang Prabang. Only two hours later, as I was looking through the first boxes of photographs, I was informed that the Abbot had just passed away. The whole town was stunned, and at the same time it was buzzing with energy and apprehension. The room with the photographs became out-of-bounds to aliens like myself, as valuable temple objects were locked away to protect them for the next two weeks, during which hundreds of lay people and monks came to pay their respect to the Abbot. This period ended with an impressive funerary parade and cremation ceremony.

With the collection in Vat Saen Sukharam inaccessible, but with a strengthened sense of immediacy and importance of carrying out the Venerable Abbot's will to preserve and protect the historical photographs of Luang Prabang Buddhism, we decided to carry on with the project as best as possible: preparing everything so that once the collection became available again, the structure of the archive would be ready for it and work could commence. In the nearby monastery Vat Suvannakhili the second floor of a building built in a mixture of French colonialist and traditional Lao architecture had been assigned to the project as a work space. Later, the Sangha decided to permanently dedicate it to the Buddhist Archive of Photography.

The town's novices were very curious of our doings, and word spread throughout the monasteries that two foreigners, Mr. Berger and myself, along with three former Lao monks, were searching for

3 See, for example the schoolbook written by Hans Georg Berger and Khamvone Boulyaphone (2013).

photographs. As a result, we began to receive photographs of all kinds from a large number of the town's monasteries. At the same time, official contacts were made with leading abbots, who then granted permission for us to enter the living quarters (*kuti*) and other monastery buildings, some of which had not been accessible for more than twenty years. Many of them did contain historic photographs. This was a wonderful development, since it showed us how widespread and common photography was in Luang Prabang. It was also, for all involved, a tribute to the Abbot's endeavour to unite the photographs of the region and protect them from being lost, stolen, or destroyed.

Survey of the Collections

We had decided to schedule my first, one-month trip to Luang Prabang in 2007 at the very beginning of the EAP project in order to acquaint the local team with my ideas as early in the process as possible. A survey was first carried out to find out more about the photographic processes, formats, quantities and conditions of the photographs in the collections of four monasteries of Luang Prabang. The survey was the basis for subsequent decisions on storage needs such as sleeve and box formats, quantity of enclosure materials to be ordered, the configuration of the Excel lists that we used to catalogue the collections, and the teaching of the identification of photographic processes to the project staff. With additional information from the ongoing work of the following years and the growing holdings of the archive, the following summary of the collections as they stand in 2014 can be made:

So far, photographs and related materials have been catalogued from nineteen monasteries and from five private collectors. While the subject matter ranges from the 1850s to 2009, the earliest prints found are from the 1890s (some photographs are reproductions of older images or paintings), but the bulk of the material dates from the second half of the twentieth century. The final number of objects in the Buddhist Archives cannot be given yet, since photographs are still being found in a number of monasteries in the city. More than 15,000 prints were identified, cleaned, registered, digitized, catalogued, and stored in sleeves and boxes during the first two years, and the archive currently houses around 35,000 photographs. The large part are silver gelatine (black-and-white) fibre-based prints and chromogenic (colour) prints.[4] Further processes include dye diffusion instant prints, letterpress halftone prints, collotypes, rotary photogravures, and digital prints such as inkjet and electrophotographic laser prints. A few rare processes such as cyanotypes and one photograph on a porcelain plate were also found. Some original paintings and some printed matter (book pages, certificates) as well as a small number of audiovisual materials were also accepted in the archive due to their contextual relevance. Over 1,000 negatives were found; they include silver gelatine on glass and film in various formats. Colour negatives and framed 35 mm colour transparencies are also present. The fastest growing holdings of the archive

4 Since the late 1890s, black-and-white photographs have most commonly been printed on a photographic paper that consists of a sheet of paper coated with a white pigmented layer (the baryta layer) and an emulsion made of gelatine that holds the silver image. This type of paper is called "fibre-based". "Chromogenic" is the technical term used to designate photographic colour prints made from colour negatives.

are currently digitally born images: snapshots made with digital cameras that exist only as computer files and not as prints.

The photographic prints are usually acquired as loosely assembled in envelopes, plastic bags, and boxes, stacked in cabinets and in drawers, displayed in frames or albums (Figure 9.1). Some individual album pages were simply nailed to the walls of the novices' living quarters. Many of the 35 mm negative strips were in the plastic or glassine sleeves originally supplied by the photo laboratories.

In general, the gelatine silver prints show deterioration appropriate to their age: signs of use such as tears, folds, fingerprints, and surface dirt, and slight to moderate silver mirroring[5] and fading. Termite and silverfish damage is extensive on these prints, but only seldom found on the chromogenic prints, presumably due to their resin-coated support.[6] Mould growth is also more common on the gelatine silver prints, and it is often found in conjunction with water damage, leading to a powdery and stained emulsion and base. Most of the serious damage is water-related, either through the prints becoming wet or simply being in a warm, humid climate for many years. Colour prints from the 1970s through to the 1990s have noticeably discoloured. Colour slides in cardboard mounts have aged differently: while the Kodachrome brand slides have only acquired a slight bluish tinge, the Ektachrome slides have discoloured and faded severely to a light red.[7]

Photographs in frames are very common in monastery buildings. These prints are, for the most part, in very poor condition, since they have been exposed to light, dust, water, environmental fluctuations, mould, and insects over many years. As a result of prolonged humid environmental conditions or liquid water leaking into the frames, about one third of the framed photographs have become partially adhered to the glass. Often, this problem is also the result of severe buckling of the print and its support and the lack of a window mat or spacers within the frame. Some of the frames have irregular backings: narrow plates of glass were used as a support, and this caused irregular pressure on the back of the photograph, which in turn led to it adhering to the frame glass. Many of these prints also show mould damage to the emulsion and support. In one case, the paper support had deteriorated to the extent that it was impossible to open the frame without causing the disintegration of the paper and thus the loss of the image in that area.

The frames are generally not sealed on the back, so that dust and insects have been able to enter and cause severe losses and disfiguration of the images. The losses caused by silverfish and other insects

5 "Silver mirroring" is a term used to describe a bluish, mirror-like haze that may form on black-and-white photographs over time. It is typically found at the edges of the prints and is a result of the migration of silver ions within the gelatine emulsion, a deterioration mechanism that is encouraged by a warm and humid climate.

6 Resin-coated paper, more simply called RC paper, is a support material used very commonly for colour photographic prints and sometimes for black-and-white, gelatine silver prints. The paper base is sealed on both front and back with a layer of polyethylene that gives this photographic material a stiffer feel and a smooth surface resembling plastic more than paper. In technical descriptions, the term "support" is used for any material that holds or supports a photographic image. A support can thus be paper, RC paper, film, glass, among others.

7 Kodachrome and Ektachrome are both brand names for colour slides. Both were produced as 35 mm film rolls by Eastman Kodak for decades and have been used primarily by amateur photographers. The former film type is known to be quite stable, while the latter typically fades and discolours over time.

will continue unless the prints are unframed and stored safely. The common practice of creating a collage of many small prints in a frame (Figure 9.2) is fascinating in that it creates a specific context for the images, sometimes even telling a story. This practice is problematic, however, in that some of the pictures invariably fall away from their original location while others adhere to the glass. These factors made it difficult to find a solution that will ensure the preservation of the images while respecting their original order and context.

An album offers a system of organizing and presenting prints, and it also serves as a practical method of preserving them both physically and chemically over time. However, not every type of album is equally suited to actually protect photographs, and some may even actively contribute to destroying them. In a tropical climate, deterioration is sped up significantly, and the albums found in Luang Prabang either showed severe problems or, in the contrary, actually protected the prints. In most cases, photographs were removed from their original albums, and their original sequence was recorded. Very special albums, such as those put together with great care and creativity by Abbot Pha Khamfan Silasangvaro, have been kept in their original state.

The archive is a treasure trove of different types of albums. The historical albums have black paper pages and thin interleaving tissue. Some, more modern, black paper albums, however, have a plastic sleeve that is folded around the outer edge of the sheet. The photographs are adhered to the pages with an unknown glue, either in the corners or overall. Some of the photographs are loose and easily fall out and become damaged or lost when the album pages are turned. The photographs in these albums are, in general, in good condition.

The PVC-type albums have pages that are made entirely of poly(vinyl chloride). Prints up to 9 × 13 cm are inserted into sleeves on both sides of each page. Almost all of the prints have partially adhered to the PVC. In most cases it has been possible to separate the prints by simply inserting a pointed bamboo spatula, but where water had once entered the sleeves the emulsion has either completely dissolved or it has stuck to the PVC so firmly that it cannot be removed.

Small and simple plastic albums are typical for the 1980s and 1990s. They were generally used for the display of prints of one whole film, up to the format of 10 × 15 cm. The pages consist of plastic sleeves stapled to the cardboard cover at the spine. Prints are inserted back to back into the sleeves through the open top edge. The plastic sleeves, made of cellulose acetate, have shrunk and become distorted to a great extent in most of the albums. Many of the prints had adhered to the inner surface of the sleeves, but they could be very easily removed.

So-called sticky albums have cardboard pages that are coated overall with thin, horizontal lines of adhesive on each side. The prints were originally laid down onto the adhesive and then covered with a plastic sheet, commonly of cellulose acetate. As the albums aged, the adhesive hardened and lost its tack, and the plastic cover often fell loose. The plastic itself seems to have caused no problems to the prints; on the contrary, the prints have been well protected by the acetate sheets. Due to the failing adhesive,

however, some prints simply fall out of the albums or can be easily pried from the page surface with a bamboo spatula. A large number of the prints, on the other hand, adhere ever firmer to the pages and cannot be removed.

Basic Conservation

During the initial survey of the collections it became clear that a fair number of the photographs are in very poor condition and would benefit from conservation treatment. The treatment would serve to stabilize the objects to the extent that they could be handled by researchers without being further damaged, and that they would not deteriorate on their own once they had become part of the Buddhist Archive of Photography. To date, only the most basic treatment has been carried out on the photographs, since more difficult, though equally pressing, treatments would require more time, knowledge, and equipment. Conservation treatment should be part of future work within the archive. A number of steps were taught to the Lao staff.

For example, since virtually all of the items are dusty or dirty, it is important to give them a basic cleaning before placing them into their new, clean, paper sleeves, boxes, and cabinets. In addition, cleaning is an important prerequisite for high quality digitization. For most of the prints, this step consists of a simple brushing of the front and back surfaces with a clean, soft, wide brush. Most of the frames are very dirty; in consequence, they are first cleaned externally, then opened and cleaned on the inside as well. In 2010, archive staff began cleaning slides and negatives prior to scanning and storing them. A dilute solvent was used to clean one or both sides of the quite dirty, and most often slightly mouldy film. I donated my personal collection of empty slide mounts for mounting loose slides. Slide mounts cannot be purchased in Laos, and even in Europe they are becoming increasingly scarce.

Framed photographs are generally unframed and their components cleaned. The frames themselves are dusted and cleaned with a brush and a moist cloth. The photograph is cleaned with a dry brush, but extremely dirty backings without any information on them are discarded. The frame and the glass are labelled with the inventory number of the print. In some monasteries abbots expect to re-hang the prints in their original locations following their digitization, but every effort is made in the archive to avoid returning framed original photographs, since the chances of their becoming damaged or lost is great, and since they will then once again be subject to deterioration. As an alternative, copies of the prints are made with an inkjet printer whenever this is possible and appropriate. These copies are placed in the frames and returned to the monasteries so that the original photographs can be preserved in the archive.

Superficial mould growth is removed with a porous rubber-based sponge that can absorb large amounts of dust and grime. Mould that is embedded in the emulsion or support cannot be removed by this method, however. At present, no disinfection is carried out, since this step only makes sense if the treated photographs can be stored in an environment that will subsequently retard biological activity,

such as a climate controlled, cool and dry room. Since the photographs remain in the archive's current non-climate controlled storage space, they remain at risk of sustaining mould growth. A later attempt at remedying this problematic situation by means of essential oils is described further on.

A full restoration, such as mending tears with Japanese paper or lining very fragile prints, has not yet been possible. For this reason, following their surface cleaning, very fragile objects are currently simply placed in a double sleeve in order to physically stabilize them. The front of the outer sleeve is inscribed in Lao and English with a warning of their vulnerability, and the need for treatment is entered into the catalogue so that these items might be identified and retrieved for treatment at a later time.

Cataloguing

One of the most important issues to address at the beginning of the project was that of the ordering system for the photographs of the different collections. The hierarchy that was initially adopted was based on EAP's 2006 "Guidelines for Listing Copied Material", and its system was used throughout the conservation, digitization, and storage procedures. In 2011, the original archival structure was upgraded to the new EAP Guidelines, which had been rewritten in 2010.[8] In general, the archival holdings are organised as follows:

The Buddhist Archive of Photography is the general entity. It is divided into a number of collections, each of which contains the items from one monastery or from one collector. Each photograph is given a unique reference number, which is written in pencil on the verso and on its paper storage sleeve. The reference number contains a code letter for the collection that the photograph belongs to and a four-digit number. This system allows for a large number of further collections to be added to the archive over time. The photographs can be further sorted by keywords.

Microsoft Excel was chosen for handling the large amount of cataloguing data. Excel is widely used internationally and is expected not to become obsolete in the near future. It works with a very simple table-based system that can be exported into other formats if necessary. The software's *List* function allows for easy sorting and searching, and individual columns can be formatted differently: entries in two columns labelled *Description*, for example, can be made either in Lao or in English script.

The *Description* is one of the most important entries, since it describes the content and context of the image. The information gathered here gives invaluable insight into the history, culture, rituals, architecture, and persons of Lao Buddhism that cannot be found elsewhere. Following the Venerable Abbot's passing, Archive Director Khamvone Boulyaphone took over the responsibility for securing accurate descriptions of the photographs. He had been a monk under the Abbot for many years and knew many of the depicted persons and rituals. Where there are still open questions, he interviews other

8 EAP required reports on various topics. One such report on the aspects of conservation contains a wealth of technical information: Jürgens, Martin. *Report on the Initial Conservation of Photographs in the Buddhist Archive of Photography, Luang Prabang*. Appendix to the Final Report of Project 0177, 2007 (unpublished).

monks. The descriptions are generally first written in Lao in order to capture the immediate essence of the photographs; they are later translated into English by the archive staff.

For some columns of the Excel spreadsheets, dropdown lists were designed that offer a restricted choice: this is useful, for example, for the columns *Keywords*, in which only a pre-defined list of English terms describing the contents of the image (such as "Buddhist ceremony", "Pilgrimage", etc.) are allowed, and also *Original Medium*, which contains the name of the photographic process. This feature has proved to be especially useful, as it guarantees that only one spelling is used for the keywords and processes, which do not have to be typed over and over again, a sure source for typographic errors in a language foreign to the archive's Lao staff. This also enables accurate sorting and searching. The total number of catalogued items can be found at a glance, and it can also be seen how many of them have or have not been digitized. In the final version of the lists, each item has fifteen separate fields for data entry.

One of the key fields in the spreadsheets is *Location*. This field holds a code that includes the letter that describes the collection, along with the number of the box within that collection. Without this field, the photographs of the archive are essentially impossible to find, so great care had to be taken to keep track of the location of each photograph and record this information accurately.

Digitization

Two methods were initially used for the digitization of the items in the archive: scanning and digital photography. The first desktop flatbed scanner that was available could capture prints up to approximately 18 × 24 cm. Prints that were larger than this had to be photographed with a digital camera.[9] Since photo lamps or flash units were not available, pictures were taken in natural daylight. A simple duplication stage was constructed out of cardboard, and positions for the stage and the camera tripod were marked on the floor with brightly coloured tape with so that the set-up would be reproducible (Figure 9.3). Both of the digitization procedures were adjusted to result in the highest quality possible with this equipment and under the given circumstances. Workflows were standardized and recorded in protocols (in both Lao and English), and these protocols updated regularly, so that the results would be as consistent as possible over time. Since the quality of natural light is time and weather dependant and fluctuates greatly in colour temperature and brightness, the use of a calibration target was important for producing high-quality duplicates.[10]

9 A single lens reflex (SLR) camera was used. This type of camera uses a mirror and prism system that permits the photographer to view through the lens and see exactly what will be captured, as opposed to point-and-shoot cameras where the image can differ from what will be captured.

10 The Kodak Greyscale Q13 target was used at first. The aim was to create a digital file that captures all of the details of the original photograph. Using the camera's software, the digital images, taken in the RAW format, could be developed to optimize colour balance and levels.

The archive's current practice is to save master copies (also called preservation copies) as uncompressed TIFF images. Derivative copies for access are then generated as JPEG images. All photographs are digitized in 24-bit RGB colour space (due to a misunderstanding, some early black-and-white photographs were scanned in 8-bit greyscale). Some confusion ensued due to the presence of two different Q13 targets, both of which have slightly different colour casts. Despite the known disadvantages associated with these Kodak targets, we decided to continue working with one of the targets throughout the various scanning stages in order to maintain continuity in our digitization procedures.

From 2010 on, a larger, more professional scanner, the Epson V750 Pro, was used to digitize negatives and slides in addition to prints (Figure 9.4). This scanner remains to this day the working horse of the archive, and it is holding up remarkably well in the tropical climate. The scanner and the computer monitor were both calibrated, and we had a moment of triumph when, for the first time since the archive was founded, the scan of a colour print, displayed on the monitor, looked precisely like the print itself.[11]

Creating multiple copies of the digital files as a safety measure, should the original files accidentally get lost, damaged or deleted, is an essential part of every digitization project. At the archive, these backups are generally created on a number of external hard drives. These hard drives with the duplicate files are stored in a well-secured house in Luang Prabang for safe-keeping. However, backup safety remains one of the greatest challenges of the Buddhist Archive.

Initial Storage of the Photographs

It was clear from the beginning that it would not be possible to satisfy the international archival requirements for the ideal storage of photographic materials given Luang Prabang's tropical climate.[12] Nonetheless, it has been important to keep them in mind as a reference. The goals for storage are set as high as possible for the given situation, but it has been important to retain a certain amount of flexibility in the interpretation of the guidelines. The storage conditions that were implemented in 2007 were a great improvement to the prior ones, and they have been improved continuously over the years.

The archive's storage room has a number of unglazed windows that have slatted wooden shutters. These allow air to pass through the building at all times. This form of ventilation is advantageous in that it cools down the room and does not allow for areas of stagnant, humid air that might encourage mould growth. At the same time, however, it makes it impossible to control the passage of airborne dirt or influence weather-based fluctuations in temperature or RH.

Since a technical solution to climate control is not possible at this time, the individual prints are housed in paper instead of plastic sleeves. Although sleeves made of polyester, polyethylene or polypropylene are chemically inert and give a better protection against handling, plastic has the disadvantage that it is largely impermeable to water vapour. Paper sleeves, on the other hand, allow for diffusion of water vapour throughout the storage units, which may be an important factor in an uncontrolled tropical environment. Many examples of prints that had adhered to their plastic enclosures were found in the collections, and there was no desire to duplicate this situation.

The new individual sleeves are stored in paper boxes, which themselves are stored in wooden cabinets. Although wood is not recommended in climate controlled archives due to its potential for off-gassing

11 Separate scanning protocols were written for each type of material: reflective print, colour slide, colour negative, black-and-white 35 mm negative, black-and-white 6 x 4.5 cm up to 6 x 9 cm negative, black-and-white sheet film negative, and black-and-white glass plate negative. Protocols were also prepared for calibration of the monitor and of the scanner with Monaco IT-8 targets.

12 See, for example *ISO Standard 18934:2006. Imaging Materials – Multiple Media Archives – Storage Environment*. International Standards Organization, 2006.

acidic fumes that can damage photographic materials, metal shelving may pose severe problems in a tropical climate: at constant high relative humidity levels, the development of rust would be the main issue. The bleak functionality of a powder-coated, metal cabinet would also simply have been out of place within the monastery buildings, so the design of the six new cabinets is based on that of traditional furniture found in the temples (Figure 9.5).[13]

The cabinets were made of tropical rosewood, a heavy and very hard wood found in Laos. Long legs ensure that the cabinets are kept a sufficient distance from the floor of the archive. This is especially important to avoid termite infestation: the outer tunnels that the light-shy insects would need to build on the cabinet legs in order to reach the dark, "safe" inside of the cabinets would be quite visible to inspection and thus easily removed. In order to avoid the build-up of vapours from the fresh wood, all inside surfaces were coated with a layer of shellac, a good barrier for volatile organic compounds (see Tetreault 1999). Oversize prints are stored in simple sleeves or in specially made boxes in a wooden flat-file cabinet that was constructed during the second EAP project.

It was decided early in the project to use locally available materials for the storage of the photographs in the collections, since this would not only support the local economy, but also provide the archive with an internal sense of connection to its own basis: the local materials, markets, customs, and culture. In addition, importing papers, boxes, and cabinets from overseas would have greatly increased the budget for the conservation of the collections. It turned out that the papers available in Luang Prabang promised to be suitable, to a large degree, for the storage of photographs. This area of Laos is known for its handmade paper, produced from the inner bark of mulberry trees that grow in the forests of the region. A local factory that we visited produced eight different grades of mulberry (*sa*) paper.[14] Following extensive testing, three of these papers, the brightest with the most uniform formation and smoothest surfaces, were chosen for use in the archive.[15]

Two boxes were designed that would accommodate almost all of the prints found in the collections (Figure 9.6). The smaller box is used for vertical storage of prints up to the format 10 × 15 cm; the larger box is for the horizontal storage of prints up to the format 30 × 40 cm. When stored together on one shelf, two boxes of each type match each other in their outer dimensions to save space. No stiff board of higher quality was available, so the boxes were made by the mulberry paper factory according to our designs. Despite the use of relatively thin paper, these boxes turned out to be quite stable, though not

13 Depending on the way the cabinets are filled, they can hold up to approximately 120 boxes. To deter mould growth within the cabinets, holes were drilled near the top and bottom of the back panel to ensure adequate ventilation. All of the holes were closed with a finely meshed textile on the inside to ensure that, ideally, only air, but no insects or dust enter the cabinet. There is also a 4 cm gap between the edges of the shelves and the outer panels of the cabinet. In addition, there should always be a small gap left between the boxes on the shelves.

14 In a process similar to that of the manufacture of Japanese papers, the inner bark is harvested, the fibres are separated, purified and washed with sodium hydroxide, then bleached to various degrees with hydrogen peroxide. The mulberry paper sheets are made without any internal sizing. The papers are quite absorbent to water, but they proved to be surprisingly strong nonetheless. From the point of view of their composition, these papers are very pure.

15 The papers were evaluated for their suitability for the storage of photographs by a pH test and a simple lightfastness test. Details and results of these tests can be found in Jürgens, Martin. *Report on the Initial Conservation of Photographs in theBuddhist Archive of Photography, Luang Prabang*. Appendix to the Final Report of Project 0177, 2007 (unpublished).

made for transport or for storage of heavy objects.[16] The sleeves for the photographs consist of simply cut mulberry paper with a single fold; for reasons of simplicity, purity of materials, and cost, no adhesives were used.[17]

Teaching

An important step in the establishment of the archive was teaching the staff fundamental skills and a basic understanding of photograph preservation and archiving. Special times for teaching units were set apart, and it was critical that each staff member takes part in all of the units. At a later point, the individual members discovered their strengths and weaknesses and concentrated on an area most suitable for themselves.

One of the teaching units covered the identification of photographic processes. It was first necessary to explain fundamental principles of photography. Luckily we had found some unused photographic paper in its original packaging in one of the collections, and with it I could demonstrate how a positive is created by contact with a negative under the influence of light: A negative from the collection was placed on the photographic paper, held flat by a sheet of glass, and this sandwich was placed in the sunlight. As if by magic, the image appeared rapidly and could be seen as a positive. We had no chemicals to fix the image, but the basic principle of the light sensitivity of photographic materials and that of positive and negative images could be shown to the staff, all of whom belong to a generation only familiar with digital cameras and who did not know what a negative was used for. Following this, the characteristics and specific sensitivities of gelatine films and emulsions were explained and demonstrated, and the processes were discussed with the help of examples from the collection.

In 2010, the archive's IT specialist Peter Richi showed the staff members his collection of antique cameras. The devices ranged from a turn of the century Kodak Brownie camera to the latest digital model. Peter also had the fitting film types for each camera, and it turned out to be a wonderful demonstration of the great variety of photographic apparatus, especially for the young archive staff, to whom this world was entirely new.

Whenever we handled photographs, frames or albums, I tried to impress upon the staff the importance of conscious and correct archival practice. Basic conservation principles and issues of cleanliness were

16 The floor, lid and walls of the boxes consist of double or triple layers, and the adhesive used was a locally available polyvinyl acetate (PVAC) white glue. Although a local rice starch paste would have been more suitable in terms of purity and off-gassing, it would have been very difficult to convince the papermaker to cook the paste regularly, the workers at the factory were accustomed to using the PVAC, and starch would have been a food source for mould and insects.

17 Four standard sized sleeves were designed to fit into the two types of boxes. The smallest sleeves, made of a thin mulberry paper, are used for the vertical storage of prints up to 10 x 15 cm. For ease of handling, stiffer inserts are made that consist of simple U-folds, with a 1 cm wide base strip. Six of these inserts fit into one vertical box, and approximately 14 prints fit into one insert, resulting in a total of approximately 84 prints in one box. For a small group of prints that belong together, a simple phase box can be made individually. In this case, prints are simply interleaved with a tissue-like mulberry paper. Larger sleeves are made from the thicker mulberry paper to accommodate prints up to 30 × 40 cm. These are placed in the flat boxes made for horizontal storage. These boxes can hold approximately 50 prints of the format 30 x 40 cm and up to 90 prints of smaller formats.