


Kungri Tsuglakhang Murals Conservation-Restoration Project

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Introduction

he Kungri Tsuglakhang Conservation Project is an undertaking of the Padma Sambawa Cultural Memorial Society directed by Yomed Rinpoche, also known as the Spiti Tulku, head of the Ugyen Sang Ngag Chö Ling Monastery. Kungri is located in the Pin valley, at a two-hour distance by car from Kaza, the capital of the Tehsil Spiti of the Lahul-Spiti District. With an altitude of 3600 meters above sea level, the organisation of a conservation project in the region is no small task. The principal aims of the project are to conserve and restore the Tsuglakhang (*gtsug lag khang*) which is the oldest Buddhist Nyingma shrine of the Pin Valley.

The project began in 2013 when Tibetologist Namgyal Henry invited the present author, in the capacity as painting conservator, to visit the Kungri Monastery in order to assess the conditions of its murals. The wall paintings were then examined and a detailed condition report was prepared. Following this first survey, I organized a fieldwork with voluntary conservators to carry out the necessary preliminary tests in 2015. Thanks to Yomed Rinpoche's interest in the preservation of the monastery's heritage, the conservation work continued up to 2017, and is now in need of further action.

The Tsuglakhang was founded in the 14th century by *Rang rig pa Sang rgyas 'od zer*, a Nyingma lama from Central Tibet.¹ The paintings were realised later when the temple was modified to welcome another ritual practice brought from Bhutan, namely the

¹ Henry 2016: 186.

tradition of Pema Lingpa.² Since the beginning of our work, and as soon as we started cleaning the paintings, a stylistic and iconographical study suggested that they were probably painted at the end of the 17th century.

In 1841 the temple was severely damaged by fire caused by a Sikh raid. As a consequence the murals were covered with a thick layer of black soot that rendered them nearly invisible.³ Thereafter, the painted interior has also been affected by further deposits of soot due to the practice of lighting butter lamps for religious purposes.

The priority of the project, therefore, was to clean the surface of the murals so as to study their iconography. The work, however, immediately met with new developments due to technical problems due to the difficulty of cleaning of the murals. Restoration required a delicate methodology and the participation of skilled conservators. Research is a large component of the conservation project. It could not take place without the scientific collaboration of N. Henry for the study of iconography and the participation of the Epitopos laboratory in Strasbourg, France, for technological analysis. The scientific research has been supported by the Khyentse Foundation who sponsored the stratigraphic analysis of one sample of painting, which was carried out by Emilie Checroun, Luc Rosenbaum, and Fabrice Surma. The Khyentse Foundation has also provided funds for the acquisition of conservation-restoration material acquired in France and in India.

During the last two interventions (of three weeks each), a good deal of work has been accomplished, though a good deal still remains to be done in order to complete the restoration of the Tsuglakhang and its treasures. The monastery and the conservation team are both actively searching for more funds to resume the conservation work of this important edifice of Spiti.

Description of Ugyen Sang Ngag Chö Ling Monastery

Today, the Ugyen Sang Ngag Chö Ling is composed of a large monastic complex surrounding the main modern temple, which was erected with its courtyard in the 1980s. The complex also comprises the ancient Guru Lhakhang; an edifice built in mud brick and which

² *Ibid.*: 188.

³ *Ibid.*: 189

was extended in 2015 with an additional stone wall and surmounted by a tin sheet roof. The ancient Tsuglakhang, which is the focus of the present study, was constructed in stone and mud brick with a flat roof. Another shrine was built directly against the Tsuglakhang at the beginning of the 20th century, and is dedicated to the practice of the red *sPyan ras gzigs* of the *gter ma* of *Padma gling pa*.⁴ In 2004, a concrete guesthouse was also built to welcome the Dalai Lama; unfortunately the building obstructs the view of half of the Tsuglakhang.

The architectural layout of the monastery, as witnessed by a photograph published by Romi Khosla in 1979,⁵ was quite different not so long ago. These photographs are probably the oldest views of the monastery. One of the images shows the access to the Tsuglakhang surrounded by buildings built in stone and mud brick. Another image shows a large scroll painting (*thangka*) displayed outside the Tsuglakhang during a ceremony.⁶ This *thangka* is still preserved inside the temple. As a result of the significant alterations made to the site in modern times, the surroundings of the temple have seen drastic changes, however, the access to the Tsuglakhang has retained its original configuration. Visitors enter through a small door and step into a corridor one and a half meter wide; they then turn left passing by the entrance to the red *sPyan ras gzigs* shrine, before arriving into the ancient Tsuglakhang, which is now the second shrine on the right.

The exterior of the Tsuglakhang is in perpetual state of renovation. In 2015, the monastery's head decided to dismantle a concrete terrace built in 2004, as well as the additional rooms surrounding the two shrines. The monks, advised by our team, wanted to set up a small garden to valorise a natural water source, which springs in summer time. The channelling of the watercourse would also have protected the building from eventual dampness damage. However, the results visible in 2016 were different from the proposal given by us. Instead, a concrete flight of steps is now leaning against the temple and the garden is unlikely to be set up (Fig. 1).

⁴ *Ibid.*: 190.

⁵ Khosla 1979: Figure 147.

⁶ *Ibid.*: Figure 146.



Fig. 1 — The Tsuglakhang in 2016.

Another view published in Khosla's book shows the temple from the back flanked by additional rooms. These rooms no longer exist and were probably used for meditation or storage.⁷ In the picture, the original architectural design is still visible, characterized by stones, mud plaster, a flat roof ornamented with different levels, a low surrounding parapet composed by dry twigs painted in red included in the wall with mud and, underneath the parapet, a thirty-centimetre large band painted in plain red which is still visible today. Yomed Rinpoche confirms that these red and white layers were made with natural colours still produced nowadays in the valley. These colours can still be seen as having been used on old and new houses in the village, although the technical know-how might have been lost. Today the roof of the temple looks slightly different from the one photographed by Khosla; as lanterns with glass windows were added on top of the two shrines, while the external design remains similar.

Description of the Tsuglakhang

Despite the altered aspect of the temple outside, embedded in modern constructions, its interior can still be considered as authentic. The Tsuglakhang is a small forty-two square meter room with four wooden pillars (Fig. 2). A low traditional wooden ceiling is three

⁷ Id. Figure 148.

meters high from the wooden floor, which is fifty centimetres higher than the level of the access corridor. The original height of the ceiling is unknown and it might have been modified after the Sikh plunder, or in more recent times after Khosla's visit.⁸ After parts of the paintings were cleaned in summer 2016, however, the conservators discovered that the position of the painted curtains (*sham bu*), which are traditionally visible on the murals just underneath the ceiling, matched the height of the ceiling. It is therefore believed that the original height of the room must have been preserved. The framework of the ceiling is made of undecorated timbers. Pillars and capitals present simple shapes. Columns simple and uncarved in contrast to those inside the red *sPyan ras gzigs* shrine and the Guru Lakhang. The walls are made of stones in their lower part, while mud bricks and mud plaster are used for the upper portion. Walls are approximately ninety centimetres thick. Natural light enters through a modern one meter high lantern set in the centre of the room. The opening light up a platform where ritual butter lamps are disposed by the monks. The rest of the room remains usually quite dark; an impression accentuated by deposits of black soot on the wall paintings.



Fig. 2 — The Tsuglakhang in 2016, after the conservation intervention.

Most of the walls are painted, even behind the more recently painted wooden altar. The total surface of the paintings reaches

⁸ Henry: 189.

almost sixty square meters. While various *thangkas* used to be hung in front of the murals they were removed in 2013 to allow for a preliminary assessment of the wall paintings. The small wooden altar contains numerous statues, and its one meter high coarsely painted platform made of mud supports a series of clay statues likely dating to the 19th century, as well as various ornamented metal reliquaries (i.e. chörtens). Some of the statues are clad with textiles and are only shown during peculiar rituals. The mud platform is a later addition, as an interruption of the painted patterns on the wall paintings behind it indicates.

The temple is still in use today for daily rituals performed by a monk appointed to this position every second year. The room is also used by other monks of the monastery on special occasions. Pilgrims and worshippers from the valley or elsewhere visit the temple, and as such constitutes the living heritage of a vivid and ancient religious tradition. For that reason, the conservation-restoration project of this edifice presents specific human challenges in addition to the classic technical and scientific problems that usually concern conservation professionals.

Conservation project

The project started in 2013 when N. Henry, who was studying the history of the valley for his doctorate at the time, noticed that the monks of the monastery were facing difficulties trying to clean the wall paintings. They were indeed trying to remove a thick layer of soot with traditional white scarves and water, hence causing important damage.

The author of this paper, who has matured experience in the field with similar projects in Tibet and Sikkim,⁹ went to Spiti for the first time to meet Yomed Rinpoche in September 2013. As for every conservation project, the first step consisted in determining the condition of the paintings by assessing the extent of damage and material used. All the data collected were presented in a report, along with a full analysis, a restoration proposal, and recommendations for future interventions concerning the type of conservation material required. At that time, small painting samples were collected to carry out a technical analysis in a laboratory. The study of the artistic

⁹ Bonnat 2012. Id. 2015.

programme of these murals was essentially impossible due to a thick layer of soot covering them. Henry's research on the iconography was therefore put on hold and could resume only after a first cleaning phase.

Condition report

Original materials

The original materials used in the making of these paintings present peculiar features. The support is a classic mud plaster containing a large amount of straw. The plaster is between three to five centimetres thick. It is quite cohesive and presents cracks probably due to the way the plaster was applied. The local clay has relevant shrinking characteristics, proving that it has a high content in swellings clays. Therefore, it is necessary to use sufficient material like straw and sand to counterbalance the shrinkage and to press the plaster surface repeatedly after the application for several days. This procedure was probably not respected by the artisans, resulting in the natural formation of numerous one-centimetre deep cracks due to the evaporation of water. This type of mud plaster requires to be treated with a proper method, such as correct preparation of the mud plaster and appropriate application of the restoration mud mortars on the wall.

The original technology of the paint layer is complex and it could have not been fully characterized without a technological analysis. Few studies about wall paintings technology analysis have been published in Spiti so far. The research made by Bayerova and al. on the wall paintings of Dangkhar in Spiti, and the one conducted by Stephanie Bogin on 12th-century wall paintings at Nako Monastery in Kinnaur, are the most relevant for the case under review.¹⁰ Further studies published regarding murals conservation in Ladakh,¹¹ in Tibet,¹² and in Central Asia,¹³ which may be useful to establish comparisons with the present study. Publications about material analysis of *thangkas* paintings could also be considered as possible

¹⁰ Bayerova et al. 2013. Bogin 2005.

¹¹ Nicolaescu 2008.

¹² Simonsen et al. 2015.

¹³ Yamauchi et al. 2007.

references as far as paint layer technology is concerned.¹⁴

Due to budget restrictions, we could analyse only a single sample of paint from the Tsuglakhang, which nevertheless yielded numerous results. The sample was taken from the blue body of the third standing deity located in the middle of the south wall called *Che mchog he ru ka yab yum* (Fig. 3).



Fig. 3 — *Che Mok Heruka* after 2016 intervention.

A micro stratigraphy was conducted by the laboratory Epitopos in Strasbourg, thanks to the Ashoka Grant from the Khyentse Foundation. The cross section obtained under microscope shows a multilayer stratigraphy of the painting, from the structure of the wall to its surface (Fig. 4). First, in the lower portion of the sample lies the superficial part of the mud plaster (layer 1 in the picture). Secondly, the preparatory layer applied on the plaster is a thick and intense orange layer made of red ochre, which can be seen with the naked eye observing the paint layer losses (layer 2). This orange layer is surprising as preparatory layers usually identified on Himalayan wall paintings and thangkas are made of white substance such as calcium carbonate or kaolin. No reference is made to an orange preparatory layer. The third layer, which overlies the orange preparation, is a black under-layer made of charcoal (layer 3). The fourth layer, i.e. the visible paint layer, is made of ground azurite, a precious stone and blue mineral (Fig.5) (layer 4).

¹⁴ Jackson 1984. Boyer 2010.

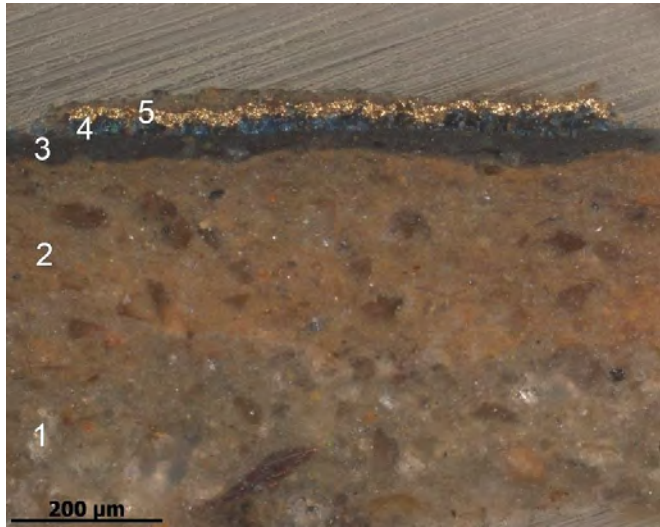


Fig. 4 — Cross-section of a sample analyzed by Epi-topos.

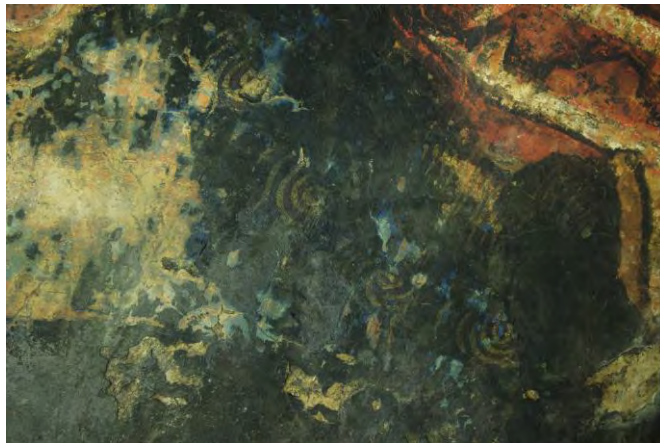


Fig. 5 — Detail of the deity Che mchog he ru ka yab yum whose skin is painted with azurite on the south wall.

It is a well-known technique used in Europe and in Asia. A black under-layer made of a cheaper material is used in order to enhance the hue of the expensive azurite blue. This technique is also attested in Nako (Kinnaur, H.P.),¹⁵ in Ladakh (J&K),¹⁶ and in Bamiyan

¹⁵ Bogin 2005.

¹⁶ Nicolaescu et al. 2008: 67.

(Afghanistan) where lapis lazuli was used instead of azurite.¹⁷ The traditional binding media has not been analysed but we expect an animal glue widely used all over the Himalayan regions.¹⁸ Glue paintings present specific properties such as high water solubility, brightness of colours, and natural lack of glossiness. These characteristics need to be taken into account during restoration work; the presence of the thick soot deposit, however, modifies entirely these properties.

Returning to the micro stratigraphy, a fifth layer made of gold was thinly applied on top of the blue (layer 5). It was used to depict and enhance the jewellery, eyebrows, and eyelashes of the deities (Fig. 6).



Fig. 6 — Detail of gShin rje whose eyebrows are painted with gold powder on the south wall.

Eventually, the analysis of the sample did not bring to light the presence of any layer of varnish. The presence of varnish, however, is easily ascertainable by a simple visual observation with or without the aid of an ultraviolet lamp. On the south wall, for example, it is possible to observe a very irregular varnish with blue-green fluorescence under ultraviolet light, which indicates the use of a natural resin. The varnish was roughly applied. It seems likely that the resin was originally meant for furniture rather than for murals.

The technological study, although limited to a small sample, has been very important to understand the uncommon stratigraphy of

¹⁷ Tanigushi 2007: 147.

¹⁸ Jackson 1984. Boyer 2010. Simonsen 2015.

the murals; especially regarding the presence of the orange under layer. All the information obtained are essential to help choose the best conservation treatments. Moreover, the use of gold and azurite blue confirms the antiquity and precious nature of these wall paintings.

Alteration and damage

A great variety of alteration and damage has been observed on the murals. Regarding the plaster, we noted the presence of old fillings made of cement, mud, or even mud mixed with PVA glue and wood powder.¹⁹ These fillings overlay the original paintings and were physically and chemically incompatible with the original plaster. Some deep and superficial plaster losses, due to the desiccation and contraction of the original mud, were also observed. Notwithstanding these problems, the support was in a relatively good state of conservation in view of the age. It is worth noting the absence of plaster detachment and a general good adherence of the plaster onto the mud bricks of the wall, despite the shrinking properties of this material.

On the other hand, the paint layer presents numerous alteration and damage of different kinds and types. The main problem is a noticeable soot deposit incrusting in the painting surface. Moreover, roof leakage resulted in additional deposits of mud on top of the soot, taking the shape of vertical lines. These traces impregnate the paint layer and hide large portions of the paintings. Traces of abrasion are attested on both varnished and unvarnished areas of the walls. Varnished surfaces were probably cleaned manually and inadequately before the application of the resin, while unvarnished areas suffered from paint losses due to roof leakage. In several places, especially under the ceiling, the paint layer presents a low adhesion level and numerous flakes are visible. These flakes are likely to fall off and cause further paint loss, as is already noticeable in some areas.

The varnish presents various problems. It is quite irregular, yellowed, and thick in some places. It was applied above layers of soot and mud leakage, which accidentally contributed to consolidating them. In varnished areas, old mud deposits are

¹⁹ PVA, polyvinyl acetate is a common white emulsion glue used for furniture.

impregnated with resin as a result of which they stick strongly onto the paint layer. Old renovation work, particularly nearby the door, has caused further damage. A grey and white paint was applied on the edges of the door, partly covering the original paintings around it.

The conclusion of this condition report indicated that the preservation of the Tsuglakhang paintings require a huge amount of conservation-restoration work. Efforts should be made to find appropriate cleaning methods to separate and remove all exogenous substances from the original paint layer, such as mud leakage, varnish, and soot.

Conservation Work

Prior to the cleaning phase, paint flakes were treated with a mix of water and alcohol before being consolidated with sturgeon glue diluted at 2% in water using small syringes. For thicker flakes, the sturgeon glue was mixed with methylcellulose to get a more viscous glue. These types of glue are very effective. They leave no halos on the paint layer and show a good level of compatibility with both mud plaster and paint layers. Moreover, it is important to exclude the use of synthetic adhesive to guarantee material compatibility, and to keep the circulation of air and humidity through the wall.

Cleaning

The cleaning of the east wall was carried out using a cotton swab, water and saliva. The process was sufficient to remove the mud and the soot deposits entirely, which were rather thin in this area. The cleaning revealed some painted images more clearly, allowing for a first study of their iconography. Unfortunately, the murals on the east wall are not sufficiently preserved and all the figures could not be identified.

On the south wall, we tested several cleaning agents; including dry methods, such as erasers and solvents, or water based methods, such as solutions or hydrogels; these methods were used with different types and time of application (e.g. compresses and cotton swabs).

The first step consists of cleaning the varnished surface with a water based cleaning agents (e.g. tri ammonium citrate solution).

This step was relatively quick as the varnish layer protects the original paintings against alterations. It resulted in an immediate change in the appearance of the room.

Next we proceeded to numerous varnish removal tests. The best result was obtained with the use of isopropanol compresses made with facial tissue applied on the varnish for two minutes, before being cleaned with cotton swab and isopropanol. The result was satisfying and homogenous, preserving the original colours underneath. It eliminated the shining effect of the varnish, providing a better view of the paintings (Fig. 7 and Fig. 8).



Fig. 7 — Detail of the south wall before cleaning; the blue square localize the next detail.



Fig. 8 — Detail of the south wall after cleaning; one of the followers of Padmasambava.

A third phase consisted in removing a first layer of soot deposit using dry methods such as latex smoke sponge, vulcanized latex eraser, and standard white vinyl eraser. Dry cleaning methods are commonly used for removing soot,²⁰ especially from matte paints and *thangkas*.²¹ Dry cleaning had a discrete effect that should not be neglected before starting further cleaning: the reactivity of the surface to liquids is facilitated and the vertical mud deposits are more visible after dry cleaning, and therefore easier to remove.

Afterwards, the mud deposits caused by roof leakage were removed from both varnished and unvarnished areas. In both instances the mud was strongly incrustated into the paint layer making its removal tricky and time consuming. The cleaning was carried out with the aid of magnifying glasses, scalpels, thin hard brushes, and various pointy thin tools in order to gently scratch the mud after having humidified it with small quantities of water. The intervention was not completely successful, however, as the removal of mud caused the dispersion of a thin white powder, which created halos leaving, even after hours of work, tiny remains on the surface. Nonetheless, the general aspect of all cleaned areas was considerably improved.

The fifth phase consisted in removing soot deposits. Soot deposit is a common problem for mural conservators in the Himalayas and Central Asia where butter lamps are traditionally offered by worshippers, causing dramatic effects on tempera techniques. While the conservation treatment of *thangka* paintings has been more thoroughly documented,²² few scientific articles address the issue of soot.²³ The methods used for cleaning *thangkas* can be adapted to wall paintings. Only few cases of Himalayan murals conservation projects with a similar soot-related problem have been published. There are more reports concerning the technological study and the peculiarities of working in a Buddhist context than about the conservative technicalities relative to soot cleaning.²⁴ The use of laser has been explored by Schmidt, in particular to remove soot from the surface of glue-based paintings.²⁵ This method, however, has proven

²⁰ Spafford-Ricci et al. 2000.

²¹ Rieuf 2011. Boyer 2010.

²² Boyer 2010; Rieuf 2011.

²³ Spafford-Ricci et al. 2000.

²⁴ Oeter et al. 2010; Pfund 2015.

²⁵ Schmidt 2011.

to be effective only on certain pigments, and was generally considered too expansive for the present project.

The religious use of butter lamps in Himalayan temples suggests that soot deposits are composed of numerous inorganic dust mixed with protein decomposition substances, the latter of which are rather organic, acidic, and polar. We have thus followed progressive testing methods using an array of material, from non-polar to polar solvents and water based products, with the use of different types of application like cotton swabs, absorbing compresses, and gels, as suggested by Cremonesi and Wolbers.²⁶ Eventually, the best results were obtained with three different products. In the first place, and for sensitive areas, we used saliva cleared with water or a solvent mix (water/isopropanol 50/50) applied gently with cotton swab for a short period of time to avoid the dissolution of the paint layer. Secondly, and for less sensitive areas, we gently applied with cotton swab water alkaline (pH between 8 and 9) soap solutions prepared with triethanolamine, or different kinds of Ethomeen[®], which are surface-active lipophilic amines, for a short period of time and cleared with water.

Finally, and for more resistant areas, lipophilic neutral or slightly alkaline hydrogels prepared with Pemulen[®]TR2,²⁷ and various alkaline salts such as ammonium hydroxide and bis-tris methane.²⁸ These methods would seem quite extreme on this type of paintings but they are admittedly the only way to produce a chemical reaction with the polar and oxidized soot deposit, and thus diminish its opacity without altering the appearance of the original colours. In view of the satisfying results obtained, it was decided not to test other and more aggressive methods that could cause abrasion or deterioration of the paint layer (Fig. 7 and Fig. 8). In the future, the methods developed for the south wall could also be used on the other walls of the room. On the north wall for example, tests have been carried out revealing a gold pigment used for the skin of deities (Fig. 9) where cleaning methods were effective.

²⁶ Cremonesi 2011; Wolbers 2010.

²⁷ Pemulen TR2 is a poly acrylic acid that produces translucent hydrogels under certain pH conditions.

²⁸ Different alkaline salts have been tested by Hennen for her Master Degree at La Cambre in Brussels. Hennen 2016.

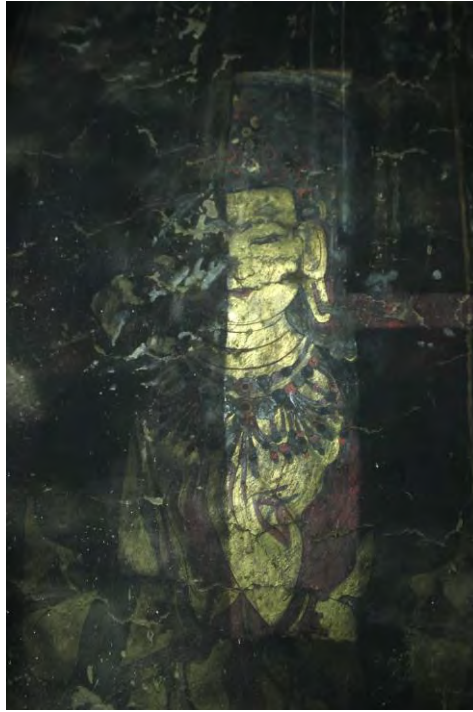


Fig. 9 — Detail of the north wall during cleaning (Credit E. Aubert).

Mud plastering

Before filling plaster losses, tests were carried out to select adequate mud composition; local mud was dried up and sifted to get appropriate grain size; various types of mortar were made using different percentages of sand to obtain the right hardness and avoid shrinkage. The mortar was tested on site and proved to be fit for conservation requirements. It was used not only to fill large plaster losses but also smaller ones with the help of a small spatula. The same treatment was used again in 2016 when coarse and thin plaster layers were made on the south, east, and north walls.

Recovering the iconography

After the cleaning of the south wall in 2016, we discovered a series of very fine and delicate figures painted right underneath the ceiling. It was not easy to get a clear view of the twelve-centimetre high figures

located three meters above the floor. We thus decided to trace the outline of each figure by using transparent plastic sheets and permanent markers. Each drawing was then scanned and processed through a graphic software.

In this way, we could identify on the east wall, just on the right side of the door, two of the Four Guardian Kings (*rGyal chen bzhi*); *Phag skyes po* holding a sword, and the *Yul 'khor srung* playing a music instrument. The two other Guardian Kings are visible under the soot on the left side of the door. On the left part of the south wall, Henry identified three large deities, namely *gShin rje*, *rTa mgrin yab yum*, *Che mchog he ru ka yab yum*, who are all *Yidam* related to the Pema Lingpa tradition (Fig. 3 and Fig. 10).



Fig. 10 — Detail of *rTa mgrin yab yum*'s head during cleaning.

Unidentified religious figures wearing lotus hats or a turban were painted between these *Yidams*. Similar religious figures are also represented on the west wall but could not be identified (Fig. 11).

On the right side of the south wall is a series of small scenes representing episodes of the Buddha's past lives, such as, for instance, the Tigress *Namo* feeding on the Buddha's flesh. Other animals such as rabbits, a bear, a buffalo are also depicted. Next to these scenes, Guru Rinpoche's pure field known as *Zangs mdog dpal ri* is represented. Padmasambhava is shown seated in the centre of the palace. His skin tone painted with gold pigment. Underneath, just above a recent mud pedestal, are visible two small little architectural representations, which have not been identified yet.



Fig. 11 — Detail of rTa mgrin yab yum's belt of heads.

On the upper part of the wall, thirteen of the twenty-five disciples of Padmasambhava, followed on the right by some of the hundred wrathful and peaceful deities (Fig. 12) are disposed all along the wall underneath the ceiling, and continuing the west wall and behind the altar. It is necessary to resume the cleaning of the paintings to complete the iconographical study of the figures painted in the temple, thus understanding its religious lineage and history.

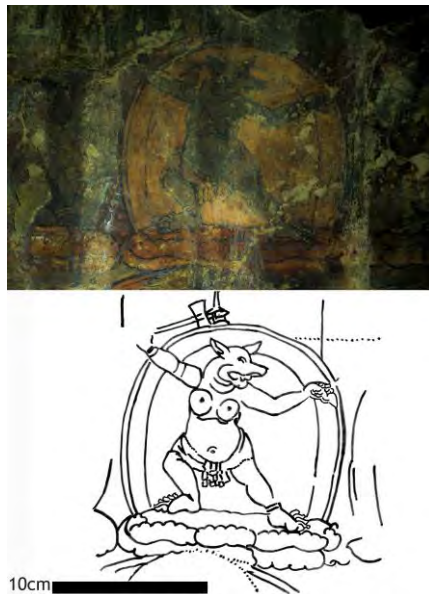


Fig. 12 — One of the hundred peaceful and wrathful deities, photography and tracing.

Conclusion

The three conservation interventions carried out at the Kungri Tsuglakhang since 2013 have already shown tremendous progress with respect to the consolidation and cleaning of its wall paintings. Every year, an international team of specialists resumes restoration work, bringing in new ideas and methods. The understanding of the artwork technology and the conservation methodology are getting more detailed and accurate. Team members were pleased to be able to implement efficient methods in order to remove mud traces and soot deposits from the wall paintings but are still looking for alternative solutions to obtain more positive results. The cleaning methods are time consuming, requiring a high degree of precision, and should imperatively be conducted by trained conservators.

The twofold aspect of this research project, both technological and artistic, sheds more light on the characteristics of the wall paintings. Sample analysis has already shown that the wall painting presents a unique red ochre under layer, rather than more conventional white preparation. The use of high quality gold and azurite pigments attest to the quality of the wall paintings.

The Tsuglakhang Temple is a very important site for the history of the Spiti Valley and for the local living Buddhist culture. In such a remote area where neither expert nor funds are available, communication with the local community about heritage conservation-restoration is essential. We deem very important for the local people to understand our work, the slow pace necessary for the conservation effort, the kind of results they can expect with the delicate training that is required for the task. The local community must participate in the decision making process, and we feel the need to explain our objectives in the most accessible manner. Some of the monks have already expressed their interest to get involved and learn simple conservation methods and techniques. We are currently offering basic trainings to some of them. They are asked to perform simple conservation tasks on sculptures as interventions on murals would require more training. We are conscious that this strategy needs to be developed carefully to get the best conservation result possible. Meanwhile we hope to create a sense of ownership and awareness of cultural heritage. Not only a service for the local community, it is also an intense experience for the foreign

participants who experience working in a living religious heritage site.

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