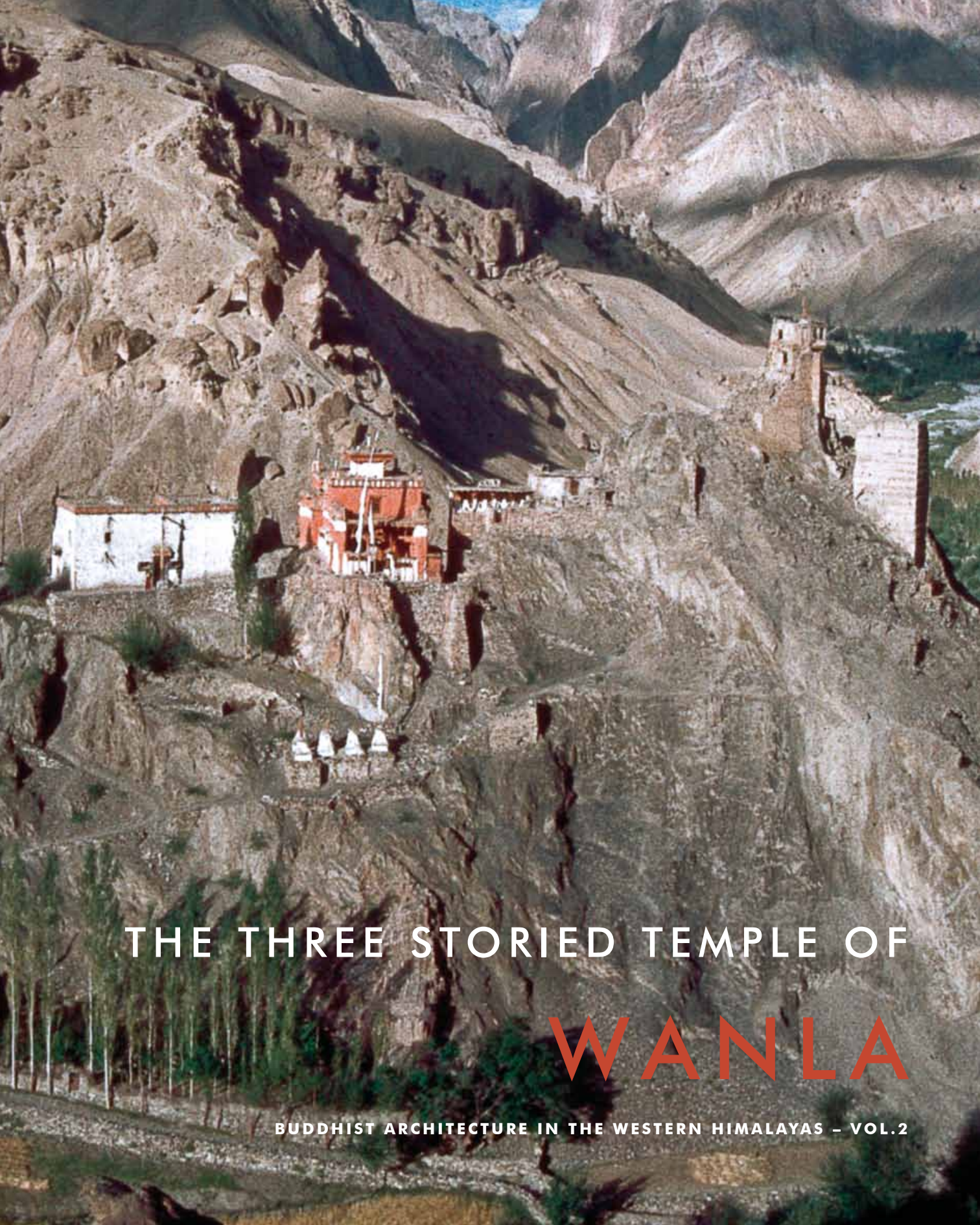

THE THREE STORIED TEMPLE OF WANLA

BUDDHIST ARCHITECTURE IN THE WESTERN HIMALAYAS – VOL.2

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WANLA

BUDDHIST ARCHITECTURE IN THE WESTERN HIMALAYAS – VOL. 2

Graz University of Technology - Faculty of Architecture
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01 Map of the Western Himalayas region, indicating the influence of the Kingdom of Guge. TU Graz 2008.

Holger Neuwirth

PREFACE

Due to its isolation and difficult accessibility, the Western Himalayan region was discovered by Europeans fairly late. A.H. Francke visited Spiti on behalf of the Archaeological Survey of India in 1909. 1906-1908 he was in Lahul and also spent time in Ladakh.[1] Consequentially, save for the existence of a few written reports, the tibetan culture shifted into the perspective of scientific interest only towards the beginning of the 20th century. In addition, the politically unstable region was declared a military area in the mid-20th century making it completely inaccessible for scientific research purposes. As a result, Giuseppe Tucci's work and expeditions (1933, 1934 and 1937) still form the basis of Tibetology and Buddhist studies today. Since the gradual opening of the Indian part of the region in 1975, scientific activities were able to be continued there. Unfortunately, similar ambitions have been subject to severe restrictions within the area under Chinese administration, Xizang-Tibet Autonomous Region, until the present day.

While both art history and Buddhist studies have been making enormous progress, architectural studies and building research have been largely neglected in spite of their evident connection to content and material in other scientific areas. Developments in the field of measurement engineering, in particular, provide superior results for the essential building documentations. Apart from Romi Khosla's work in 1979 [2], Manfred Gerner's book "Architekturen im Himalaya", published in 1987 [3] and the exhibition catalogue "Rom and Paris: Omaggio a Guiseppe Tucci" in 1987 [4], in which the typology of religious architecture in the Western Himalayas was systematically listed, no comprehensive study of that kind has since yielded significant scientific results. Although profound knowledge of traditional building techniques and the interaction of architectural elements can be regarded as an essential basis for the effective preservation of buildings, there is still a lack of scientific data, especially with regard to building materials and structures.

1 See FRANCKE, "A History of Western Tibet. One of the Unknwon Empires" 1907.
2 See KHOSLA, "Buddhist Monasteries in the Western Himalaya" 1979.
3 See GERNER,"Architekturen im Himalaya" 1987.
4 See particularly MORTARI VERGARA, 1987: 276 – 297.

Since 1999 I have been in charge of several research projects focusing on the documentation, analysis, reconstruction and other aspects of preservation of sacred architecture of the 10th to 15th centuries in the Western Himalayas. The projects in question were funded by the Austrian Science Fund (FWF) and carried out by members of Graz University of Technology under my guidance. Our analysis, which was based on specific research results, primarily sheds light on the complexity of Buddhist architecture in the Western Himalayas, especially the connections between building aspects such as construction principles and materials as well as aspects related to content and aesthetics like proportion and shape. Those elements are equally inherent to architecture as they are to visual arts, sculptures and paintings. We now aim to present and comment on the overall results of our interdisciplinary research on the remaining early temple complexes of this culture area in a series of publications.[5]

In 1998, we were able to embark on a field research project with the financial aid of Edoardo Zentner, Zurich, which centered on the three storied Wanla Temple in Ladakh. As Christian Luczanits was able to establish on a visit in 1994, the Wanla temple has largely been preserved in its original appearance. Almost since its construction, the Wanla temple has been a monument of the Drikung Kagyu school, a sub-school of the Kagyupa school of Tibetan Buddhism. Today the most important Drikungpa monasteries in the region are those of Phyang, close to Leh, and Lamayuru, not far away and also responsable for the temple in Wanla. Certainly, also due to its proximity, Wanla is administered as a branch monastery of Lamayuru.
Although the temple that is the subject of this publication is by far the oldest and most impressive Buddhist monument in the village, the monastic community of Wanla predominantly uses a much more recent temple at a more secluded spot at the end of a side valley, while the old temple appears to have been used only occasionally. Architecturally and artistically the new temple structure there is of minor quality and it is thus not treated here at all.
However, it is clear that the old temple has received increasing attention in the last two decades. The temple is thus used more frequently by both the monastic community and the villagers, which has also had effects on the historic and artistic treasures it contains.

A first survey of the temple complex and its surroundings was started in 1998 by mapping it in detail, both in writing as well as in photography. During the course of further stays in 2000, 2003, 2004, 2005, and 2009, we gathered more information and did a tachymeter survey of the building to enhance the documentation.

5 See NEUWIRTh & Auer, "The ancient monastic complex of Dangkhar" 2013.

During the 1980s and 1990s some repair work was done. In 1999, for example, Benoy K. Behl carried out a superficial renovation of some façade, roof and cornice areas as well as parts of the interior of the lantern, which unfortunately also led to an increase in the roof weight. In the immediate vicinity of the temple building, many alterations were made too. In 2002, for example, a local initiative led to the extension of the front terraced area in order to create space for a chapel for lamps. Ever since 1998, the Achi Association under its President, the 37th Drikung Kyabgon Chetsang Rinpoche and Vice-President Edoardo Zentner has been striving to implement renovation and restoration work of the interior as well as the exterior parts of the temple complex.[6]

The main purpose of this publication is to provide an accurate and detailed record of the building in question and to take its many aspects of architecture and design into equal consideration. With the comprehensive elaboration of the plans, the foundations were laid for an enhanced insight into the technical structure of the building. The final analysis proves to be necessary for future preservation measures. The plan documentation is based on the appearance of the building complex as it presented itself in 1998. The photo documentation, which was dependent on prevailing circumstances, encompasses the entire interior and is not limited to specific details.

I would like to thank Carmen Auer for her companionship, Markus Weisskopf for his patronage, Christian Luczanits for his long-standing collaboration and Martina Oeter, Alexandra Skedzuhn-Safir and Kurt Tropper for their contributions. The following colleagues were also involved in the field research, preparation and analysis of data regarding Wanla temple in the frame of the FWF research project: Gernot Angerer, Carmen Auer, Dieter Bauer, Wolfgang Heusgen[7], Gerald Kocziz[8], Dagmar Ley, Bettina Paschke, Martina Rössl and Claudia Wrumnig. I also acknowledge Yannick Laurent and Patrick Steinwidder for proof-reading the texts.
Since Manfred Gerner photographed the temple in 1982, its surroundings have been subject to increasing changes. These changes include the demolition of the south-eastern castle wall, the erection of a monastery building next to the temple, a new Lhakhang below the castle in place of the old one, and a few lamp houses in the area. The newly built road provides easier access, thus also meeting increasing tourist requirements. May this publication be a permanent source of basic knowledge for all further research and interpretation and serve as a formidable starting point for all preservation measures to guarantee the future existence of this unique cultural monument.

6 The interventions of the Achi Association since 1998 are listed on their homepage.
See ACHI ASSOCIATION, http://imap.achiassociation.org/review.php, May 2015.
7 See HEUSGEN 2010: 73–78
8 See KOZICZ 2002: 127–136.

1 INTRODUCTION

02 Northern side valley with old village houses of Wanla along the track to the entrance side of the temple. HN 2005.

1 INTRODUCTION

Holger Neuwirth

ARCHITECTURAL CONTEXT AND BUILDING TECHNOLOGY

The Western Himalayan region, with its vast mountain ranges and high valleys, lies west of the central Tibetan Highlands. Today it includes parts of Pakistan, China, India and Nepal. In the north, the Pamir Mountains separate it from Central Asia; while in the south, the Trans-Himalayan range shields the Western Himalayas from the Indian subcontinent and thus from precipitation arriving from the Indian Ocean. As a result, the climate in the Western Himalayas is arid. Ladakh, which is the highest district in India, stretches from the mountain ranges of the Himalayas and the Karakorum to the Upper Indus Valley. The valleys are located at an altitude of approximately 3000 metres above sea level and the mountains peak at over 7000 metres. The district capital Leh with its population of about 27,500 is the largest town in the district. The whole province is drained by the Indus River which is spanned by some few bridges.

The few fertile valleys are each of them dominated by a river. However, these awesome mountain ranges have not only exerted strong influence on the mythological beliefs of the native people, which are reflected in their natural religions and shamanism, but, in an unquestionable determination of space, have also formed the realistic backdrop for daily life. Nutritional and social demands have generated territorial and architectural patterns which play an essential role in maintaining vital roads and bridges, ensuring usage of pastures, fields and water supplies as well as in avoiding conflicts between various local groups.[9]

Despite the adverse conditions prevailing in the valleys, they have not only served as trade routes for over 2000 years, especially between India, Central Asia and China, but due to the restrictive confines of the terrain, have also promoted lively cultural exchange between neighboring peoples. Needless to say, those routes were also used in the course of armed conflicts as well as for subsequent territorial expansion, which had effects on their immediate surroundings. The vernacular architectural style of the Western Himalayas is the result of climatic conditions and the availability of local material resources, which are mainly limited to stone, mud bricks or rammed earth and a small amount of timber. Apart from the nomadic people of the highlands and their mobile tent architecture, the general style of architecture is based on mixed construction.

9 See GUIDONI, "Architektur der primitiven Kulturen" 1976.

03 Residential houses of the former village in the north-eastern side valley of Wanla. CA 2005.

04 Village houses in the contemporary village. HN 2000.

All bearing walls were built solidly using natural stone and mud bricks. Wood is scarce; it is used mostly for beams, pillars, corbles and capitals, as well as for framework, beamed structures and board layers. Apart from corbelled vaults, vault constructions were practically unknown and inner rooms and openings were rectangular.[10]

Comprehensive knowledge of applied materials and building technologies is a prerequisite for assessing the state of an historical monument. Since neither regional building materials nor building methods have seen great changes, they can still be observed, practically "in situ", as part of the building process.

Upon visiting a building site in Sera near Lhasa in 1987, I was able to observe traditional house-building phases. In a first step, stones and rocks are gathered and deposited at the construction site. At the same time, clay bricks are made and dried on the spot (Fig. 05). For the building's foundations, ditches are dug out and filled with unhewn stones. Then, the ground plan of the house is pegged out with a framework of strings, and the outer edges are laid out with larger stones as a basis for the exterior walls. The intermediate space is filled and levelled with gravel left over from stone hewing (Fig. 06). The first layers of the exterior walls are built with stones at a width of about 50 cm, i.e. the inner and outer edges are built of hewn stones, and the intermediate spaces are filled with gravel and clay (Fig. 07).

Larger gaps are closed with stone chippings (Fig. 08). Doors and windows are built in before bringing up the walls in the intermediate spaces (Fig. 11). The first wall layers closest to the ground are made of stone in order to counteract soil moisture penetration. Above these, especially interior walls are often built with clay bricks because clay ensures a better room climate (Fig. 12).

05 Natural stones and sun-dried mud bricks. HN 1987.

06 Foundation ditch. HN 1987.

07 Stonewall construction at the base. HN 1987.

08 Stone masonry as a basis of the wall. HN 1987.

10 See STEIN, "La civilisation tibetaine" 1962.

09 Traditional residential houses in Chömzon/Tibet. HN 1987.

10 New schoolhouse in Chömzon/Tibet. HN 1995.

The wall thickness above door and window architraves is extended to form small porches, often by doubling or trebling the layers of crossbeams covering them (Fig. 13). This is one of the most striking characteristics of Tibetan architecture until today. For the main beams, the bearings are reinforced with wall corbels, upon which a secondary layer of beams is built (Fig. 14). A final layer of planks or rods then provides a firm basis for the clay platform roof, which is multilayered (Fig. 15). A thick layer of rods or short beam pieces is then bonded with mortar to form a circumferential layer of planks for the overhanging eaves (Fig. 16). Linseed oil is added to the uppermost layer of clay, which is then especially compressed using wooden mallets (Fig. 17).

Roofs are flat, because there is hardly any rain. A thick clay layer protects the roof platforms against occasional meteoric waters. Since no other roof types are needed, the construction style was based on simple cubic shapes. Whilst vernacular construction traditions and architectural techniques have remained largely unchanged over the past thousand years, sacred buildings have been subject to various different cultural influences, not only with regard to their sculptural and iconographic significance, but also to the structural and formal design of architectural details and skeleton structures.

Initially, the simple stylistic elements of vernacular architecture offered an ideal basis for the realization of the geometrical conception of Tibetan Buddhism.[11] Murals and sculptures are obvious. The principal values of Buddhist teachings for architecture may appear invisible at first glance, but the clearly connected proportions are reflected in sacred architecture. Indeed, it is the precious simplicity of Western Himalayan architecture that raises it above the status of a mere weather-proof housing for various sculptures and paintings.

11 See TUCCI, "Rin-chen-bzan-po and the Renaissance of Buddhism in Tibet around the Millenium" 1933.

11 Construction of the doorframe. HN 1987.

12 Brick wall and supporting stone pillar. HN 1987.

13 Lintel with crossbars, covered with boards. HN 1987.

14 Cross beams resting on wall brackets. HN 1987.

15 The different layers of the ceiling construction. Yannick Laurent 2011.

16 Eave construction. CA 2011.

17 Compression of the clay layer. HN 2004.

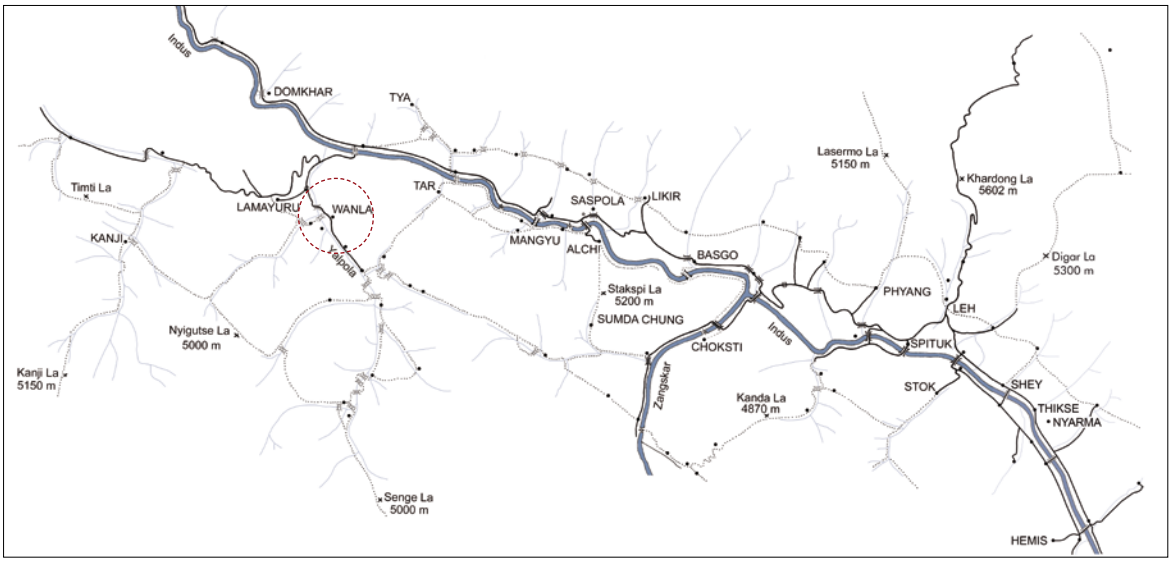
18 View of Wanla from the south-west, approaching on the footpath from Lamayuru. The last stretch leads along the Shillakhong valley. HN 1998.

Holger Neuwirth & Carmen Auer

TOPOGRAPHY AND LOCATION

The settlement of Wanla is located in Western Ladakh on the Yalpola River, a southern tributary of the Indus River, about 68 kilometres linear distance from Leh. At an altitude of 3260 metres, the climate is somewhat milder than in higher regions and offers more comfortable living conditions. The Yalpola and its tributary, the Shillakhong, which join in Wanla, supply enough water for the needs of the local population, the valleys are relatively broad and flat providing enough arable land for farming. Today the village can be reached by a road which branches off the main route connecting Leh and Kargil. After passing Kartse, which is about 85 km from Leh, the road crosses to the southern banks of the Indus where it then follows the river bed of the Yalpola.

Whilst the main road leaves the valley floor winding upwards to Lamayuru, the junction road to Wanla is reached after about 12 km by following the gorge of the Yalpola in a south-westerly direction. The secondary road leading to Wanla then continues along the river towards the east until the valley sharply turns south. Since parts of the narrow valley road were often flooded by the river, proper access was only able to be gained after blasting away parts of the rock face. From the crossing it is about 7 km to Wanla where views over both valley floors stretching to the south and west reveal the impressive ruins of the castle complex which is perched on a rocky ridge above the settlement.



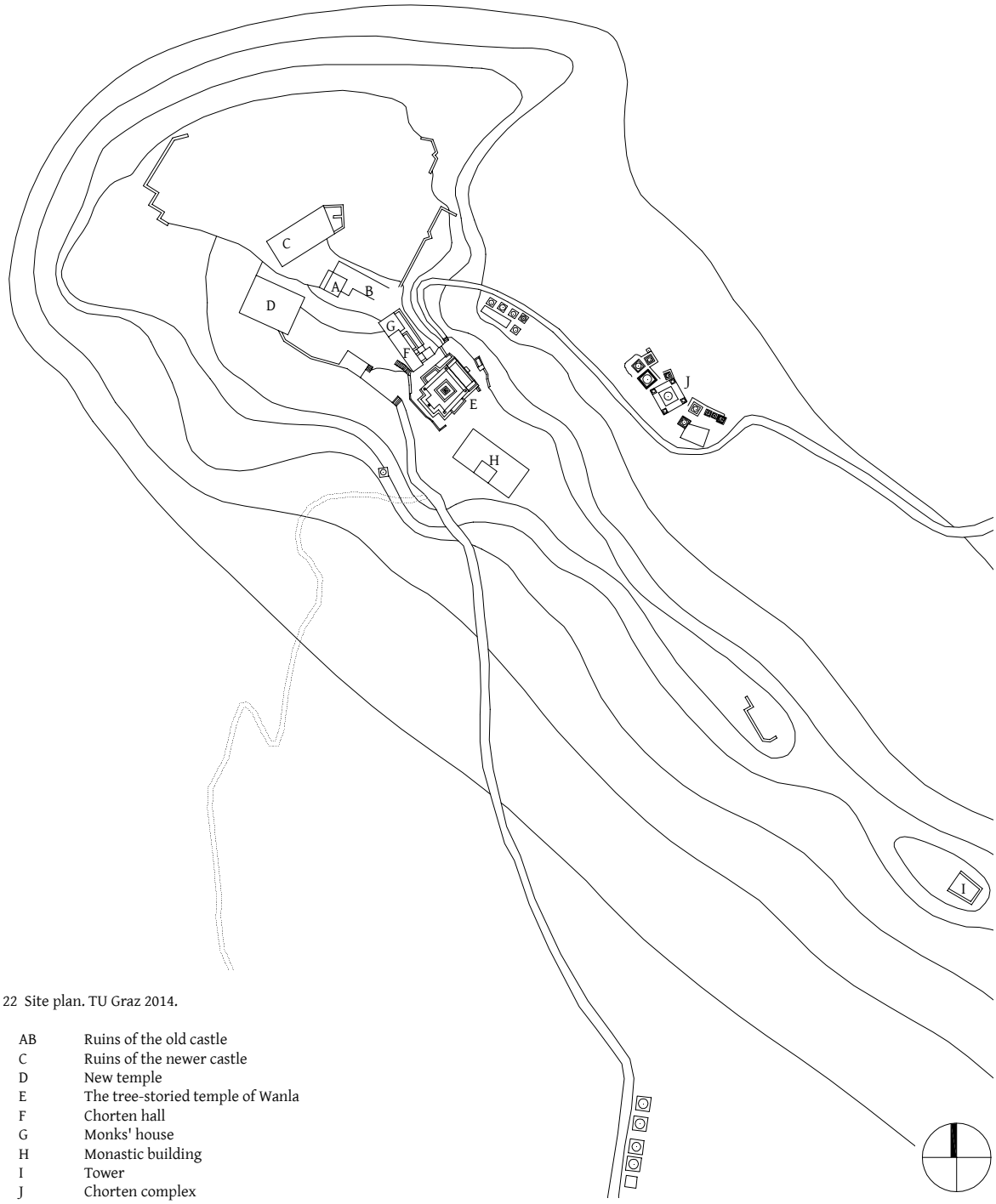
19 Map of lower Ladakh along the Indus Valley with the village of Wanla next to Lamayuru. TU Graz 2013.

20 Satellite picture of the mountain landscape around the settlement area of Wanla. The frame marks the enlarged detail on the following page. Google Earth 2013.

The Yalpola Gorge is only one of the original access routes. An old footpath leading over the Prinkiti Pass at 3726 meters connects Wanla with Lamayuru in the north-west. Coming from Lamayuru, the path joins the road into the Shillakong Valley where the castle hill and the temple at Wanla can be clearly seen in the distance. This route is the beginning of a lengthy trek from Lingshed to Zangskar, which is one of the reasons why most people currently coming to Wanla are foreign hikers who hardly ever visit the temple.

A rarely used path from Wanla to Hinju leads over the Kungski Pass at 4950 meters to the Lower Zangskar Valley and to the Markha Valley. This route is much easier to climb from the opposite direction. Tracks branching off to Mangyu, Sumda Chung and Alchi also lead over high passes, like the Stapski Pass at 5200 m. The direct route to the south-west is probably used the least. After passing through the Shillakong Valley, one arrives at a narrow valley gorge which can only be crossed at a low water level and which leads up to a high uninhabited area. Kanji village can be reached via a pass in the west. At Kanji there is a small temple which dates back to the same period as Wanla and therefore often serves as a suitable comparison.

21 Satellite picture of the location and the settlement structure around Wanla. In the center of the marked field the temple is located on the ridge above the village. Google Earth 2013.



22 Site plan. TU Graz 2014.

AB	Ruins of the old castle
C	Ruins of the newer castle
D	New temple
E	The tree-storied temple of Wanla
F	Chorten hall
G	Monks' house
H	Monastic building
I	Tower
J	Chorten complex

THE CASTLE COMPLEX AND THE TEMPLE AREA

The small mountain ridge above the settlement of Wanla is dominated by the imposing ruins of an ancient castle complex that are mainly situated on the rocky crag at the north-western side of the area.

The most striking part of these ruins of the old castle is a tower-shaped building of three storeys perched on the highest point of the ridge (A). The lower two storeys are built of rough mud-mortared stone walls and the upper storey fragments are made of mud bricks. The north-western facade of the building carries a filigree timber gallery, with different structures on each floor which have been seriously damaged by weathering. Despite that damage, it is still recognizable that the carvings of the gallery on the third floor indicate early origins. This timber construction consists of four groups of triple pillars. The lower part shows no carvings. Above, the carving clearly differentiates between a base and a top area with complex profiles and central elements. The remaining faces of each pillar are carved on the front sides showing complex vegetal motifs, which differ from pillar to pillar. The capitals set on top of the triple pillars and the crossbar connecting them above are finely carved as well.[12] The similarities of these carvings become apparent when compared with other ones in the region, like the timber construction of the Sumtsek temple in Alchi.[13]

Behind the tower stands a long and narrow building (B) of much finer mud mortared stone. The stonework of the ruins in front (C) is quite similar; additionally, the structure changes to a higher and trapezoidal formed building of rammed earth at the north-eastern side. Slightly below those ruins, an obviously newer dwelling (D) with a walled yard is situated on the western side of the slope. Next to this area one can still see the extensive structures of an old village temple which today no longer exists. At the end of the 1990s a small temple was erected on its foundations, which had to be rebuilt in 2008 following its demolition on grounds of construction deficiencies.

Easily recognizable as a sacred building with its red and white painted walls, the three storied temple of Wanla (E) forms the center of the building complex today. It is surrounded by terraced areas that allow the ritual circumambulation of the temple.Given the wall structures, we can assume that the temple once was an integral part of the castle complex.

12 See PÖLL 2005: 191-204.
13 See HOWARD 1989: 257.

23 North western view of the castle's silhouette and its central tower on top of the hill. HN 2003.

24 The front side of the central tower with the three-storied wooden gallery. HN 2003.

25 The wooden timber construction in front of the massive stone and brick walls. CA 2005.

26 The rear view of the central tower (A) with the connected side walls. HN 2003.

27 North-western view of the earthen tower (I). HN 1998.

28 Western view of the ridge with the castle ruins in the north-west, the temple area and the earthen tower in the south-east. CL 2006.

To the immediate north-west of the temple stands an open building with a traditional group of eight chortens (F) and there is a simple dwelling nearby which is used as a monk's house (G). Another monastic building to the south-east of the temple, which was built in the late 1980s and sometimes used as a guest house of the monastery, affects the appearance of today's complex most (H). During the last decade, not only the chorten hall and the monk's dwelling have been restored, but a few new buildings have been erected to house lamps.

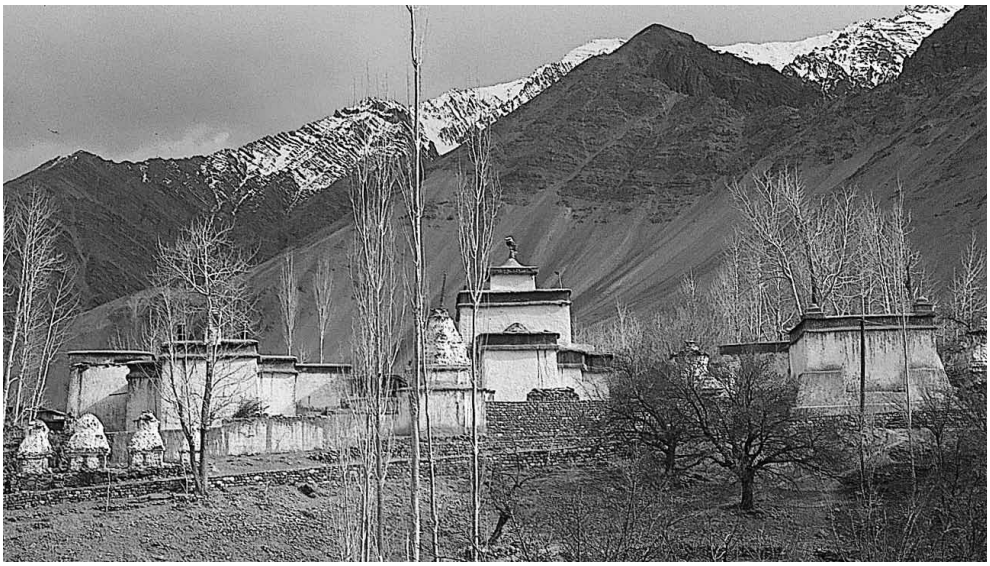
On the south-easterly foothill of the mountain ridge stands an another multi-tiered tower-like building made of rammed earth which was probably used as a defence tower for the whole complex. The chronicles of Ladakh mention that the Ladakhi King Lhachen Naglug (Tib.: *lHa chen Ngag lug* about 1150-1175) erected a castle at Wanla in a tiger year, and one in Khaltse (Tib.: *Kha la tse*) in a dragon year.[14] This event possibly occurred in the 12th century, but there is no decisive clue for an absolute date for these foundations.[15] Nevertheless, it may well be that parts of the present day ruins actually go back to this original foundation mentioned in the chronicle. It may well be that the older settlement north of the temple originates from this period as well.

Starting from the center core, the castle was extended in different building phases over the time. Its latest parts can probably be dated back to the 16th century (C and I), at a time when this complex was an outpost of the Kingdom of Ladakh which needed to be protected against the growing influence of the Islamic rulers of Purig and Baltistan.[16] The ruins of the castle lead to the assumption that Wanla must have played a prominent role as a ruler's residence.

14 See FRANCKE (1907) 1999: 65.
15 See FRANCKE (1926)1999: 36-37, 96-97.
16 See HOWARD 1989: 217-288.

29 The woodcarvings of the triple pillars defining the upper story of the balcony construction. Heinrich Pöll 2008.

30 The upper floor of the the tower's fragile balcony showing the location of a carved nimbus placed on a stone slab. Heinrich Pöll 2008.



31 North-western view of the temple area in Alchi with the three storied Sumtsek in the centre. HN 2000.

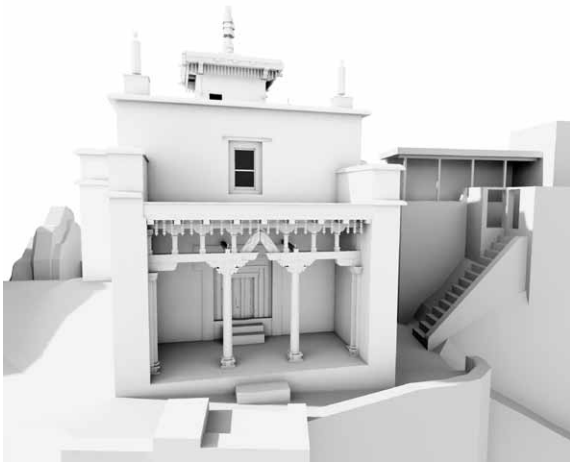
32 South-western view of the temple area in Wanla. Manfred Gerner 1982.

Both the geographical proximity of, and similarity in form and detail between the Sumtsek in Alchi and the temple in Wanla seem to confirm the presumption of the Sumtsek serving as a model for Wanla. This is of great significance for the determination of the age of the Wanla temple. Even though it dates back to the early foundation period of the monasteries and that according to oral traditions, the laying of its first foundation stone is connected with Rinchen Zangpo, the Sumtsek in Alchi is apparently the older building. Generally, for the purpose of dating the building, iconography and various textual references seem to provide the best sources. For instance, valuable insights are provided in an inscription of the temple in Wanla (see page 109).[17]

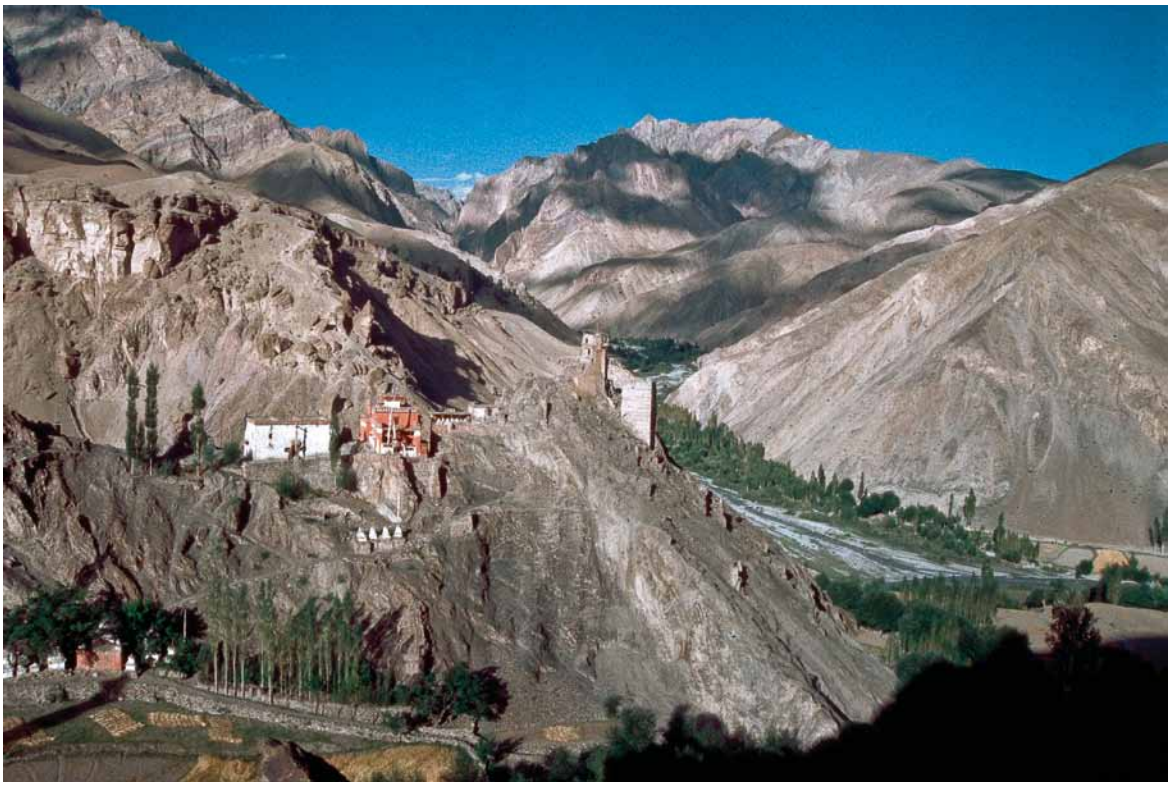
The typological limitation with regard to buildings with three stories produces the following timeline that begins with the Serkhang in Tholing, which is contributed to Rinchen Zangpo (958-1055) and in which he allegedly spent the final years of his life,[18] followed by the Sumtsek in Alchi, and, finally, the temple in Wanla.[19]
Even though several parts of the Alchi chos-'khor were constructed in the middle of the 11th century, the iconography and the ordering of the group of figures in the Sumtsek indicate a growing influence from central Tibet, which suggests that its origins date back to the time period between 1200 and 1220.[20] This would then mean that the temple in Wanla could be dated back to the mid-13th century at the earliest. In this regard, it is remarkable that the temple was integrated into the castle complex. Accordingly, the said inscription indicates that it can be related to the founder Bhag dar skyabs who erected a palace chapel within the castle dedicated to Avalokiteshvara, his personal tutelary deity.[21]

17 More information to the question of dating can be found in the publications by Christian Luczanits and Kurt Tropper. See LUCZANITS 2002: 115-125. and TROPPER 2007:105-150.
18 See PHUNTSOK Namgyal 2001: 94.
19 See TUCCI 1973: 86, 90, 223, 235.
20 See GOEPPER & PONCAR 1996: 17-19, 23.
21 See TROPPER 2007: 126-128 and chapter 4. 112-121. .

33 Reconstruction of the appearance of the Alchi Sumtsek. TU Graz 2014.



34 Reconstruction of the appearance of temple in Wanla. TU Graz 2014.



35 The mountain ridge with the temple area and the ruins of the castle, viewed from north-east. CL 1998.

36 View towards the north-west when approaching from the southeastern footpath. HN 2004.

37 Footpath leading upward on the southern side of the ridge. HN 1998.

ROUTES OF ACCESS

Interestingly, the temple and the remains of the castle were built on a narrow mountain ridge. The most pleasant route runs through a little valley which begins in the north at the foot of the ridge. Following the footpath along the valley floor, one passes by what is thought to be the oldest settlement with houses standing side by side on the northern edge of the valley and arrives at a chorten-complex, one of them a gateway chorten, amidst a group of trees.[22]
Behind the next bend begins the actual climb which leads up a rocky slope, and, about halfway up, passes by another group of chortens ending directly in front of the entrance hall of the temple. Since the entrance of the temple faces that side, it is thought to be the original path to the temple.

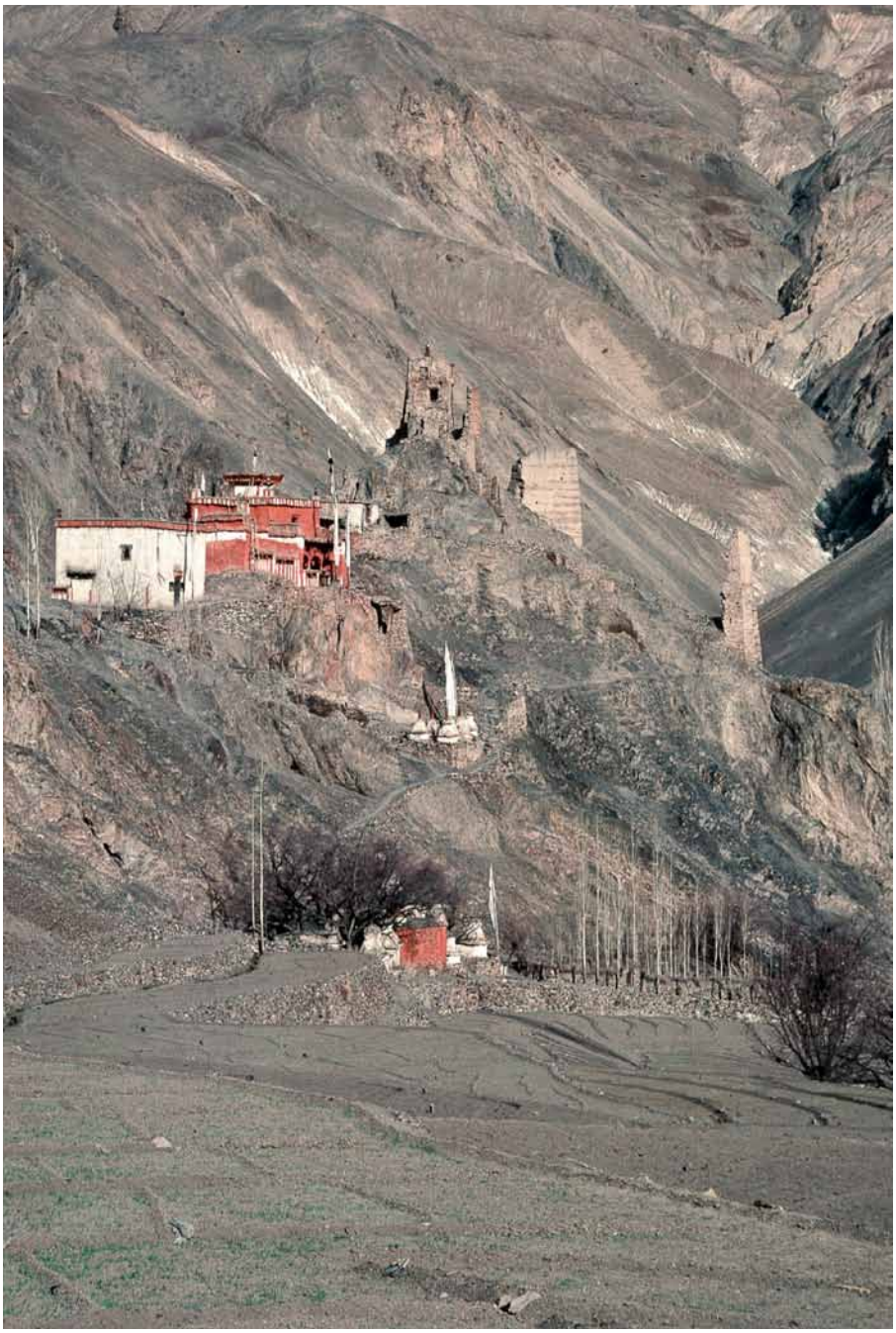
The second route leads from the south-western edge of the village up the mountain slope. Today, the larger part of the village is situated on that side of the rocky promontory. Nearby, the beginning of the road to the Shillakong Valley bridge is marked by a group of Maṇi-walls as well as a large prayer wheel. After passing through the rows of houses, one arrives at a path which runs alongside the dwellings in a steep zigzag up the rocky slope. The last part of the track crosses the rock between the rear of the temple and a chorten on a rocky crag which can also be circumambulated. From the terraced area to the north-west of the temple, a few steps finally lead up to the entrance to the circumambulatory pathway on the south-western side of the temple. These terraces once housed a village chapel which was replaced by a new temple in the late 1990s. Due to severe lapses in its construction, this building has never been used as such, but today serves as a hostel for the newly established monastic school.

South-east of the settlement, on the upper reaches of the Yalpola, a third route begins. Lined with groups of chortens, it ascends steadily on the south-western slope of the mountain and reaches the ridge to the south-east of the temple just in front of the monastic building on the same side. Meanwhile, a broader and less steep access road - similar to the aforementioned route - has been built. Running above the chorten-lined footpath, it leads directly underneath the eastern clay tower on the rocky ridge, turning afterwards into the north-eastern tributary valley. In the north-eastern valley, the new road has replaced the old path that led along the slope to the new temple and the living quarters of the small monastic community of Wanla. It is this monastic complex that has been more active in recent decades, while the historic temple was only occasionally used.

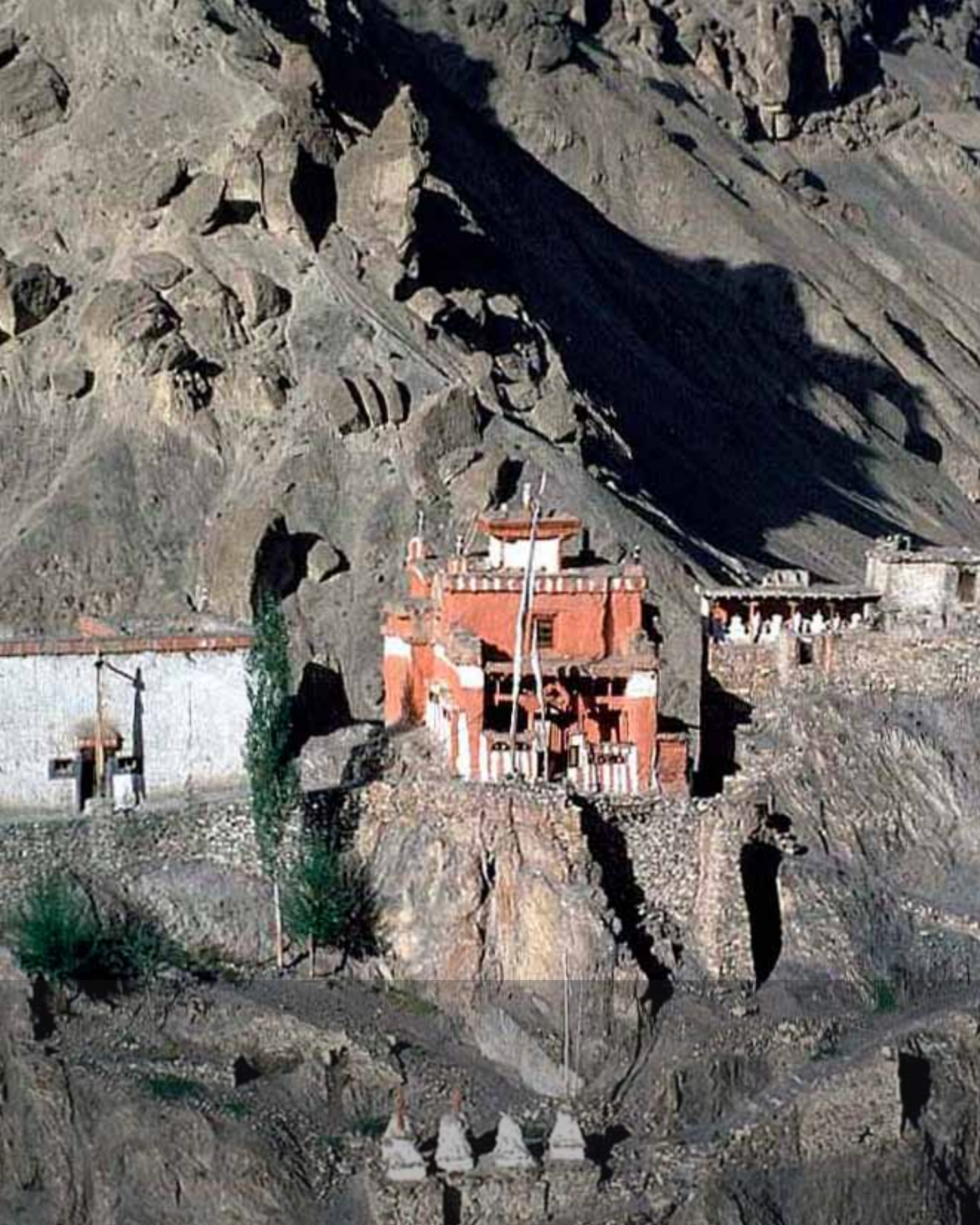
38 New road and new village lhakhang below the castle. CW 2012.

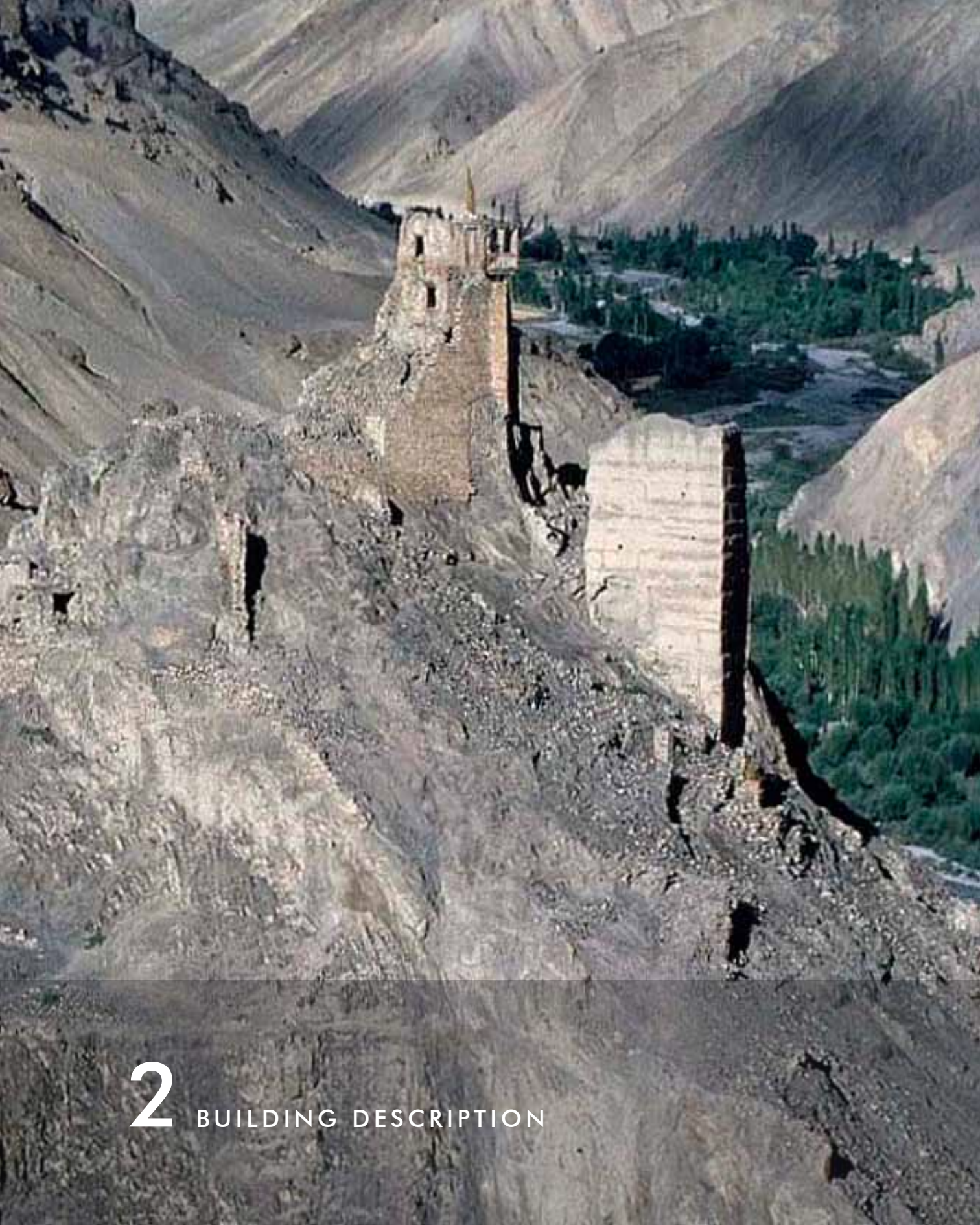
22 See also the building documentation of the chorten complex in the appendix page 193.

39 Passing through the rows of houses in a steep zigzag up the rocky slope, the footpath on the south-western side of the ridge leads to the rear side of the red painted three storied temple of Wanla, with the castle ruins to the north-west and the monastic building to the south-east. CL 1998.

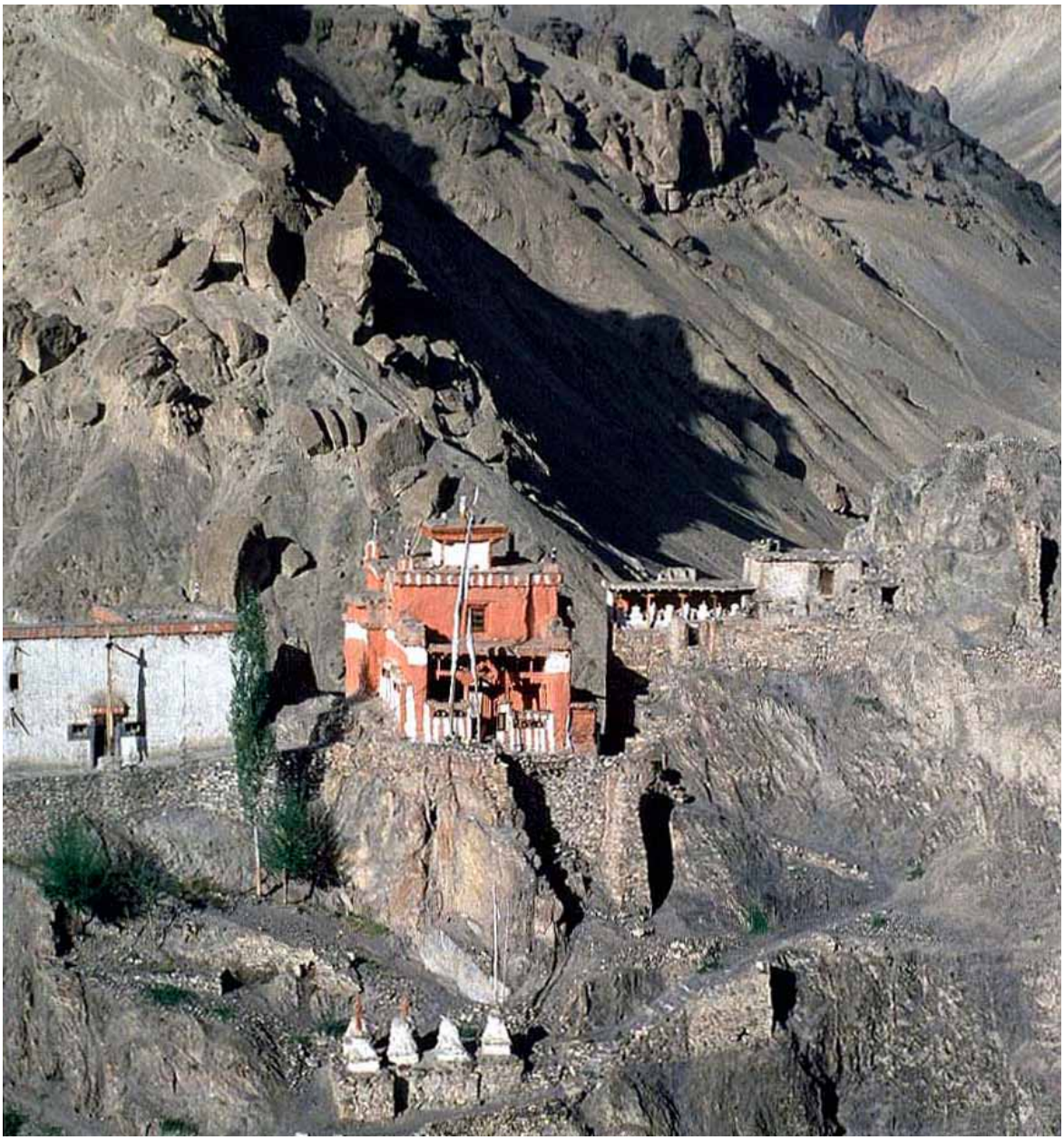


40 The Wanla temple area and the castle ruins as seen from the small valley to the north-east of the temple. This valley offers the easiest access to the temple. The path is defined by two groups of chörten, the lower one being clustered around a painted gateway chorten. CL 1998.





2 BUILDING DESCRIPTION



41 The north-eastern view of the temple area. CL 1998.

2 BUILDING DESCRIPTION

Holger Neuwirth

THE THREE STORIED TEMPLE OF WANLA

THE BUILDING SITE

At the time the temple was built, preparatory work had to be done on site, which is located on a crag in the immediate vicinity of the castle. Hence, to the north-east (entrance hall) and south-west (main apse), supporting walls were built of dry stone masonry in order to obtain the necessary space for the building and its circumambulation. During the last few decades, the immediate surroundings of the site have been subject to several interventions.

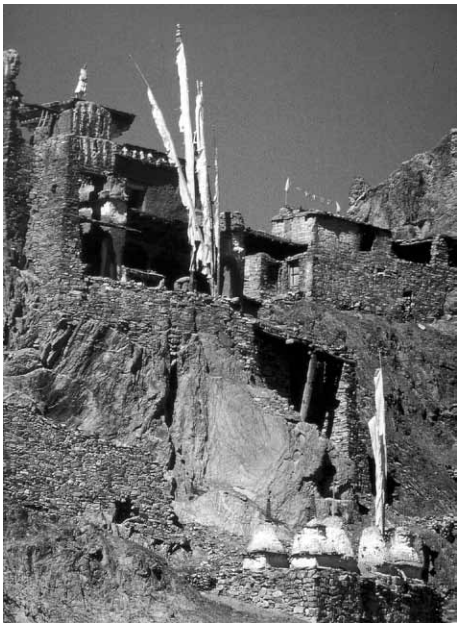
42 The supporting wall enlarges the site and creates space for the circumambulation at the south-western side of the temple. CL 1998.

43 The south-eastern castle wall was directly connected to the small circumambulation path around the temple prior to its demolition for the erection of a monastic building in the 1980s. Manfred Gerner 1982.

Photos taken by Manfred Gerner show the state of the temple in 1982 [23] prior to the construction of the monastic building to the south-east of the rocky promontory. The castle wall and temple building were connected by horizontal beams, which proves that the temple had once been built within the fortified castle complex. That wall was demolished in the course of the construction of a monastic building. To the north-west, a hall with eight stupas and a room for the caretaker monk close off the temple area.
In 2002 the terrace that leads around the temple was reinforced and extended. The rocky protrusion on the temple's southern edge was removed. A larger lamphouse and a toilet were built opposite the monk's house.

Photos from the 1980s and 1990s taken in front of the temple's porch show the state of the supporting construction in the north-east, prior to the reinforcement of this area. The terrain drops very steeply on this side, and the remains of the castle wall running along the south-eastern side of the temple, which were clearly discernable in 1982, followed the terrain up to the chortens standing by the north-eastern path leading up to the temple. The fore court is stabilised by a sub-construction of dry-stone walls and wooden structures.

Supporting walls, buttresses and this wooden structure were still visible in 1998. Since the rooms under the entrance area were only partially accessible from the lower floor, the monks used them as side rooms. In the course of urgent reinforcement work, this front area was extended to make room for a new chapel for lamps. A new road with massive supporting walls now provides direct access to the temple.



44 The south-western view (above) and the south-eastern view showing the south-eastern castle wall next to the temple. Manfred Gerner 1982.

45 The new road on the south-eastern side. CW 2012.

23 See GERNER 1987: 83, 147.

46 The south-eastern side of the temple, showing the increasing structure of the cornices on the outside. The prayer wheels next to the veranda side walls where added later on. CL 1994.

47 The Serkhang in Tholing. Ghersi 1935.

48 The Sumtsek in Alchi. CA 2003.

49 Remains of the cruciform temple in Nyarma, Ladakh. HN 2003.

SHAPE OF THE BUILDING AND TYPOLOGY

The entrance hall and main door of the temple face the north-east. The building has the shape of a cube. The entrance hall, side niches, and main apse are attachted to the cube's sides. The lantern sits in the centre of the top side. The inner cube measures 5.3 m – the outer cube 7.0 m with an amazing accuracy. The perimeter of the outer cube equals the eaves height of the lantern. The roofs above the side niches and the main apse are double roof constructions and thus somewhat higher than the interior room.
The higher level is clearly marked by the double cornices on the outside. Beginning at the roof parapet to the side of the entrance hall, the double cornices run along the double roofs of the side niches and through the double roof of the main apse, finally reaching the full height of the main building. If the lantern roof construction were considered to be an additional storey, the temple could be described as being a three storied building with an open entrance hall. Geometric and proportional principles proving the homogeneity of the design process are dealt with in more detail in chapter 5 (see page 125). A note in the temple inscription confirms this to be the original building plan:

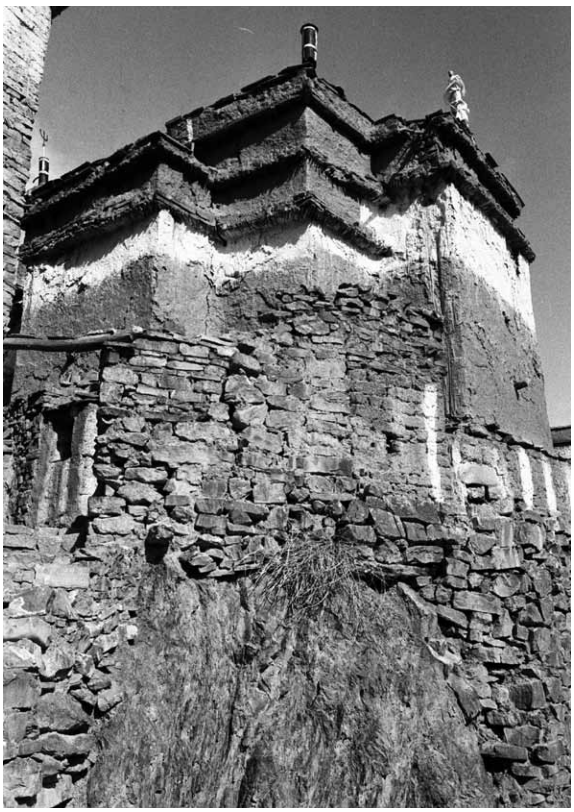
> *"(63) (At) the lower stratum he set up an excellent arrangement, assemblies of deities, new and old. The middle storey (is) like a model of the Vaijayanta-palace (and) the top floor is one that is like a model resembling a celestial mansion. The bKra shis gsum {b}rtsegs (i.e., the felicitous three-storied [temple]) of Wanla, oh, it is amazing."* [24]

Over the years, a niche for tsa-tsas (votive clay images) and some wall sections with prayer wheels were added to the outer walls on the ground storey. Today they enclose the external circumambulatory path almost entirely, leaving but a narrow space to access the entrance hall. On my first site visit in 1998, the appearance of the building was dominated by its characteristic walls painted with red and white stripes and the white lantern walls.

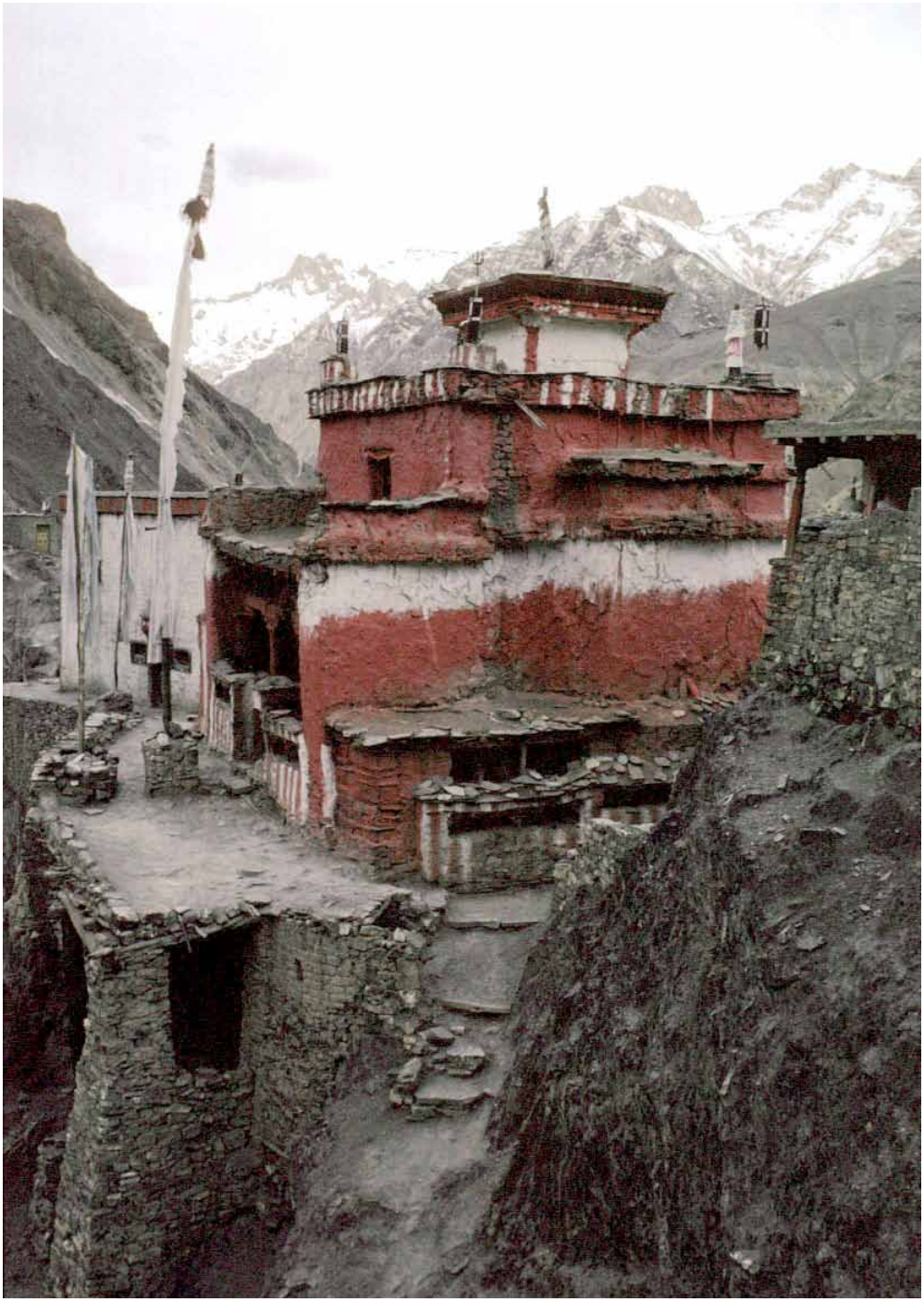
The solitary position of the temple within the castle complex and the inscription regarding the founder ('Bhag dar skyabs) indicate that the temple could be classified as both a palace chapel and three storey initiation chapel. Compared to other known three storey buildings in monastery complexes, Wanla temple can be described as a typologically unique palace chapel.
Two outstanding examples of three storey temple, which are also regarded as forerunners, are the Golden Temple (Serkhang) in Tholing [25] – founded in direct connection with Rinchen Zangpo (958-1055) and the Sumtsek in Alchi [26], originating from the early 13th century. Although the cruciform ground plan bears a striking resemblance to one of the temple ruins in Nyarma, its dedication and appearance still have to be examined.

24 TROPPER 2007: 138, for more details see chapter 4, 117.
25 See TUCCI 1973: 86, 90, 223, 235; TUCCi 1967:112; VITALI 1999.
26 See GOEPPER & PONCAR 1996: 18.

50 The terrace extension in front of the veranda which enlarges the building site at the north-eastern side of the temple. CL 1994.



51 The entrance to the terrace on the north-west of the temple, next to the circumambulatory path to the south-western side. CL 1994.



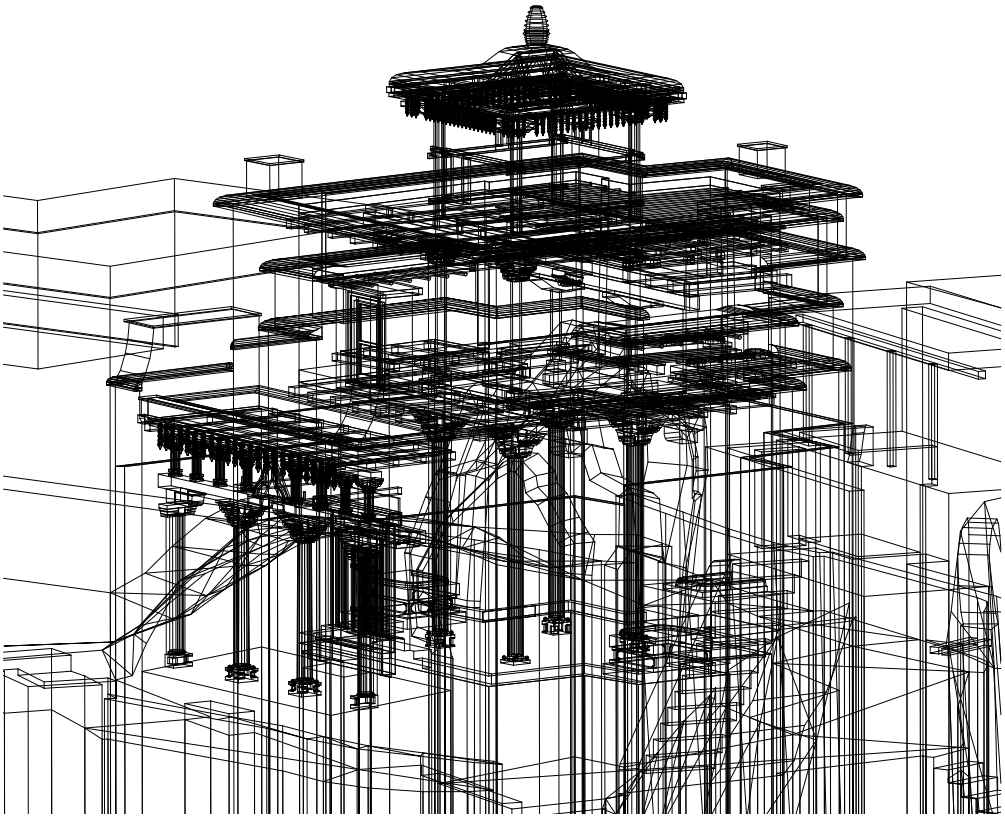
52 The northern view of the temple showing niche for tsa-tsas and the terrace earthworks in front of the veranda. CL 1994.

THE STRUCTURE

The massive wall structures are based on a cruciform ground plan. Throughout the porch there are lateral walls. All the walls are plastered and 85 centimetres thick. On the inside, the mortar is refined to produce a mural painting surface, which is over 5 cm thick in some places. Spanning a width of 5.4 m to 5.7 m, the wooden construction inside this walled cladding forms a supporting structure for the gallery and roof.

Two pillars support the main beam, maximally reducing the gap to a width of 2.0 m. Corbels reinforce the bearings of the main beam in the wall. The projecting corbels for the smaller parts of the gallery are also integrated into the wall. The main beams above the ground floor bear a layer of horizontal beams and a timber flooring with a clay layer for the gallery floor. The upper part of the interior room consists of a raftered ceiling sitting on the main beams, and a layer of posts upon which the clay roof is directly built.

Above the side niches and in the main apse, the roofs are executed as a double roof construction. Since the upper main beam in front of the main apse lie somewhat lower, a stone wall of about 80cm serves to fill the gap between the platform roof throughout. The visible interior ceilings are either beamed ceilings or false panelled ceilings.



53 Spatial illustration of the timber structure, generated with 3D Studio. TU Graz 2008.

The ceiling bearing the platform roof is not visible in the main apse. The construction above the cavity solely consists of a round wood covered with a layer of rods. The cubiform structure of the building is topped with a lantern as an autonomous lightweight construction.
The contruction of the lantern consists of four round wooden supports. Two of them stand on the main beam of the platform roof. The other two stand on the threshold beam which lies on the stone wall. The wall itself is erected on the lowered main beam. The four wooden supports are joined together by horizontal wooden slats at the base and in the middle, which are secured by wedges. Rods inserted between the slats into the openings of the framework act as a plaster base. The cross corbels on the wooden supports carry the layer of horizontal beams of the roof which in turn bears a small hip roof construction. Its apex is aligned with the centre beam of the lantern roof and the hip rafters are additionally secured by wedges. The pole inserted in the center beam for the victory (Tib.: *rgyal mtshan*) banner is secured by a wedge too.

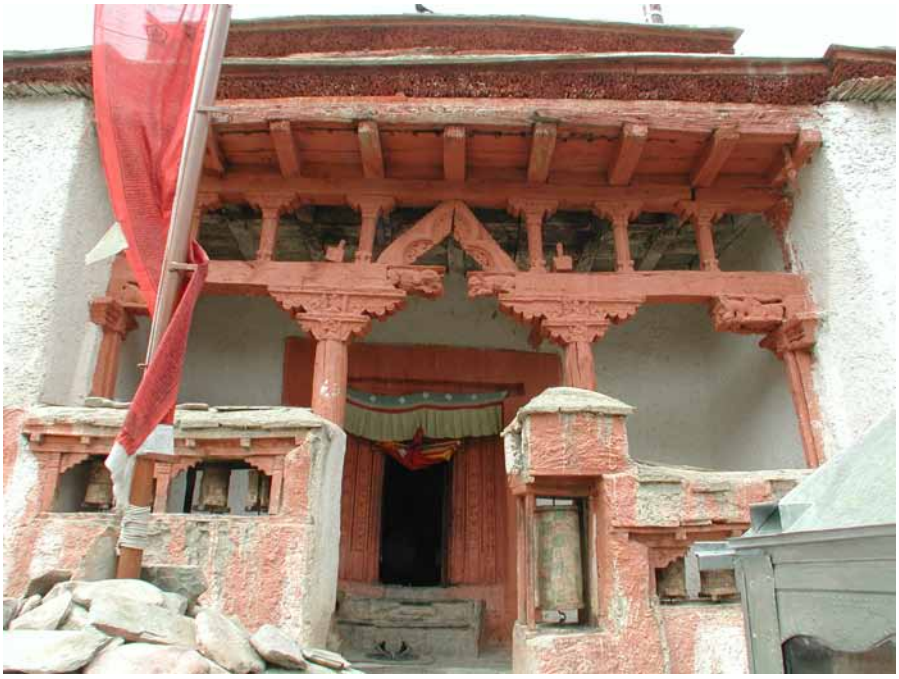
On top of the roof construction, a layer of floor boards carries the clay layer. The outer beam frame supports the upper layer of the stone slabs of the eaves. Parallel to the outer beam frame above the cross corbels there is another beam frame with peg-holes, which was originally designed to suspend a peg curtain, like the one in the entrance hall. As opposed to the lantern in Wanla, which is a mere addition to the roof, the lantern of the Sumtsek in Alchi is an integral part of the construction. Moreover, the Sumtsek lantern still shows the former design of the eaves detail. Together with the eaves of the main roof, the existing lantern eaves in Wanla do not correspond to their original design.

54 Detail of cross corbel and the roof construction; the peg-holes for the curtain can be seen on the inner beam frame. HN 1998.

55 View from the north-west showing the roof zone and the lantern roof. CL 1998.

56 Detail of lantern roof eaves at the Sumtstek. HN 2003.

57 North-eastern view of the temple from below. HN 1998.



58 North-eastern view of the entrance area. The peg-holes in the timber above were required for the curtain. The prayer wheels in the front were added later on. CL 2003.

THE ENTRANCE HALL

Apart from the prayer wheels which were later added to the porch, the open entrance hall has remained in its original form. However, it is particularly striking that the ground plan of the porch is distorted, taking the form of a parallelogram. One possible explanation for this deviation from the ideal rectangular plan could lie in the narrow connection to the castle wall and in the special composition of this construction site.
Two fluted wooden posts with pedestals and double capitals divide the front side of the entrance hall into three equal open spaces. The double capitals are dominated by the representation of the Four Great Kings – "the Protectors of the World" – as guardians of the four cardinal directions (Fig. 62). The wooden supports and semi-supports on the side wall with their alternate corbel capitals and lion corbels (Fig. 65) each support a beam. In the middle, a carved gable rests on those beams which take the shape of elephants at their ends. (Fig. 58).
Since the gable in the middle of the beam interrupts its continuity, the stability of the wooden construction is secured by two cross beams that are anchored within the entrance wall and fixed to the beam with wooden pegs. A similar gable has been discovered in what was once the original entrance hall of the assembly hall (Tib.: *'du khang*) in Alchi.[27]

Six smaller supports with bases and corbel capitals support the main central beam. In addition, there is a semi-support on each side wall. On top of the main beam, the secondary beams of the false panneled ceiling rest. Above all this, the floor boards hold the clay layer. Roof parapets have been built above both side walls. A decorative element made of turned wooden pegs, which once hung behind the front beam of the entrance hall like a wooden curtain similar to the one on the lantern. This curtain could be reconstructed in its original form because one last peg had remained and the matching peg-holes had survived.

27 See SNELLGROVE & SKORUPSKI 1977: 42, 43.

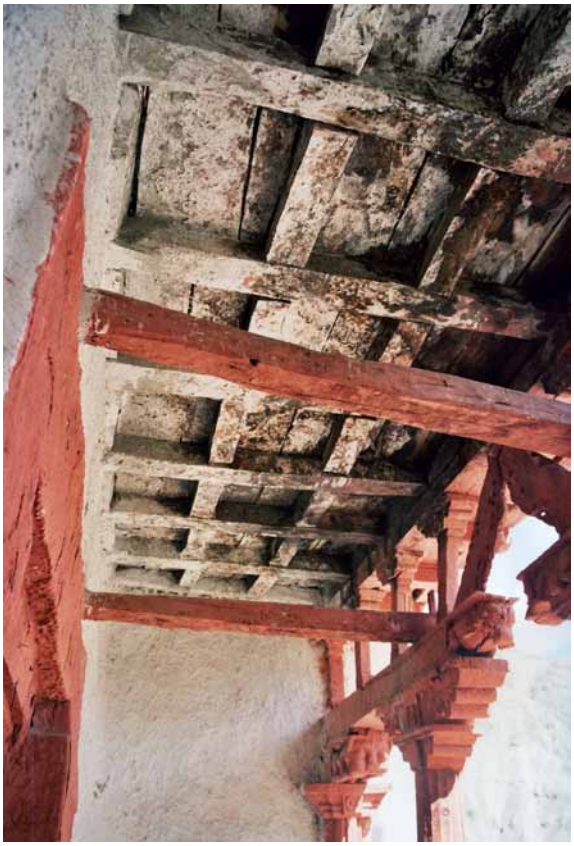
59 Gable in the veranda of the Dukhang in Alchi dating back to the first building phase. HN 2004

60 Details of the former entrance hall of the Dukhang in Alchi. HN 2003.

61 Porch of the Sumtsek in Alchi. CA 2004.

62 The left side capital of the veranda showing two of the four Great Kings. CW 2012.

63 The lion corbel of the left side wall. HN 2003

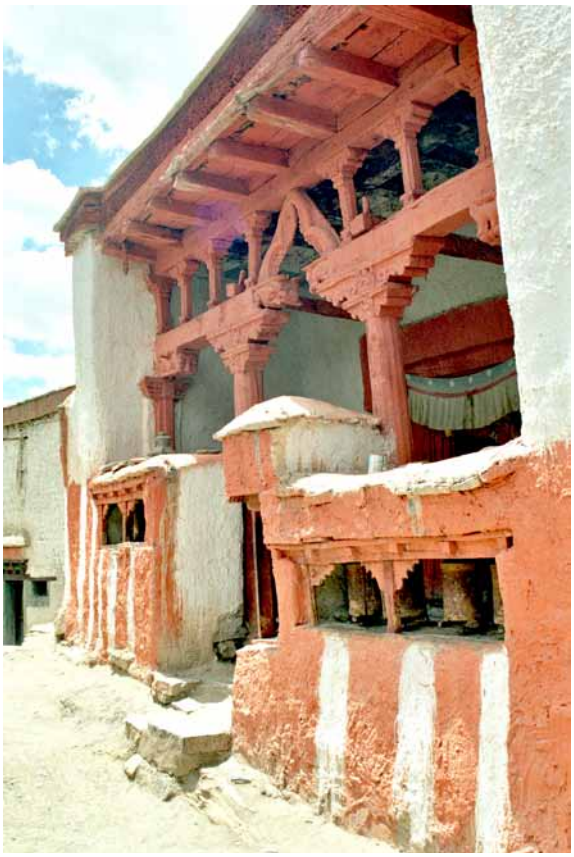


64 The rear side of the veranda with the panelled ceiling above. HN 2009.

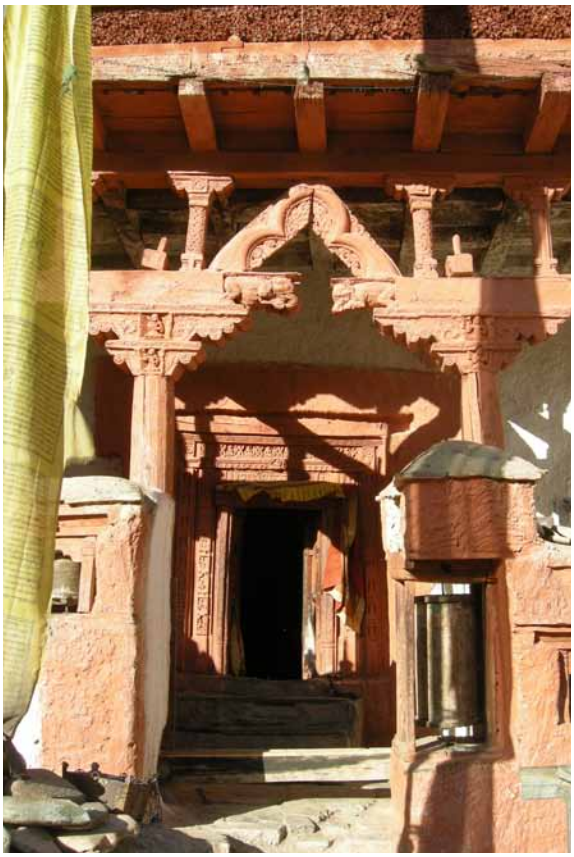
65 The lion corbel of the veranda on the right side seen from below. HN 2004.

In the middle of the entrance hall two steps lead up to the temple door. The richly ornamented door frame is completed by a two-part blind frame with figural representations of the Buddha's life (Fig. 68). There is a remarkable carved six-syllable mantra in the middle section of the lintels : *|| *ōṃ ma ṇi pad me hūṃ hri ||* which is dedicated to Avalokitesvara (Fig. 69). Comparable wood craft can be found in the remaining carvings of the Wanla castle and, particulary, in the beautiful carvings of the entrance door of the Dukhang in Alchi.

The outside access door to the gallery can only be reached from the roof above the entrance hall by means of a ladder. With its single-storey entrance hall, the Wanla temple is one of the last authentic representatives of the early style temple entrance building that has remained almost completely intact. At the Dukhang in Alchi as well as in Sumda Chung, there are merely a few remaining fragments of the original simple three-part entrance hall construction. In comparison the Sumtsek in Alchi has entrance porches on all three storeys, two of them were fashioned in much more elaborate and decorative details.

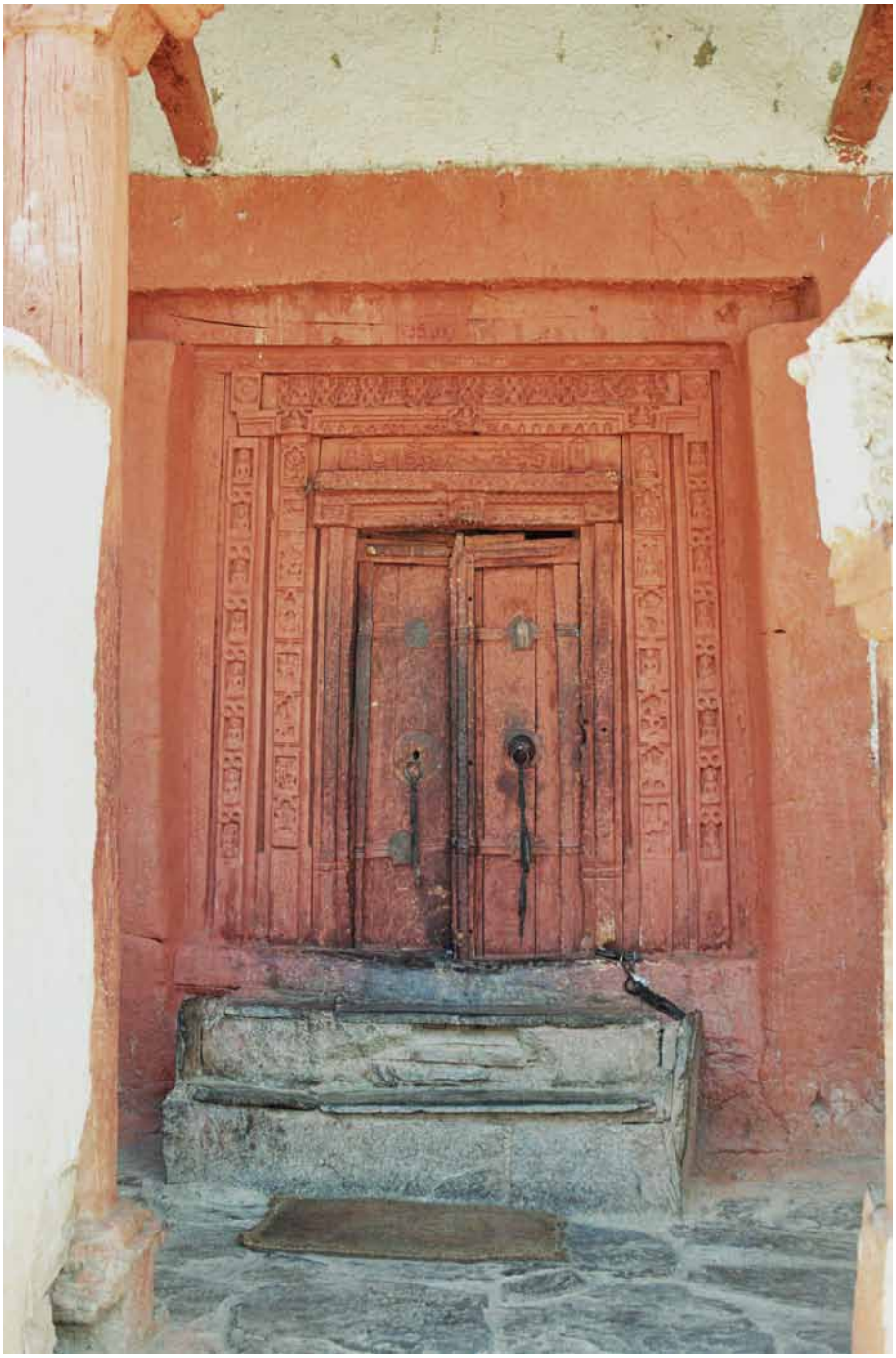


66 The upper part of the veranda showing one wooden peg protruding behind the upper cross beam. MR 2005.



67 Central part of the entrance hall with a triangular centerpiece and elephant consoles and the door in the background. CL 2009.

68 Details of the wood carvings on the left side frame of the entrance door. Heinrich Pöll 2008.



69 The entrance door with the mantra of Avalokiteśvara on the lintel
and the representation of the Buddha's life in the central area of the side frames. MR 2005.

70 Wooden structure of the centre up to the lantern roof construction. HN 2003.

71 Narrow gallery in the main apse. HN 2003

THE INTERIOR

Two steps lead up to the entrance of the main chamber on the ground floor, which is square, and only has two side niches in the south-east and north-west. The south-eastern niche houses a sculpture of the Bodhisattva Maitreya (3.0 m high), and in the north-western niche there is a sculpture of the Buddah Sakyamuni (3.0 m high). Facing the entrance, the main apse in the south-west, which is constructed higher, displays a sculpture of the eleven-headed Bodhisattva Avalokitesvara (4.5 m high), reaching up to the second story with its multiple heads. The sculptures are made of clay supported and fixed on the back wall of the niche by wooden posts. This triad symbolizes the perennial significance of the Buddhist doctrine over time; embracing past, present, and future.[28]

Just like the porch, the square ground plan of this room is distorted to form a parallelogram. Its angle deviates by approximately 2° from the main axis of the square in a southerly direction. However, the striking accuracy with which the sides of the square were measured would suggest that this was a deliberate adaptation to conditions of the site.

The main beams divide the interior from north-east to south-west into three areas: the entrance area, the centre area with its side niches and the main apse area. The entrance area is entirely roofed over by the gallery. In the central area between the four posts, a vertical space stretches from the ground storey to the top of the lantern roof. In the main apse, a corbel-supported narrow gallery presents the scluptures of the Drikung Kagyu lineage. It ends on the rear wall of the main apse where the main sculpture stands. All wall surfaces are decorated with murals.

28 See LUCZANITS 2004: 292-293.

72 Sculptures of the Bodhisattva Maitreya, the Bodhisattva Avalokitesvara, and the Buddah Sakyamuni. CL 2009.

73 Parts of the portal frame later added to the main apse. HN 2003.

74 The top chord of the portal frame with the centrepiece, before it was removed. CL 1998.

FIRST FLOOR - GROUND STOREY: "ASSEMBLIES OF DEITIES, NEW AND OLD"

The whole ground floor is plastered with natural stone slabs. A narrow skirting board running around the wall forms a plinth. The figures in the side niches stand on their own pedestals, the main niche being completely elevated and extended by means of a step in front of the main figure. The entrance area is covered entirely by the second floor gallery. In the central area, only the lateral areas are closed, while the area between the supports remains open, with a trapezoid extension towards the main apse. Looking up vertically the lantern's opening becomes visible. In the main niche area, the second storey continues to the rear wall of the apse, providing a pedestal for sculptures. The ceiling here is lower than in the other areas.

A portal frame was built into the main niche. The frame itself is decorated with a painted letter band that runs along its whole length. The wall paintings display underneath figurative motivs. It is thus believed that the frame must be a later intervention whose purpose is not quite clear. Originally, the top chord was rendered continuous through a centrepiece. Meanwhile, this centrepiece has been removed to allow a better view of the main figure.

Four fluted wooden posts with carved bases and corbel capitals bear the main beams above the ground storey upon which a gallery floor lies. The upper part of the double corbel capitals are decorated with the "Eight auspicious symbols".[29]

The gallery floor is again made of layer of horizontal beams with floor boards and a thick mud covering. The wall bearings of the main beams on the ground floor are supported by four painted lion corbels. The sides of the corbles between the center and the main apse area which face the entrance are painted. All other corbels remain unpainted. It is highly probable that this decoration is a later addition.

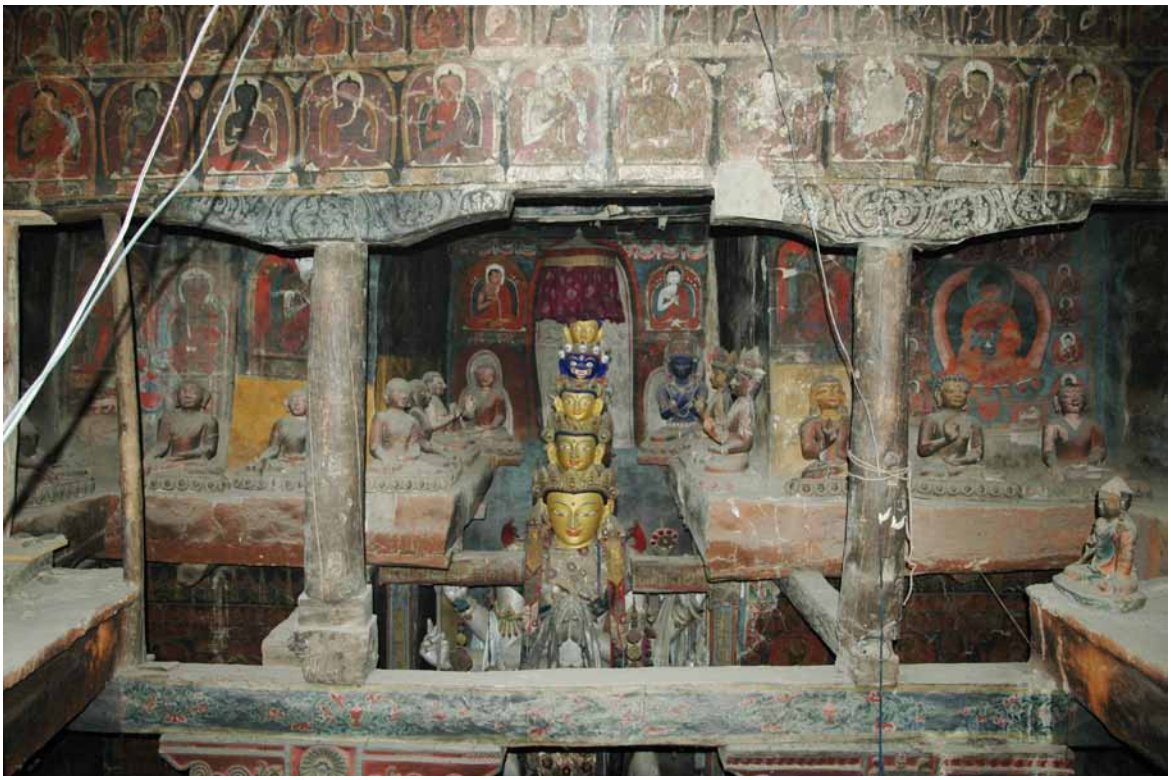
29 See TROPPER 2007:138 and chapter 4,117.

75 One of the painted lion consoles. HN 2003.

76 Painted capital below the main beam. DL 2009.

77 Carved capital below the main beam. HN 2003.

78 Base of the main pillar on the ground floor. HN 2003



79 Wooden construction above the main beam, seen from above. In the background on the small gallery stand the statues of the Drikung Kagyu lineage starting with the dark blue Buddha Vajradhara on the right side of the Bodhisattva Avalokitesvara. DL 2009.

80 The base of the column on the south-east side. DL 2009.

81 The base of the column on the north-west side. DL 2009.

SECOND FLOOR - GALLERY: "VAIJAYANTA PALACE"

On the second floor, two fluted columns are located between the entrance and the central area and have no plinths. These two columns sit directly on the main beam.

The back sides of the capitals are not carved. The ceiling of the platform roof above the entrance and central areas lies at the same height.

All the roof's secondary beams are complete throughout. There is only a small square in the floor boards which opens up to the lantern storey.

The two round columns between the central area and the main apse do not sit directly on the main beam. The support to the north-west sits on the beam that connects the main beam with the right apse wall. The support to the south-east is fixed to the main beam by means of two wooden blocks (Fig. 79).

The beam connecting the main beam and left apse wall lies next to these wooden blocks. Supported by two simple corbel capitals, they bear the lowered main beam that is mounted on the wall without corbels. A stonewall fills the gap between the lowered beam and platform roof. The capitals, main beam, and stonewall are rendered with mortar and painted on the side facing the center area.

While the eleven-headed Avalokitesvara dominates the apse, Drikung Kagyu lineage statues are presented on the surrounding gallery. This lineage is shown again on the wall-paintings above the lowered beam. The images commence on the left corner with Buddha Vajradhara and include 29 figures in total.[30]

82 Opening to the lantern seen from below. CL 2003.

83 Corbel at the noth-west wall on the gallery. DL 2009.

84 Sculpture of Milarepa on the gallery. CA 2004.

85 Detail of the wall paintings above the lowered beam showing Marpa and Milarepa. HN 2004.

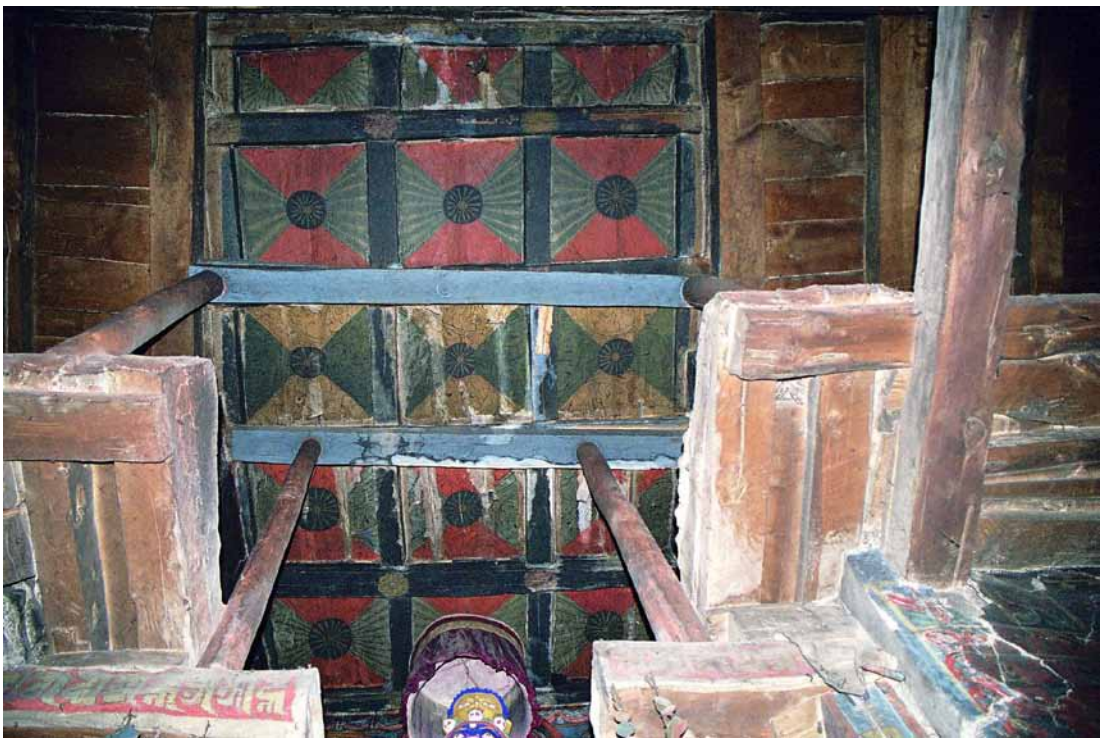
30 See LINROTHE 2009: 91-99.

86 South-eastern side of the gallery. CL 2003

87 North-western side of the gallery. CL 2003.

88 Uncarved back side of the corbel capital. DL 2009.

89 Carved front side with triple jewel and endless knot. DL 2009.



90 The decorated false panelled ceiling above the main apse. The light blue beams are later added supporting beams. HN 2003.

91 In the left corner of the south-eastern wall one can recognize the wooden crossed corbel, that is also painted. CL 2003.

92 Walled entrance opening on the north-eastern wall. CL1998.

93 The lantern wall construction. Rods were inserted into the horizontal connections between the vertical posts acting as a lathwork. Wooden frames close the square openings. CL 1998.

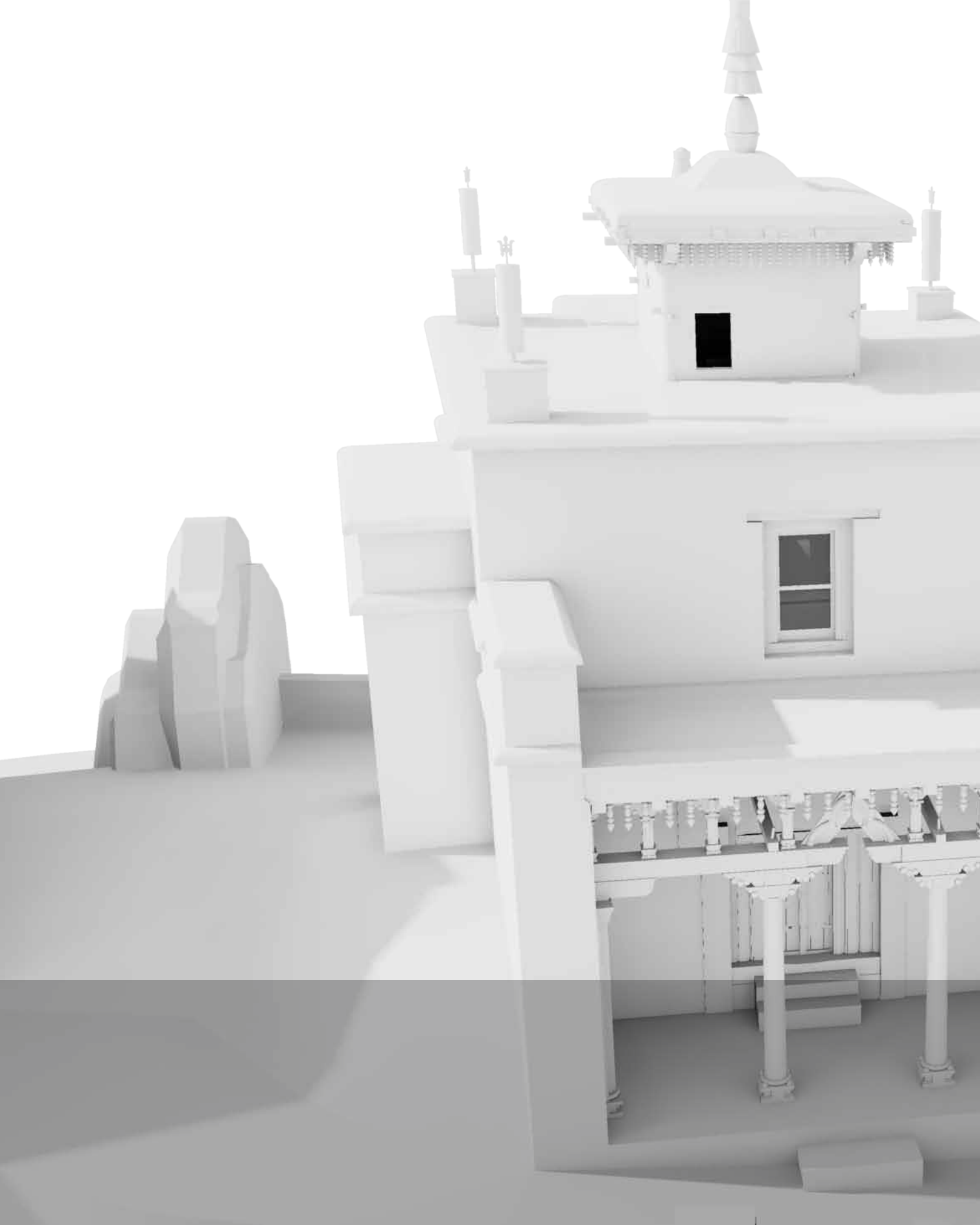
THIRD FLOOR - LANTERN: "CELESTIAL MANSION"

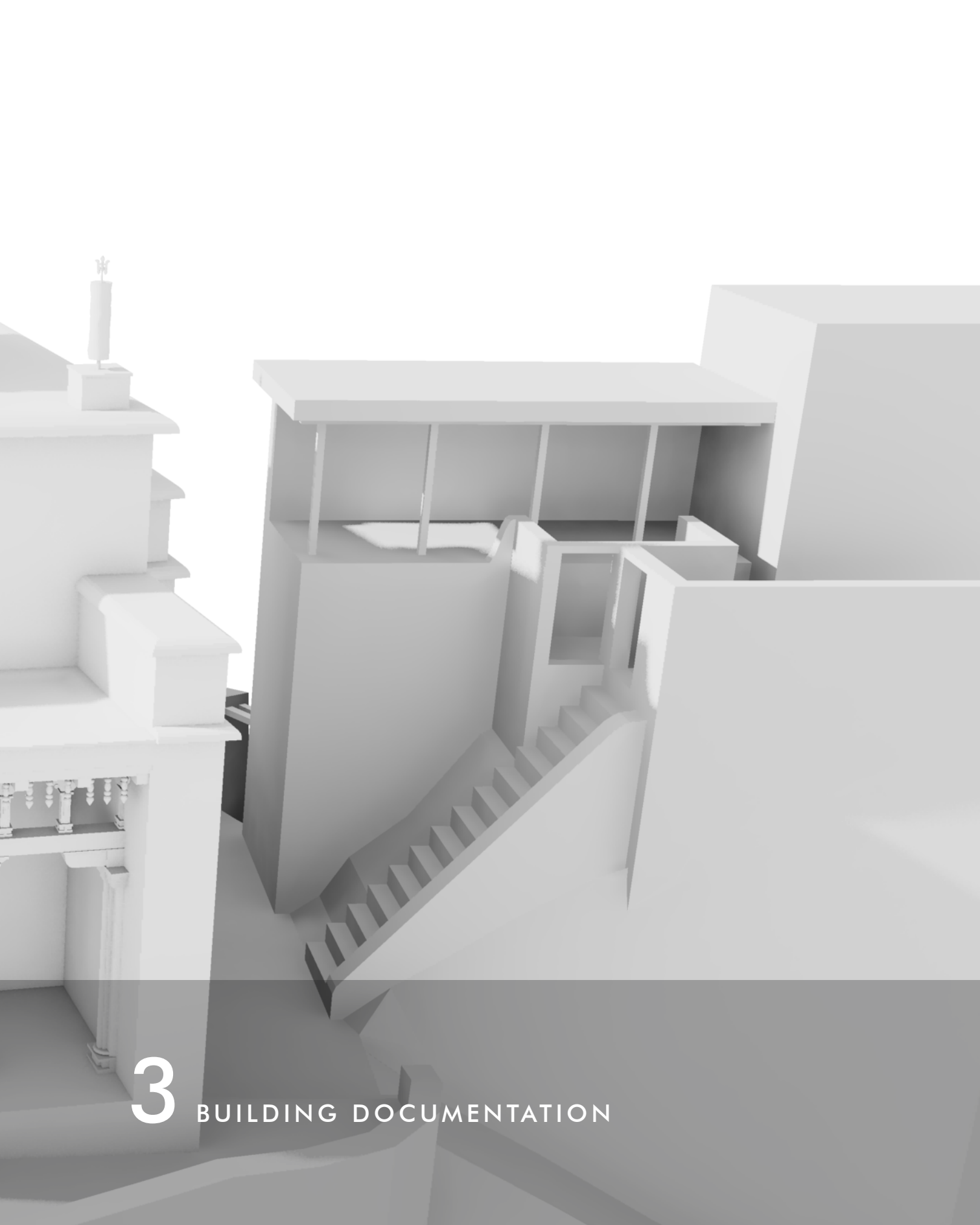
The lantern on the top platform roof forms the third storey. The small square opening in the lantern storey floor is the only connection to the interior of the first and second floor. This opening, however, only allows for a visual connection between the three storeys. The small opening may have been used as a seat although it is not centered in the middle, thus resulting in different floor widths (25-60 cm). Both the inner walls and the inner parts of the crossed corbels are rendered and painted.
The roof construction sits visibly upon the crossed corbels. Three beams aligned to the main apse bear a smaller mounted hipped roof. The remaining lateral horizontal spaces are each bridged with three straight and two diagonal tail beams. The entire roof is covered with a layer of boards. In order to observe the murals more closely, you have to access the lantern floor. The access doorway to the lantern on the north-east wall can be reached only from the temple roof by means of a ladder. There are small windows in the south-east and south-west walls. The roof surface allows an outside circumambulation of the lantern.

Apart from the entrance doors on the ground storey and the upper storey, the lantern above the main chamber with its three small openings is the only source of natural light inside the edifice. A lasting impression is left by the widely unspoiled appearance of the extensive interior mural paintings, the larger than life-sized sculptures in the main and side niches, the gallery with the sculptures of the Drikung Kagyu lineage and the wood carvings of capitals and corbels, which all can be traced back to their origins.

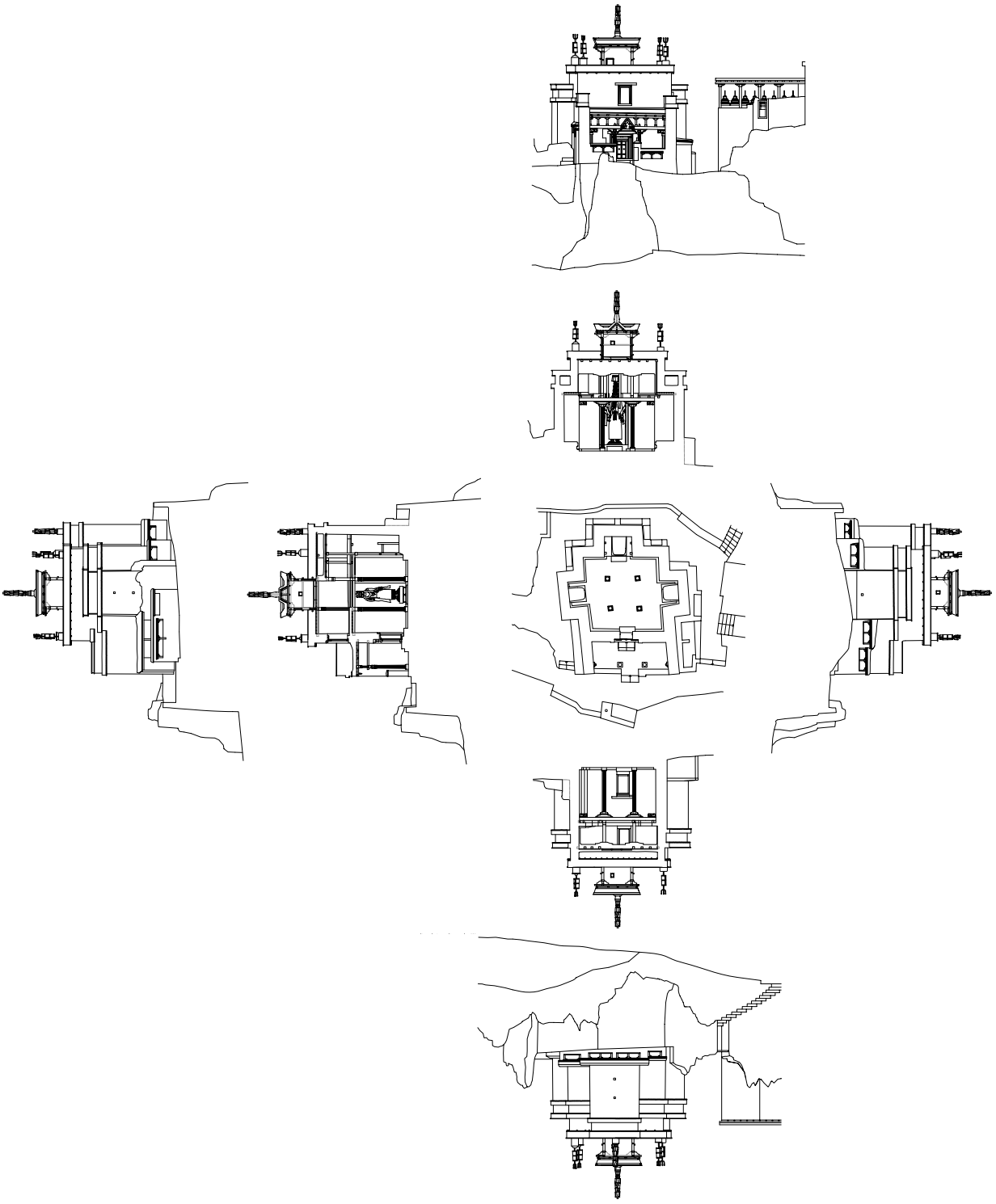
94 The hipped roof above the lantern. HN 2004.

95 Details of rafters inside the hipped roof of the lantern. The pole holding the victory banner outside is fixed to the central beam with a wedge. CL 2003.





3 BUILDING DOCUMENTATION



96 Overview of the vertical sections and elevations assigned to the floor plan of the temple. TU Graz 2010.

3 BUILDING DOCUMENTATION - PART 1

Holger Neuwirth

INTRODUCTION

Drawings in the form of true-to-scale architectural mapping are a prerequisite for the comprehensive assessment of a building. Important data, such as wall thicknesses or wall lines, becomes solely visible in the plans, thus showing horizontal and vertical sections and elevations. These plans help in differentiating the various building phases. Existing deformations tell us about the state of the building. Thus we can comprehend the load transfer from roof to foundation.
Moreover, for an efficient reconstruction of the original planning process, scaled plans help to assess the geometric and proportional regularities. The same also provides useful elements for the planning and specification of costs for restoration and continuing preservation measures. The developed view of walls yields a complete and uninterrupted rectangular-coordinate grid system for the mural paintings.

The building documentation is divided into three parts. In the first part, the plan documentation shows two-dimensional plans of the building. They provide the basis for the subsequent description of the spatial models and the documentation of the interior which - by showing the mural views and interior elevations - focuses on the total wealth of the murals within the temple's interior.

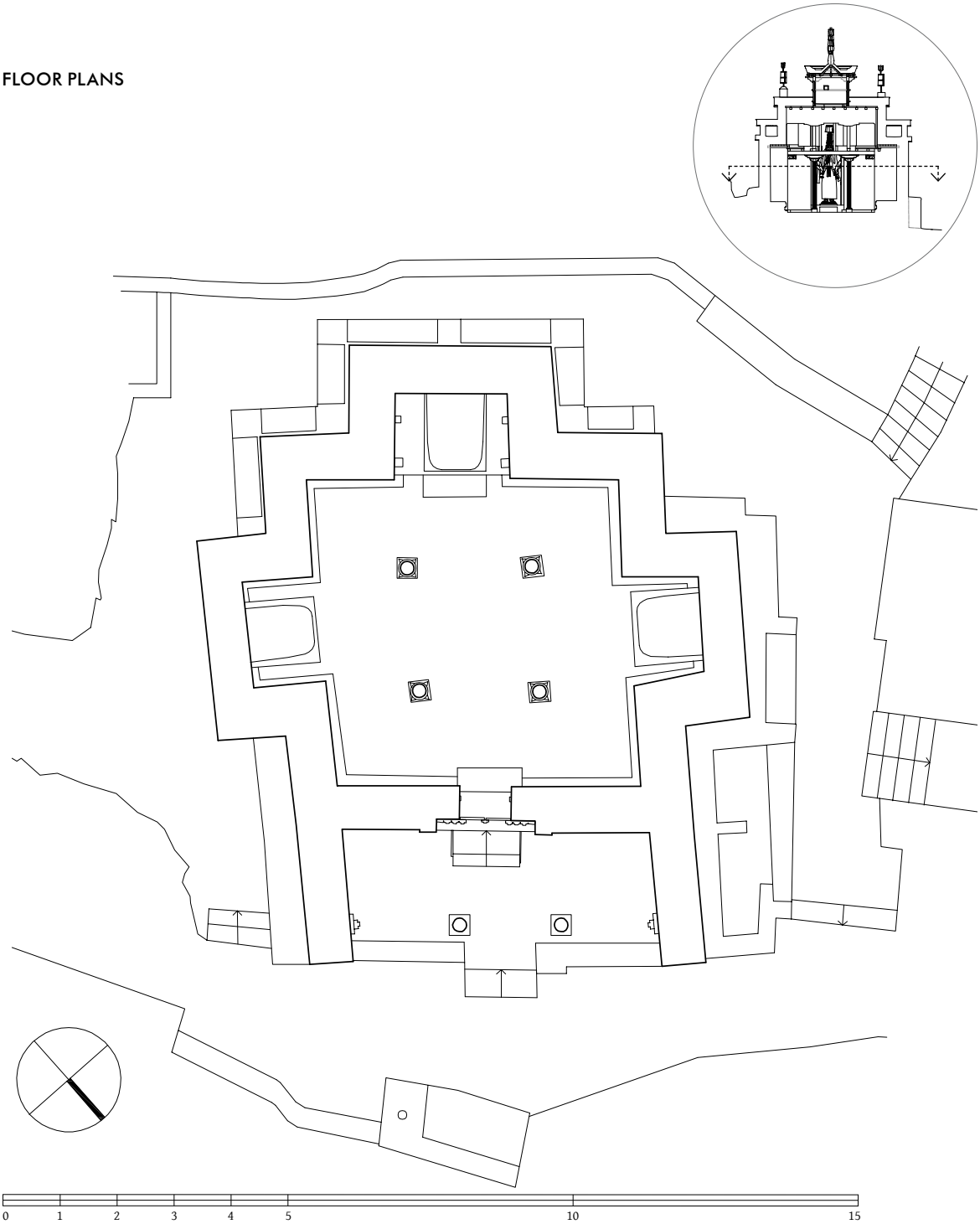
PLAN DOCUMENTATION

Seven horizontal sections were arranged in such a way to clearly show the different floor levels and their respective horizontal timber work. The floor plan of the ground floor shows the circumambulation path and its position in respect to the neighbouring chorten hall. One vertical section focuses on the main niche intersecting the side niches and the lowered cross beam; the second vertical section shows the entrance side. The longitudinal section shows the ceiling height from the veranda to the main niche. Four views, which are enhanced by a reconstruction of the original appearance of the veranda, define the outward appearance. The north-east and south-west views reflect the neighbourhood of the chorten hall. Each plan has a defined projection plane. The two-dimensional plans show the state of the building in 1998 to which control measurements from 2000, 2003, 2004 and 2009 were added.
The first architectural survey of 1998 was done by hand. In 2004 the survey was corrected by the help of a laser tachymeter. The montages were created in 2009. The appendix contains an architectural survey of the chorten complex in the valley to the east of the temple which was completed in 2009.

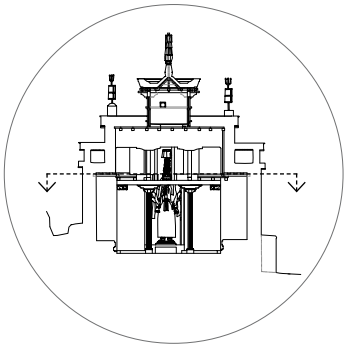
SITE PLAN

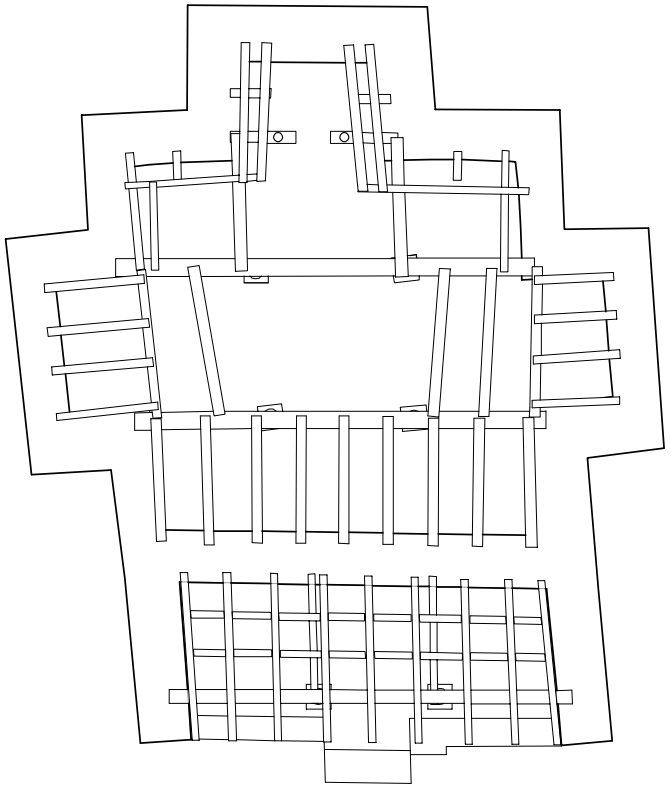
97 Site plan of the castle complex and the temple area. TU Graz 2010.

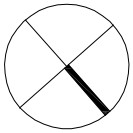
FLOOR PLANS

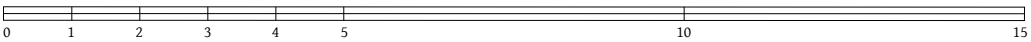


98 Horizontal section of the first floor. The unaltered interior plan is a square with minor deviations from the perpendicular. Its angle deviates by approximately 2° from the main axis of the square in a southerly direction. TU Graz 2010.

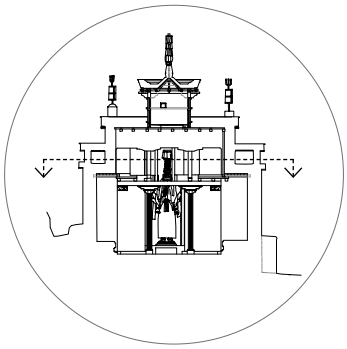


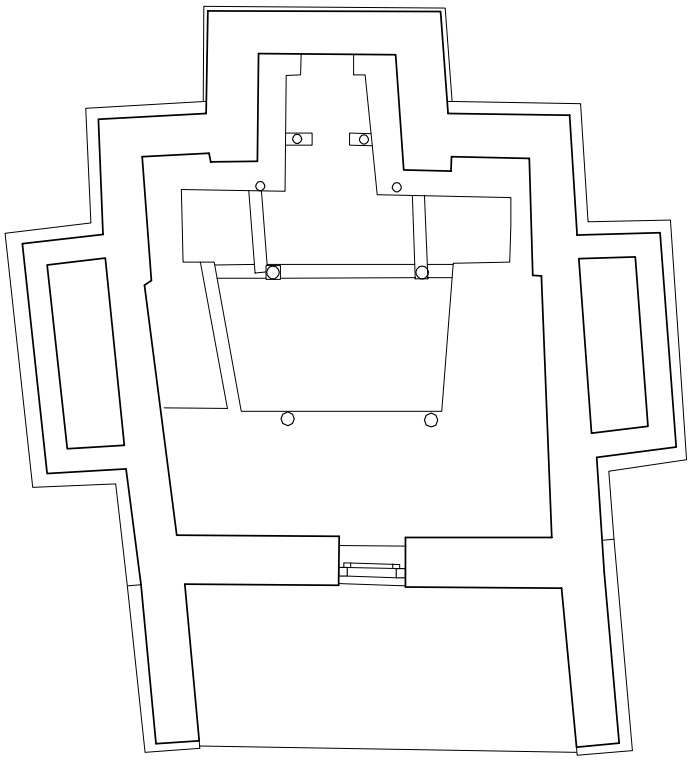


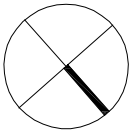


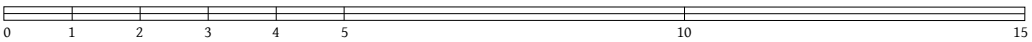


99 Layer of beams above the ground storey for the gallery construction and the veranda roof. TU Graz 2010.

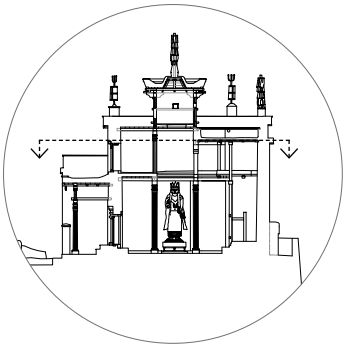


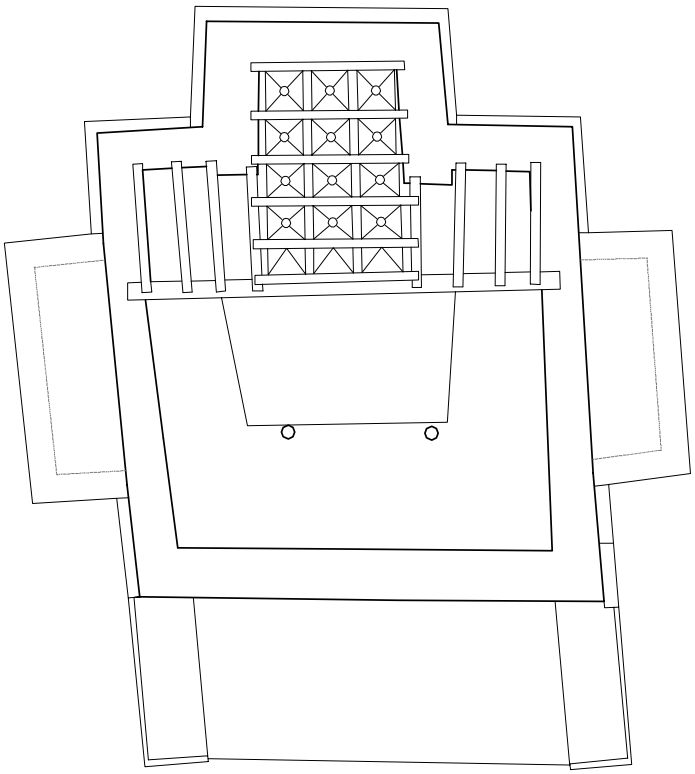


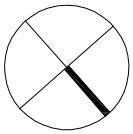


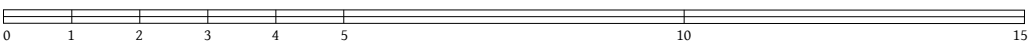


100 Horizontal section of the second floor (gallery) showing the cavities above the side niches. TU Graz 2010.

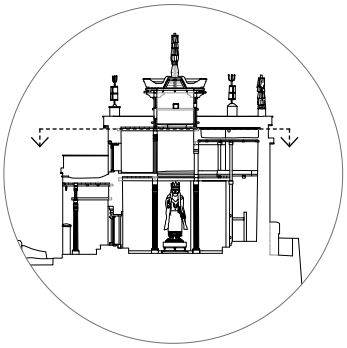


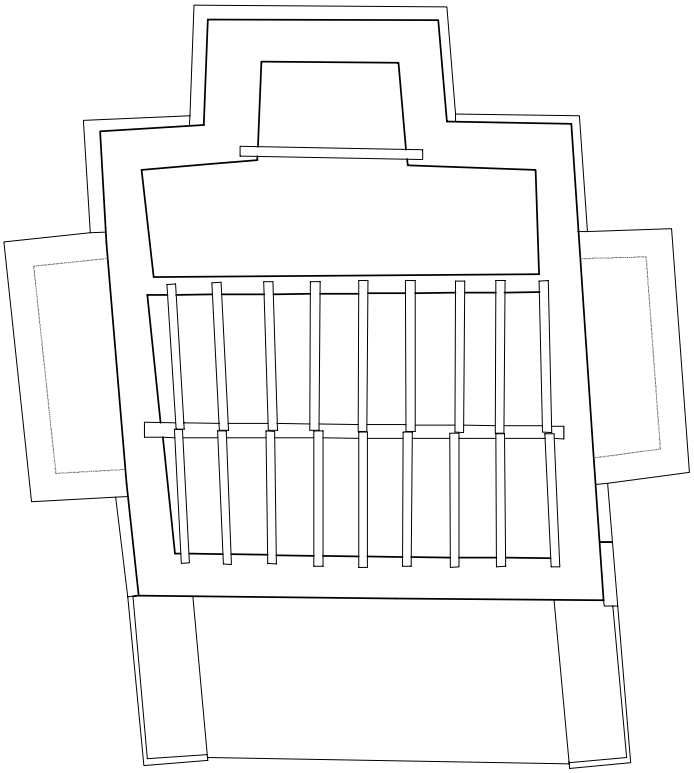


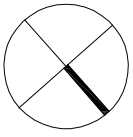


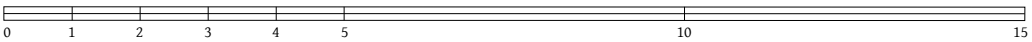


101 Layer of beams above the upper storey near the main apse showing the decorated false panelled ceiling. TU Graz 2010.

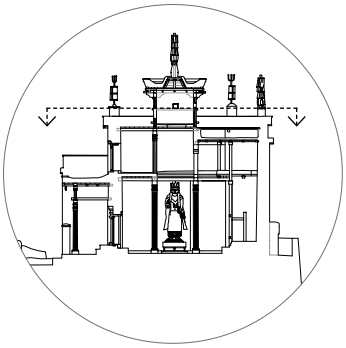


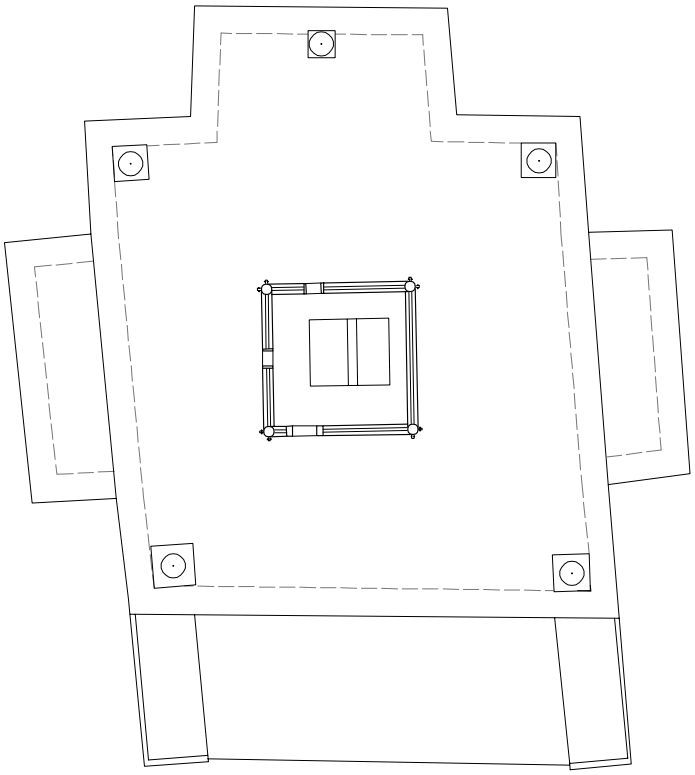


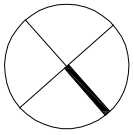


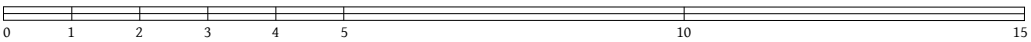


102 Layer of beams above the upper storey showing the entrance and centre area with the cavity above the intermediate ceiling above the main niche.

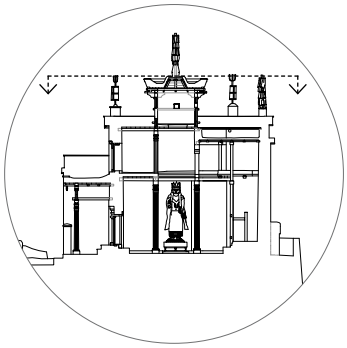


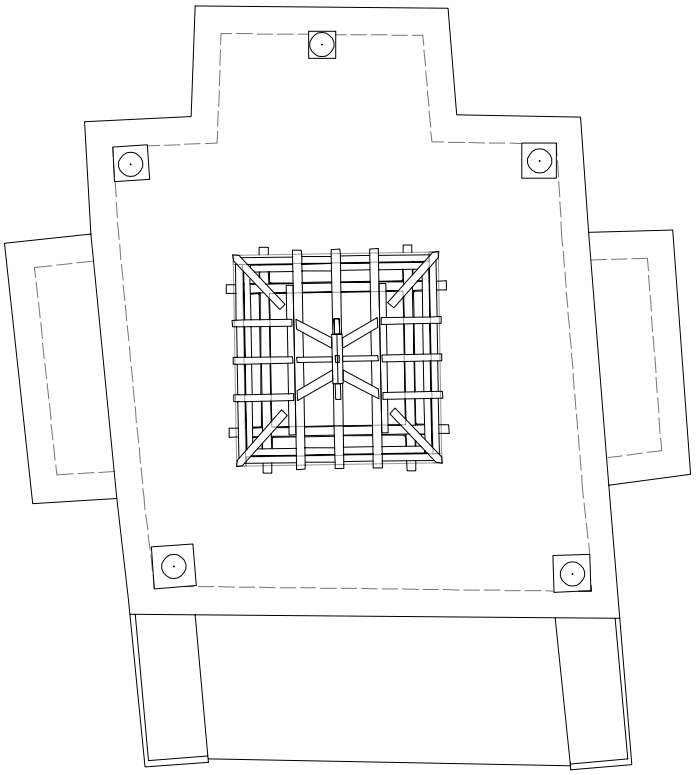


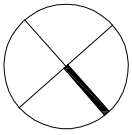


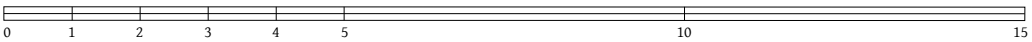


103 Horizontal section of the lantern with the opening to the central area. TU Graz 2010.



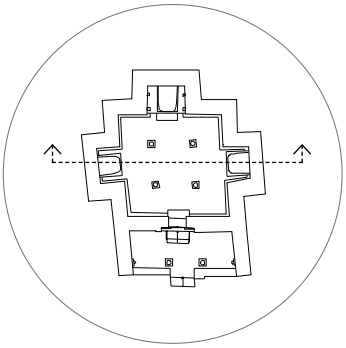


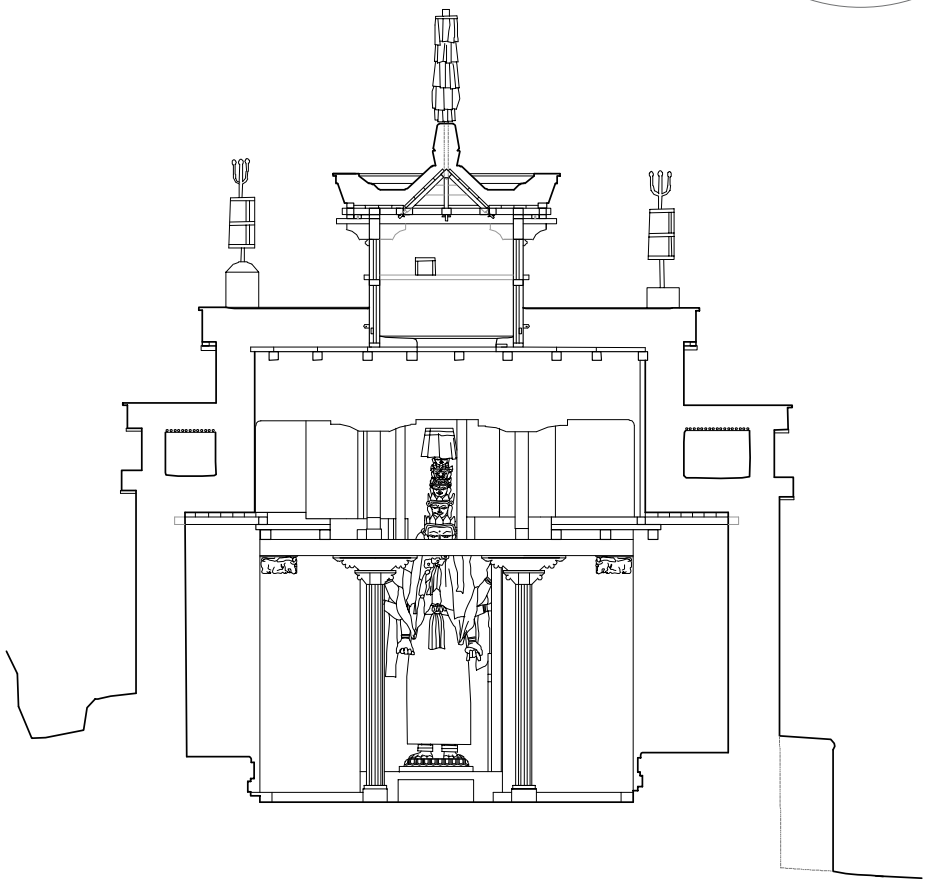


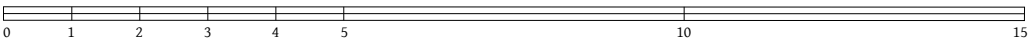


104 Layer of beams and hipped roof construction of the lantern. TU Graz 2010.

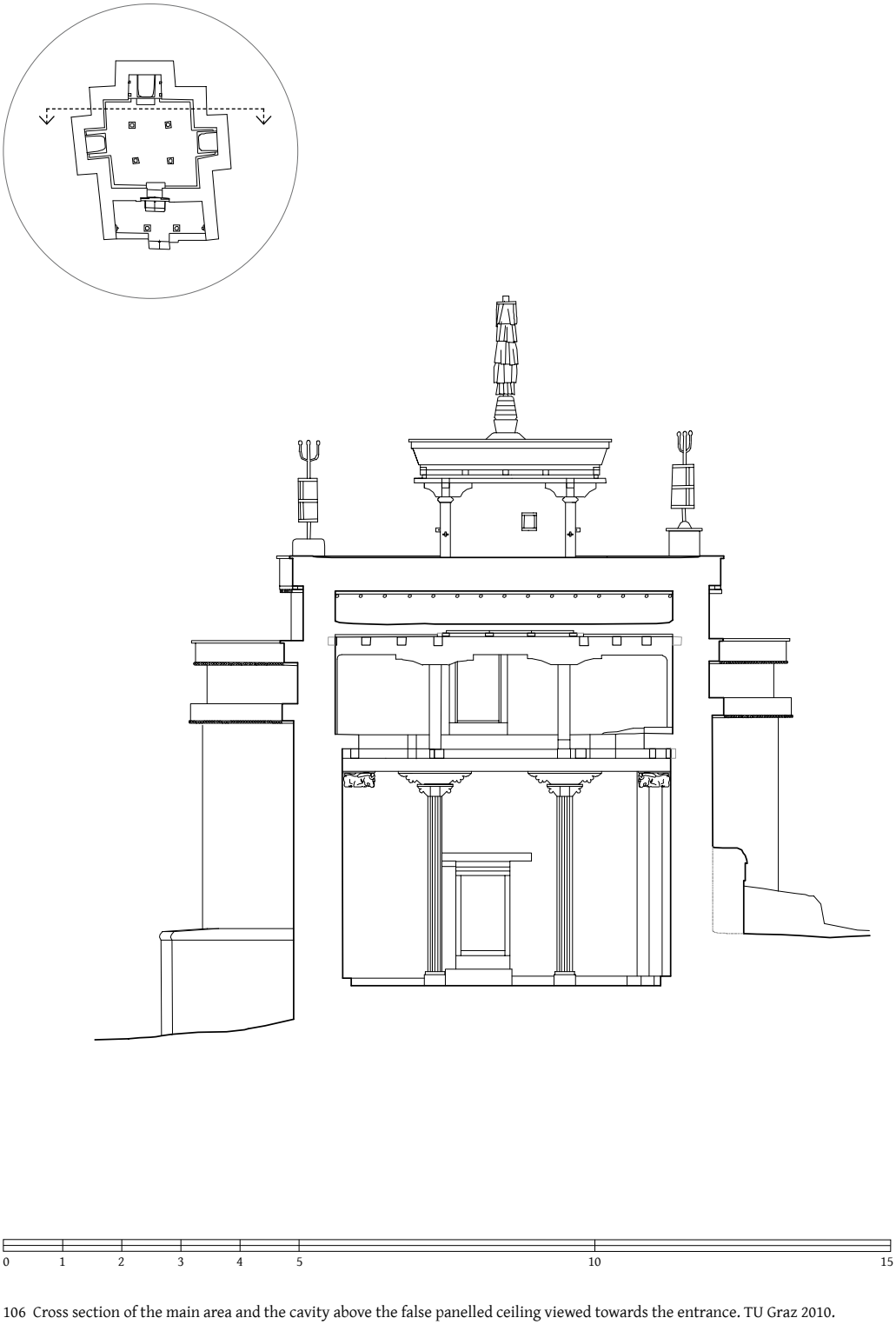
VERTICAL SECTIONS



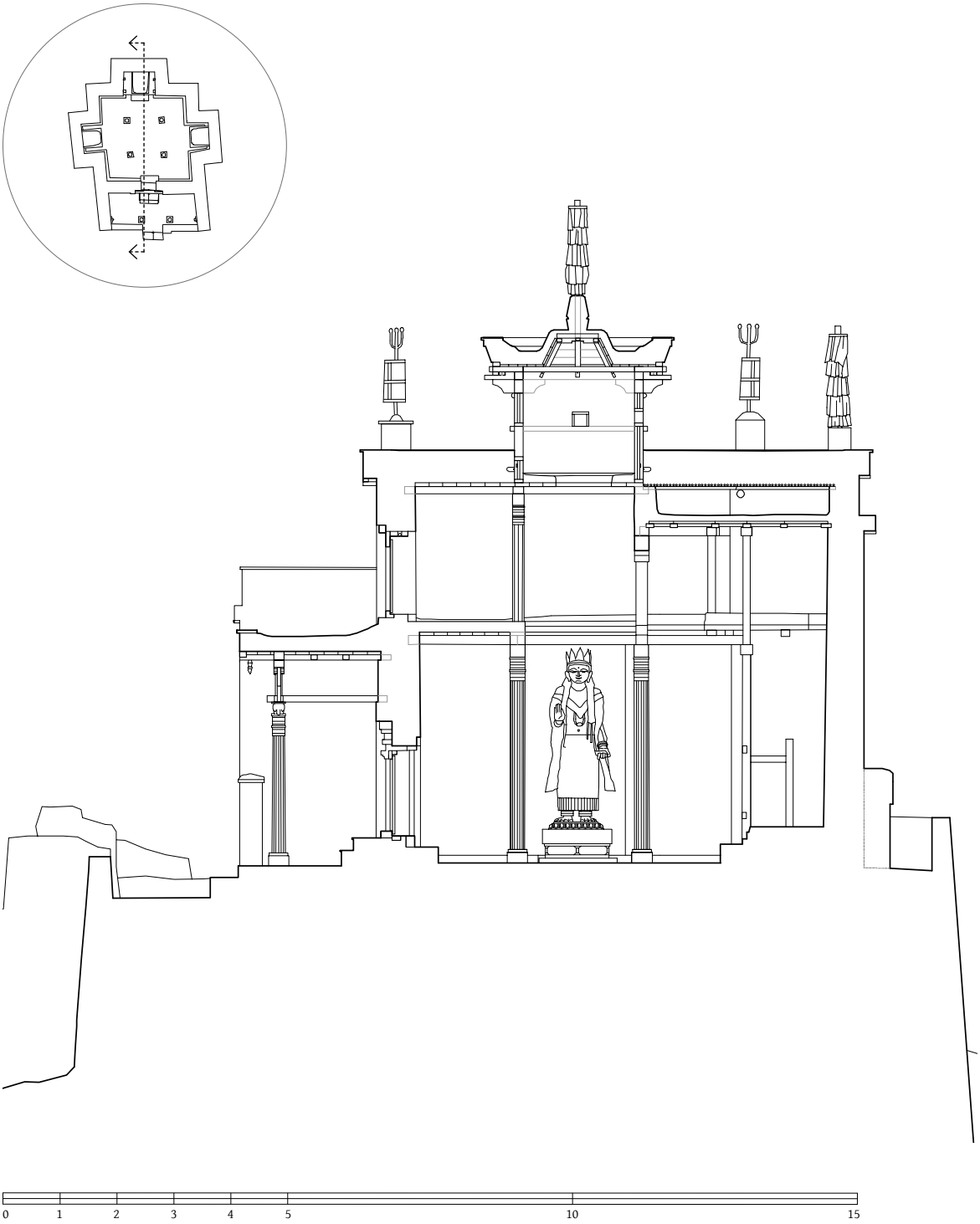




105 Cross section of the side niches, the cavities of the double roof and the lantern viewed towards the main niche. TU Graz 2010.

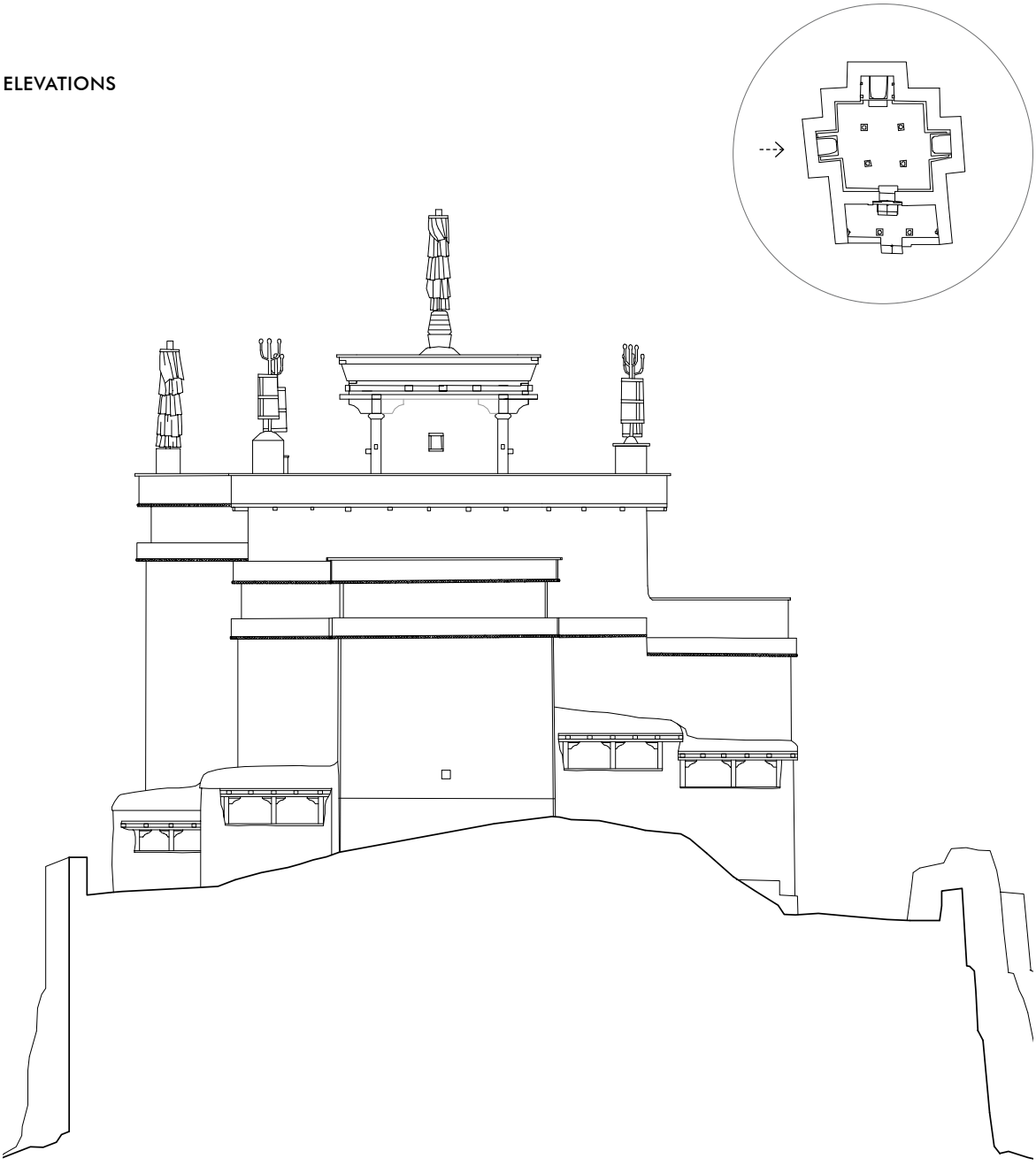


106 Cross section of the main area and the cavity above the false panelled ceiling viewed towards the entrance. TU Graz 2010.

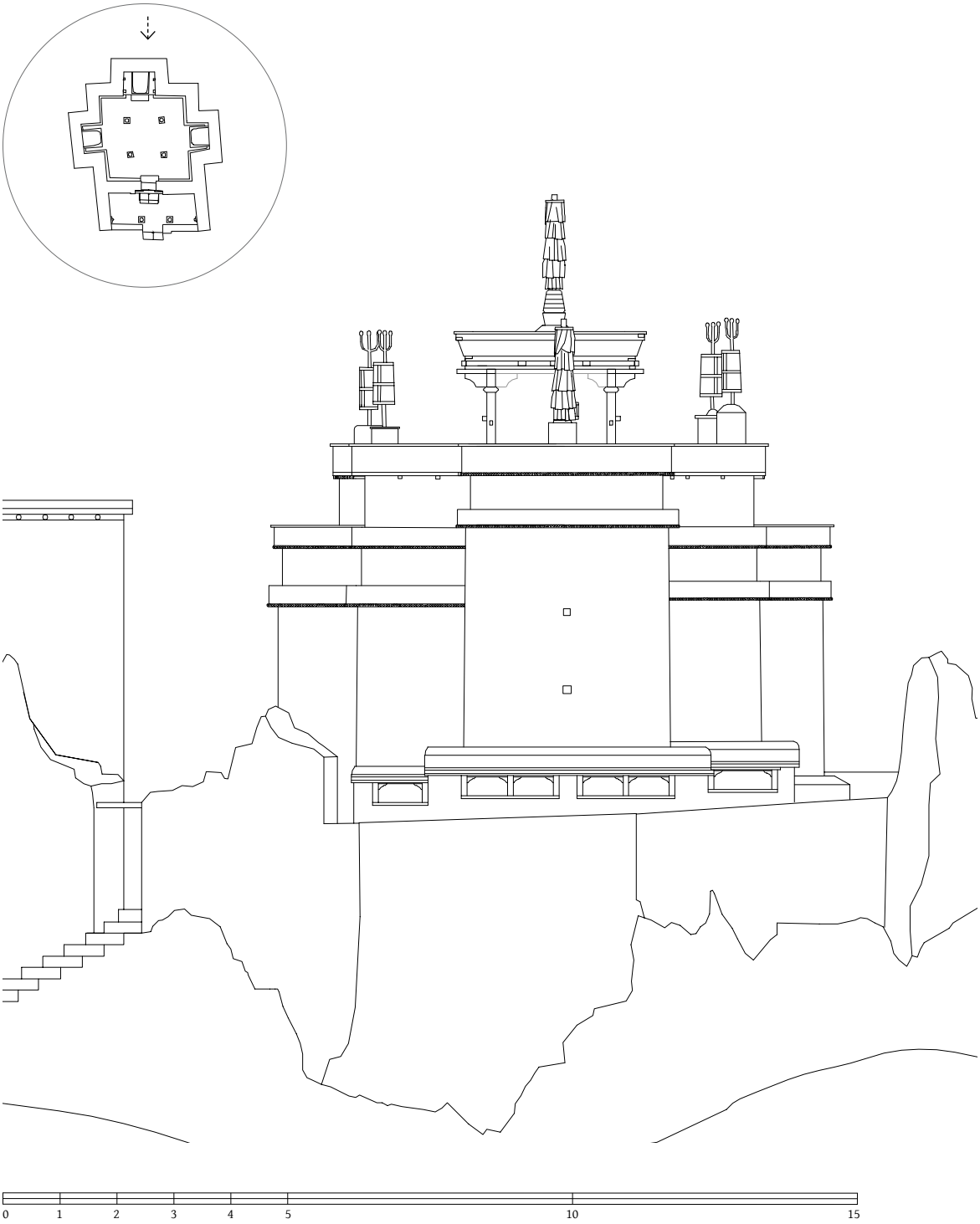


107 Longitudinal section of the veranda, the entrance, the centre, and the main apse. TU Graz 2010.

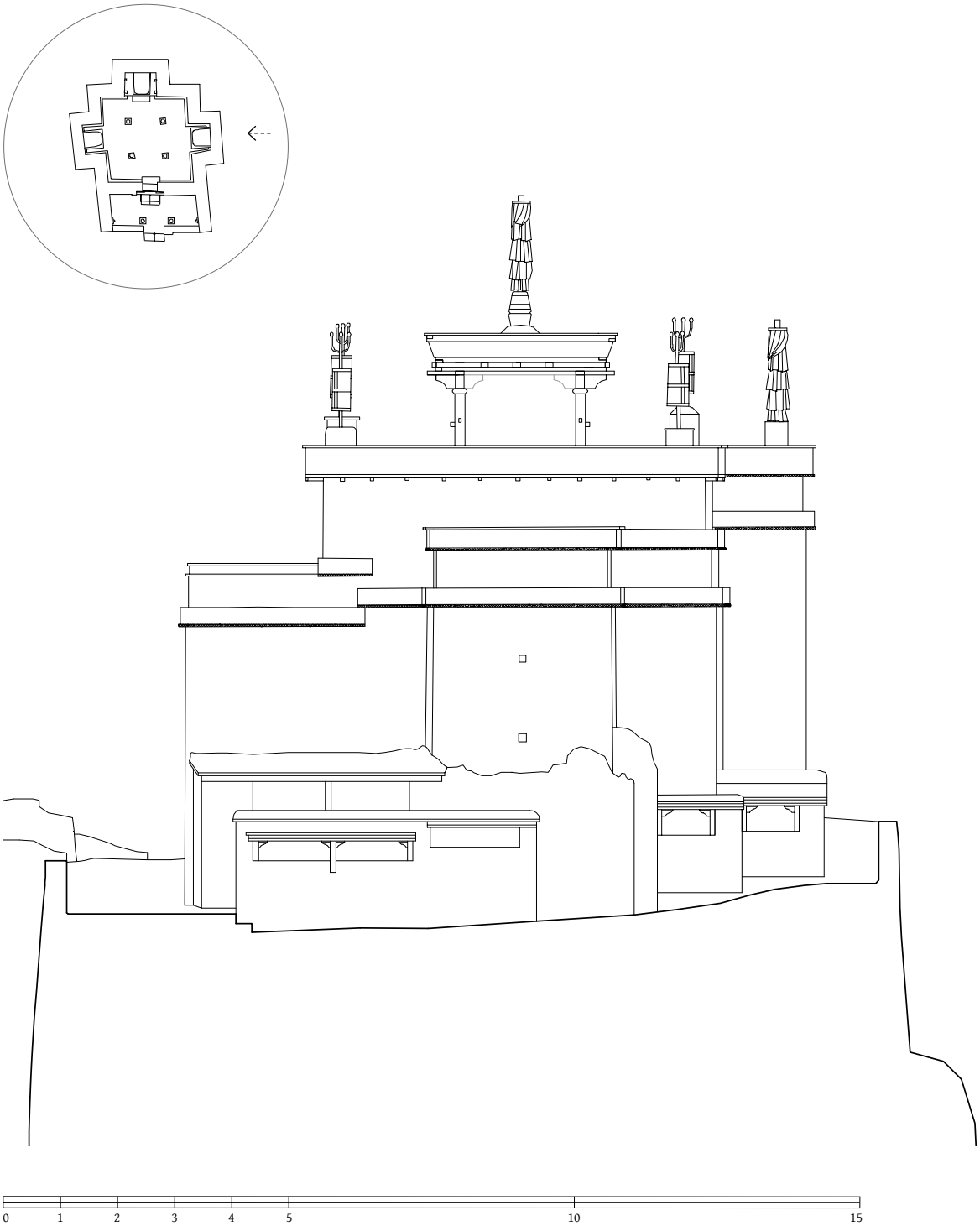
ELEVATIONS



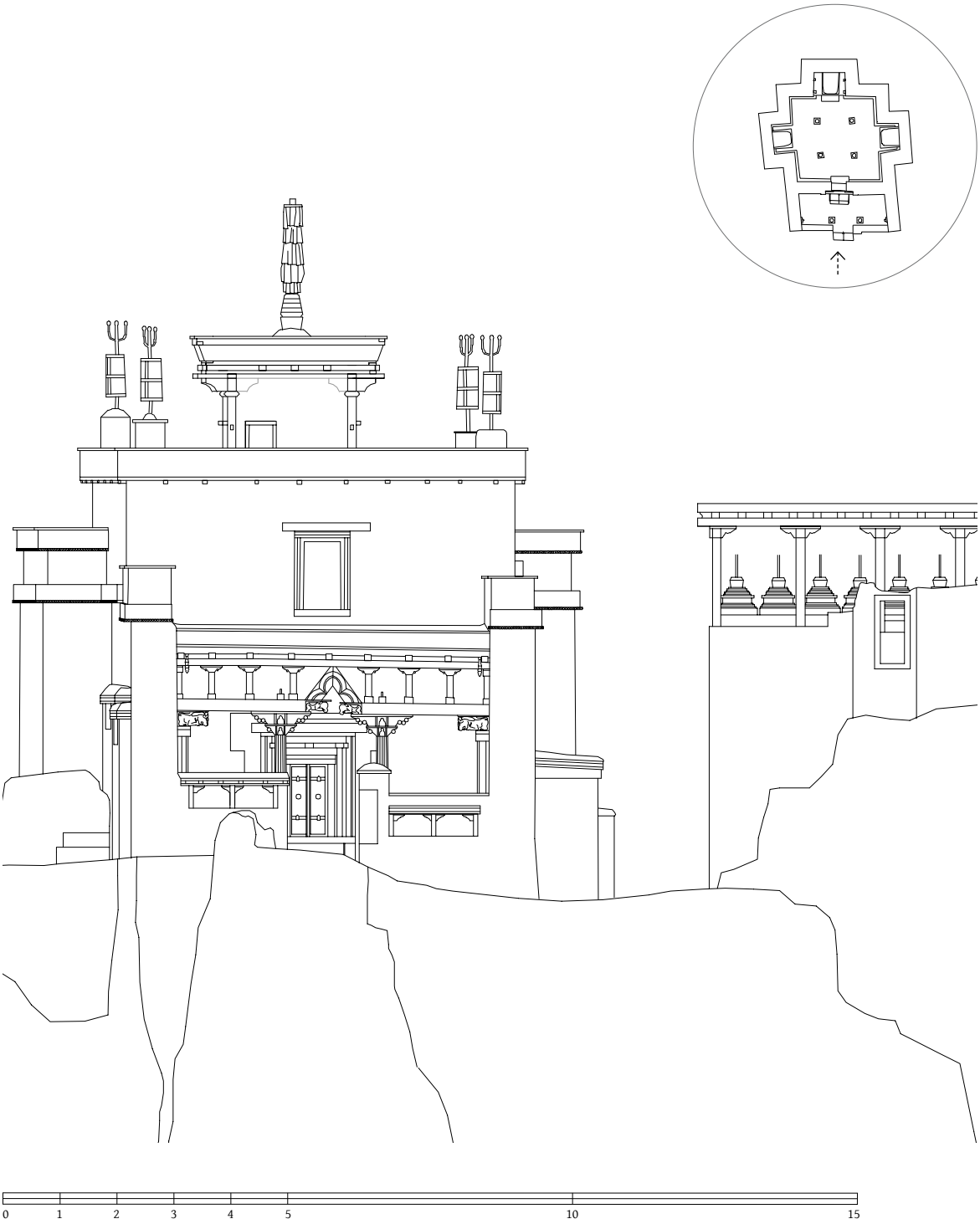
108 South-eastern elevation. TU Graz 2010.



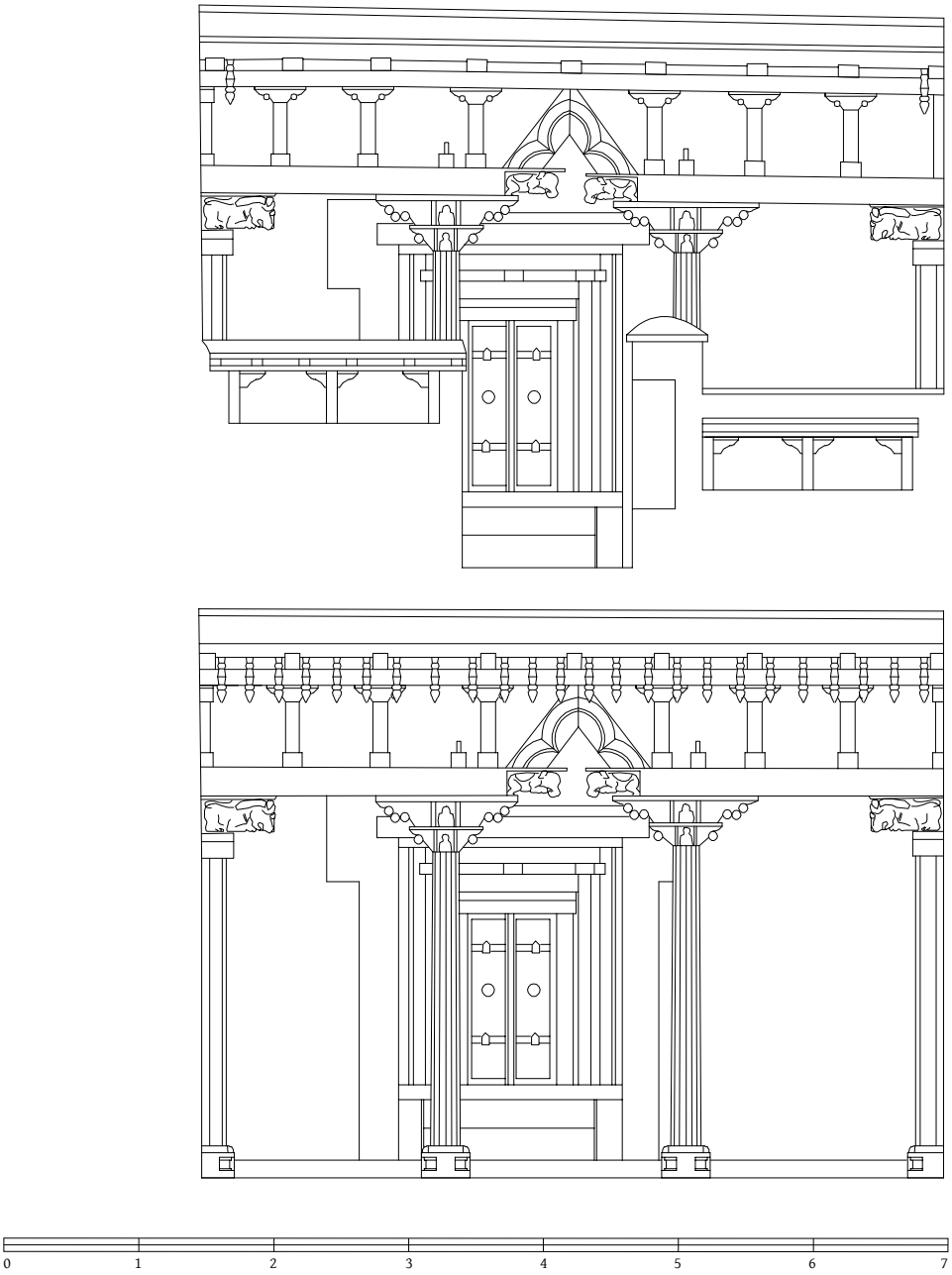
109 South-western elevation with chorten hall and the rocky protrusion. TU Graz 2010.



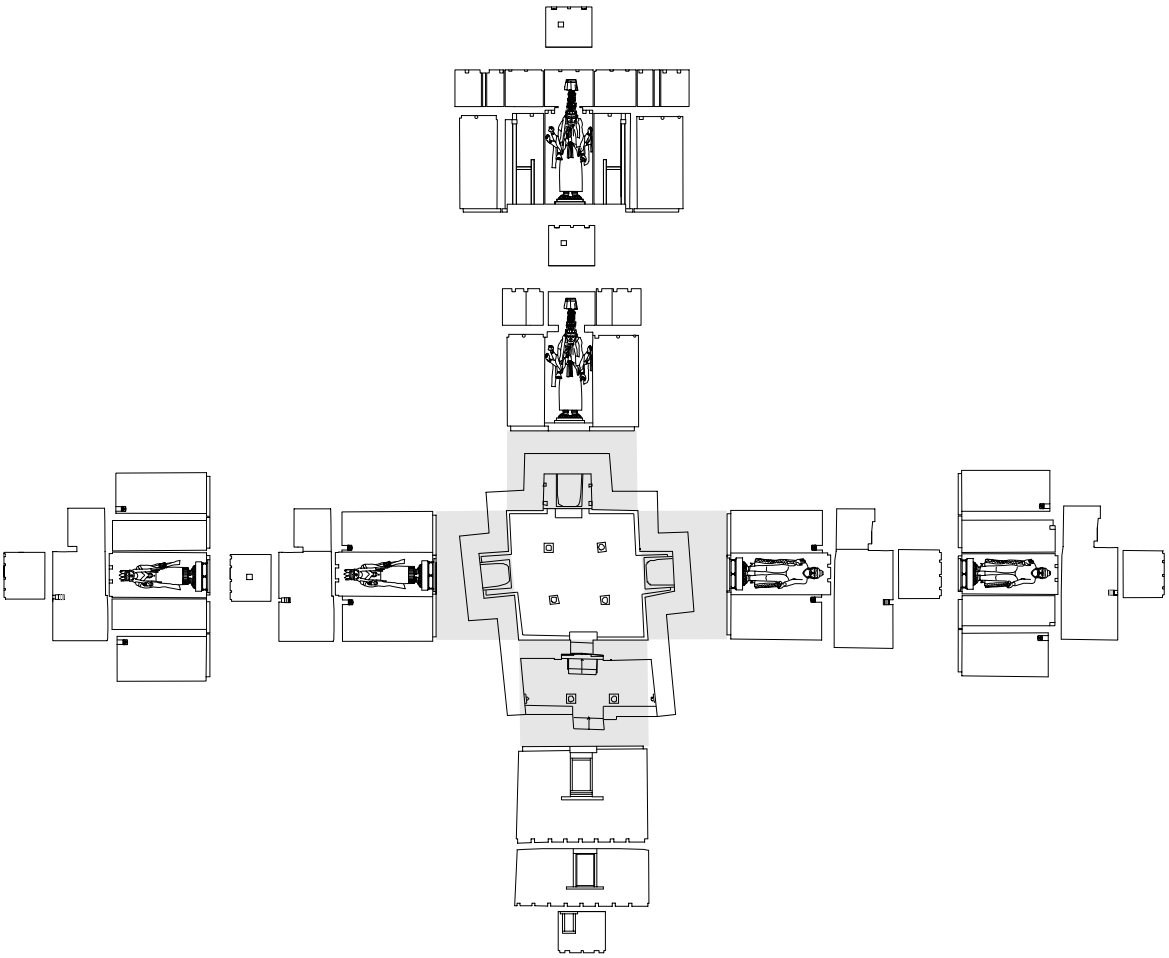
110 North-western elevation. TU Graz 2010.



111 North-eastern elevation (veranda) showing the neighbouring chorten hall. TU Graz 2010.



112 Reconstruction of the veranda without the prayer wheels, showing the original peg curtain below the eaves cornice. TU Graz 2010.



113 Overview of the interior walls in relation to the floor plan. TU Graz 2010.

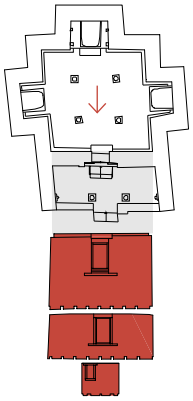
3 BUILDING DOCUMENTATION - PART 2

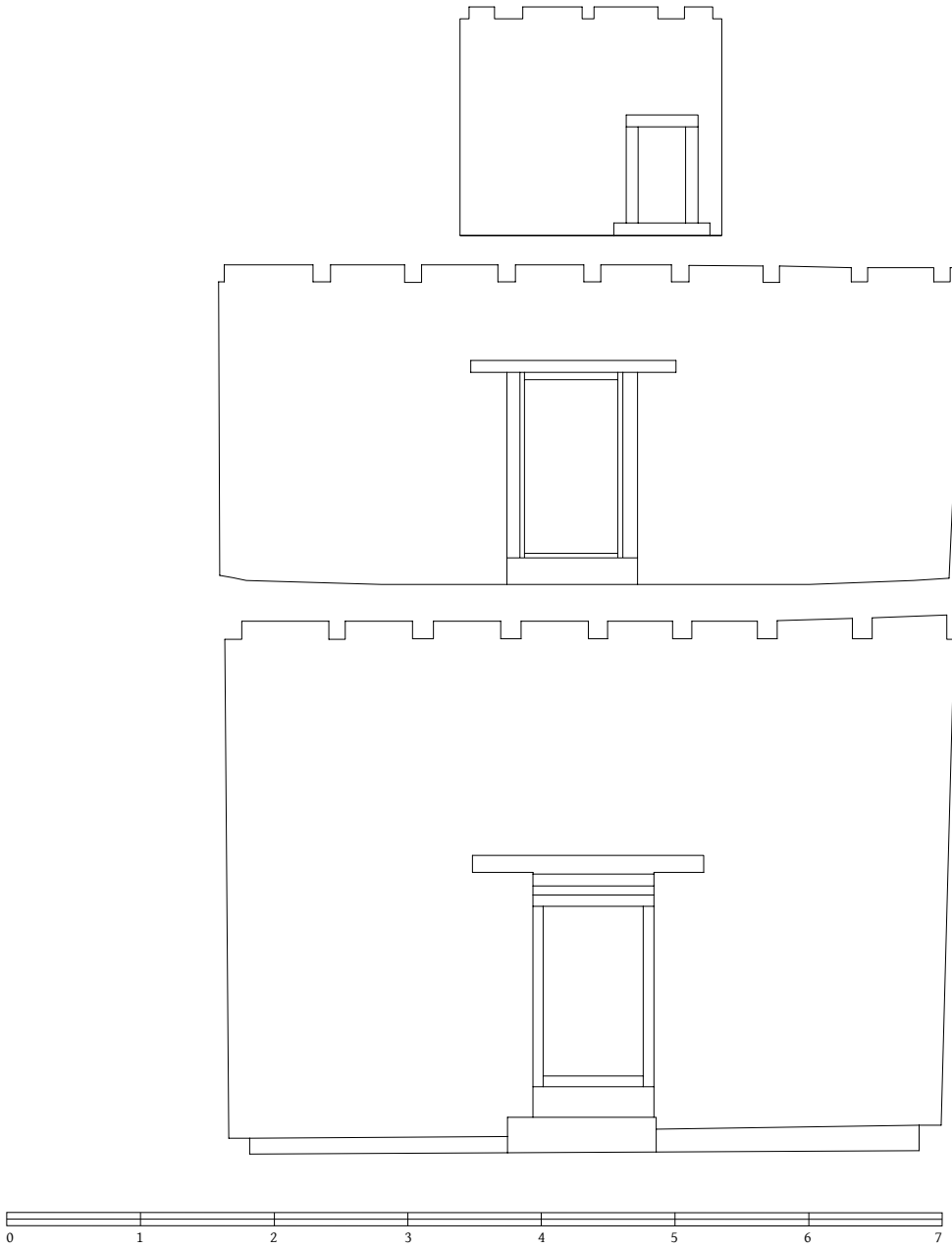
DOCUMENTATION OF THE INTERIOR

In order to complete the documentation, the wall paintings are photographed, assembled in the photomontage below and thus integrated into the scaled elevations.
The side walls of the main apse, which were not able to be examined because of their partial inaccessibility, are an exception to the rule. The respective areas on the first floor, the second floor, and the third floor (lantern storey) are represented vertically - on top of each other. Thus it is possible to define the accurate position of each painting detail within the spatial context in a rectangular coordinate grid system.
In addition, the documentation will provide a vital basis for future plans and mural restoration measures and thus enable long-term changes in building structures to be monitored and detected.

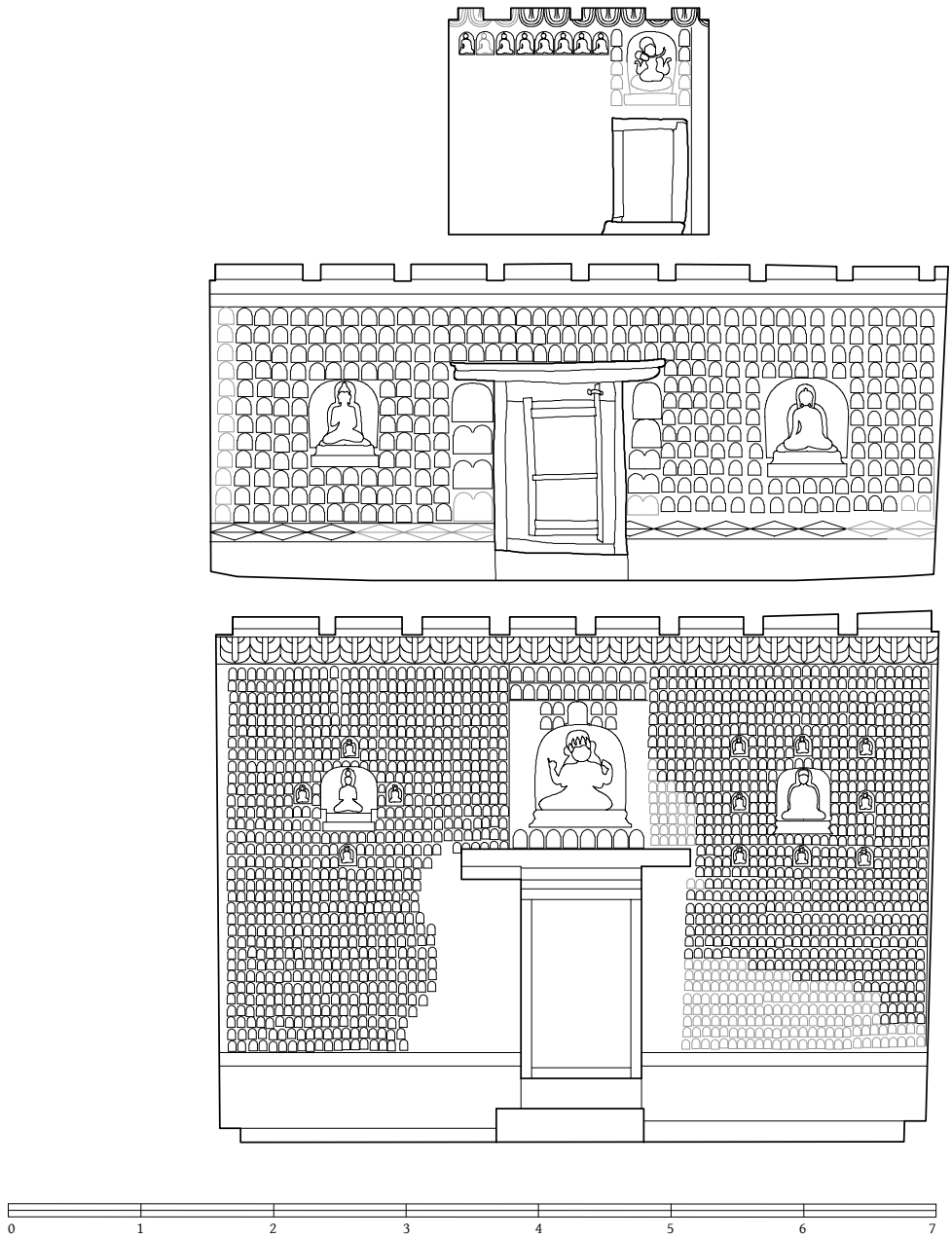
114 Montage of the murals on the interior walls. TU Graz 2010.

North-eastern interior wall





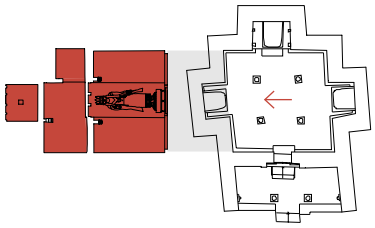
115 Orthogonal projection of the north-eastern interior walls and the entrance openings on all three levels. TU Graz 2010.

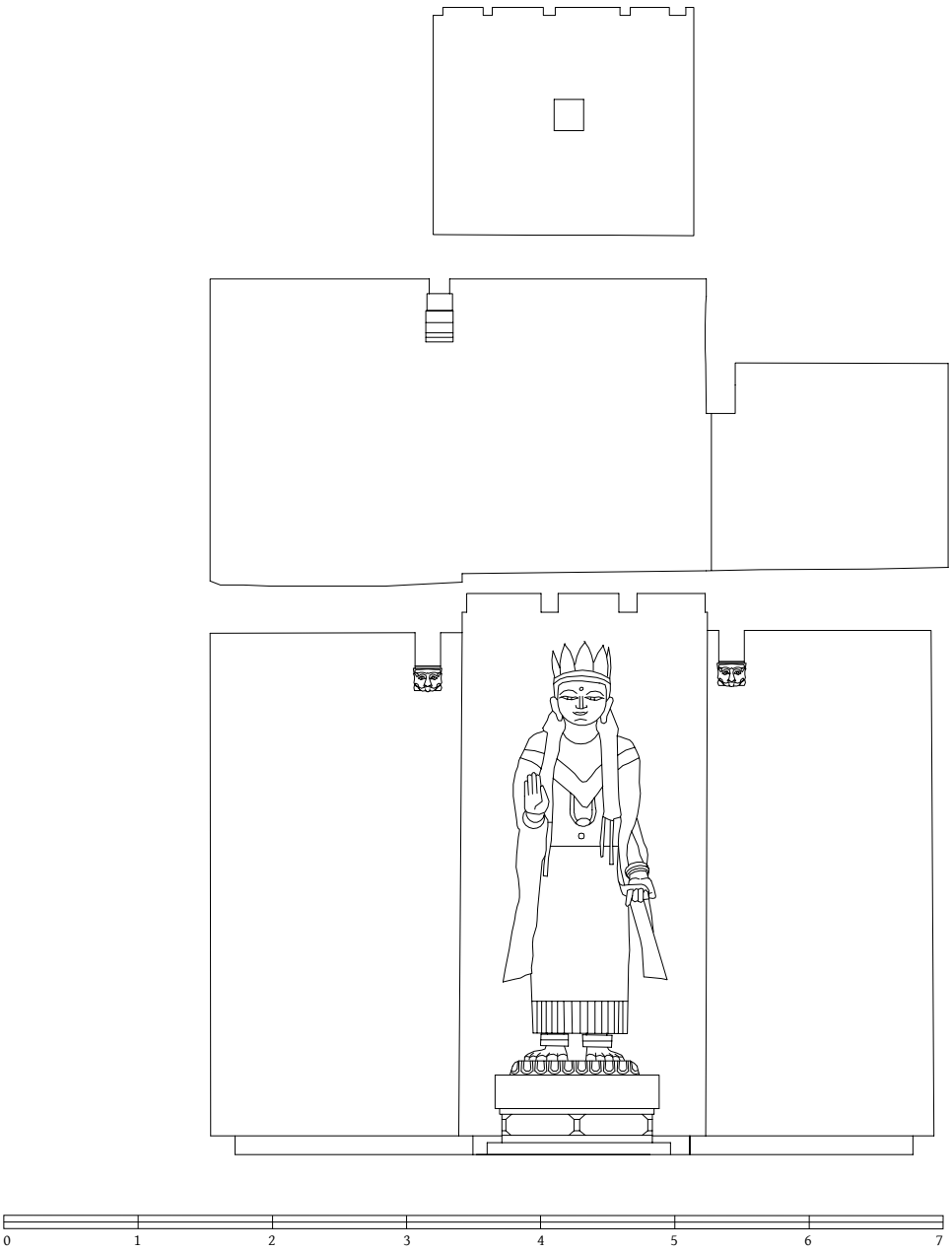


116 North-eastern interior walls with the disposition of the murals. TU Graz 2014.

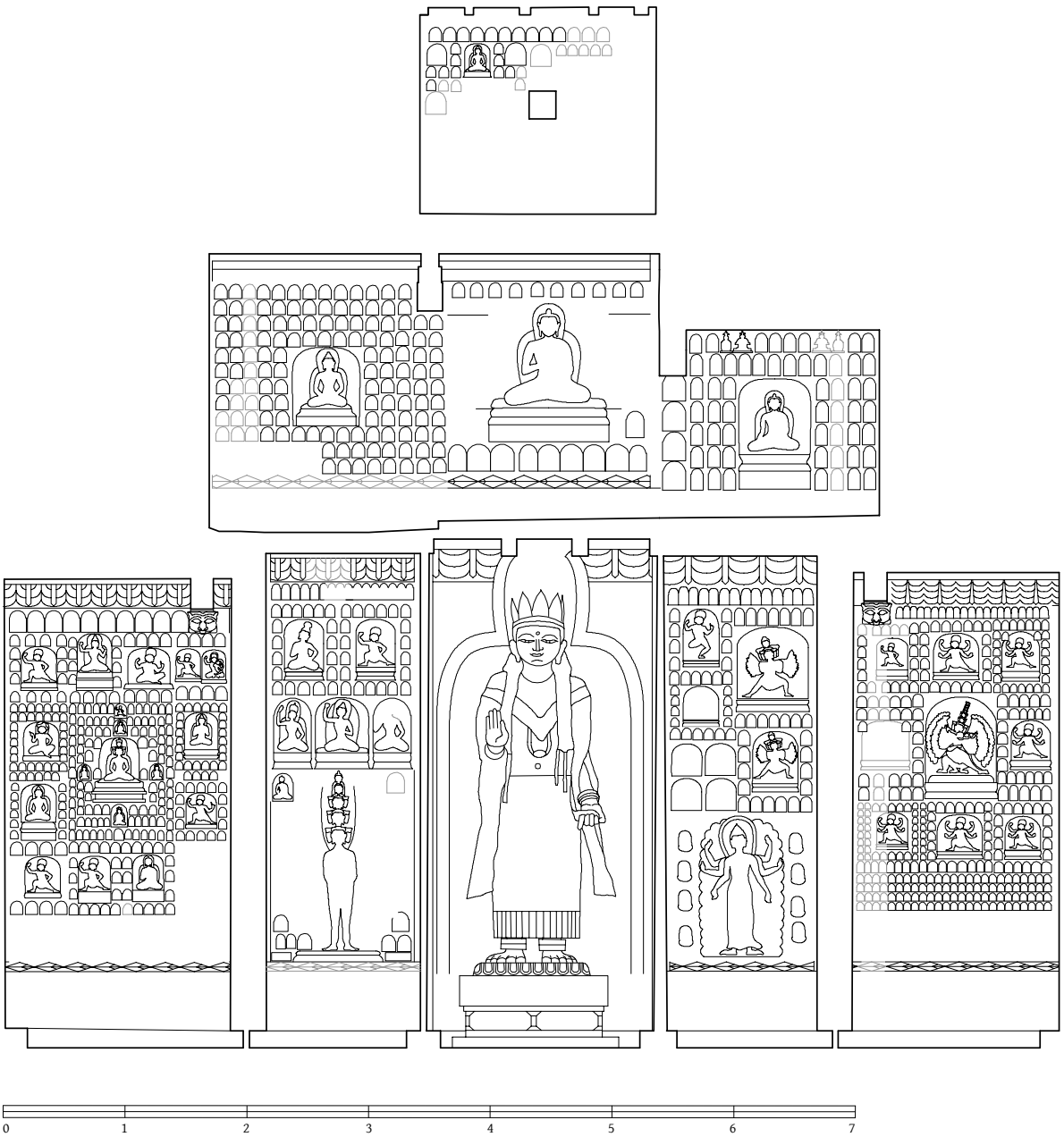
117 Full scale murals on the north-eastern interior walls. TU Graz 2010.

SOUTH-EASTERN INTERIOR WALL





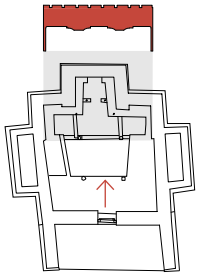
118 Orthogonal projection of the south-eastern interior walls and the sculpture niche of Bodhisattva Maitreya. TU Graz 2010.

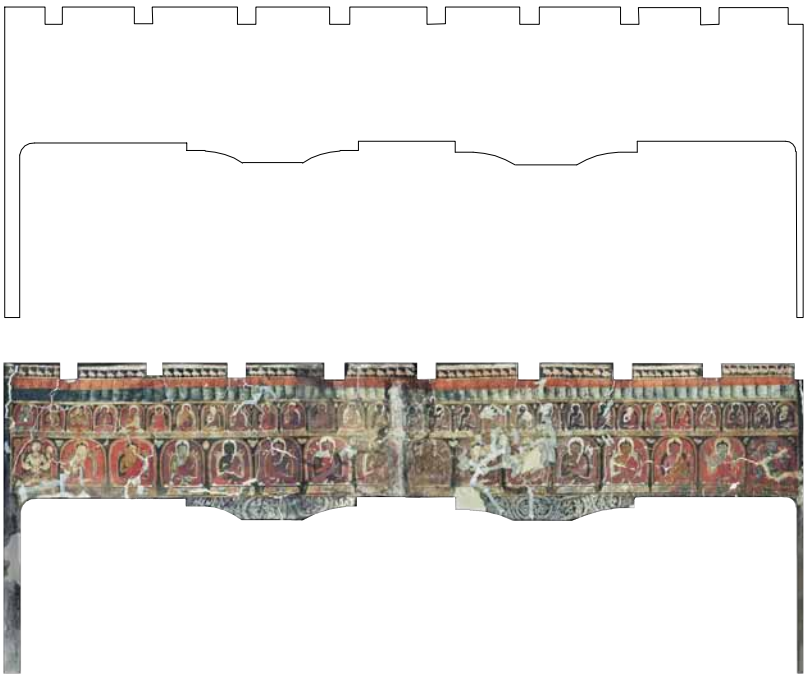


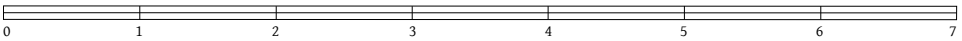
119 Developed view of the south-eastern interior walls with the disposition of the murals. TU Graz 2014.

120 Full scale murals on the south-eastern developed view of interior walls with the sculpture of Bodhisattva Maitreya at the centre. TU Graz 2010.

LOWERED BEAM IN FRONT OF THE SOUTH-WESTERN WALL







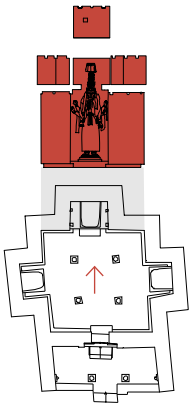
121 Orthogonal projection of the lowered beam between the centre and the main apse combined with the developed view of the full scale murals. TU Graz 2010.

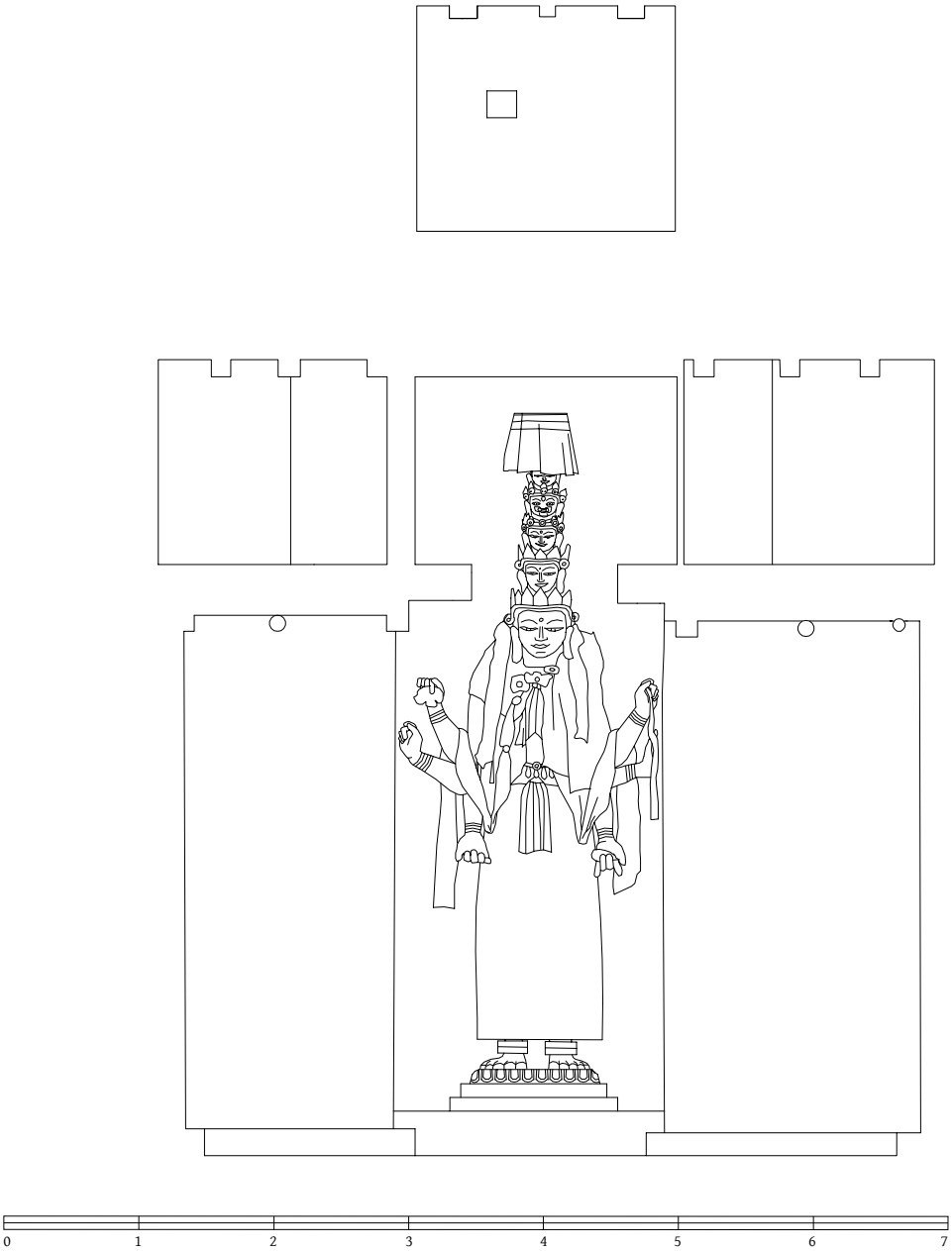
"On this screen are two painted registers, the larger exclusively depicting Buddhas except for three well-placed bodhisattvas: the eleven-headed Avalokiteshvara (far left), Manshusri (centre) and the wrathful Vajrapani (far right). Above this register is a Drigung Kagyu lineage, starting on the far left with Vajradhara and proceeding in the conventional teacher-student order through the Indian mahasiddahs ('great adepts') Tilopa and Naropa, to the first Tibetan laymen, Marpa the translator (1012-97) and his disciple, the yogi and poet Milarepa (1052-1135), the monks Gampopa (1079-1153), Phagmo Drupa (1110-1170) and Jigten Gompo, after which, without inscriptions, identifications are too challenging to hazard."[31]

31 LINROTHE 2009: 94.

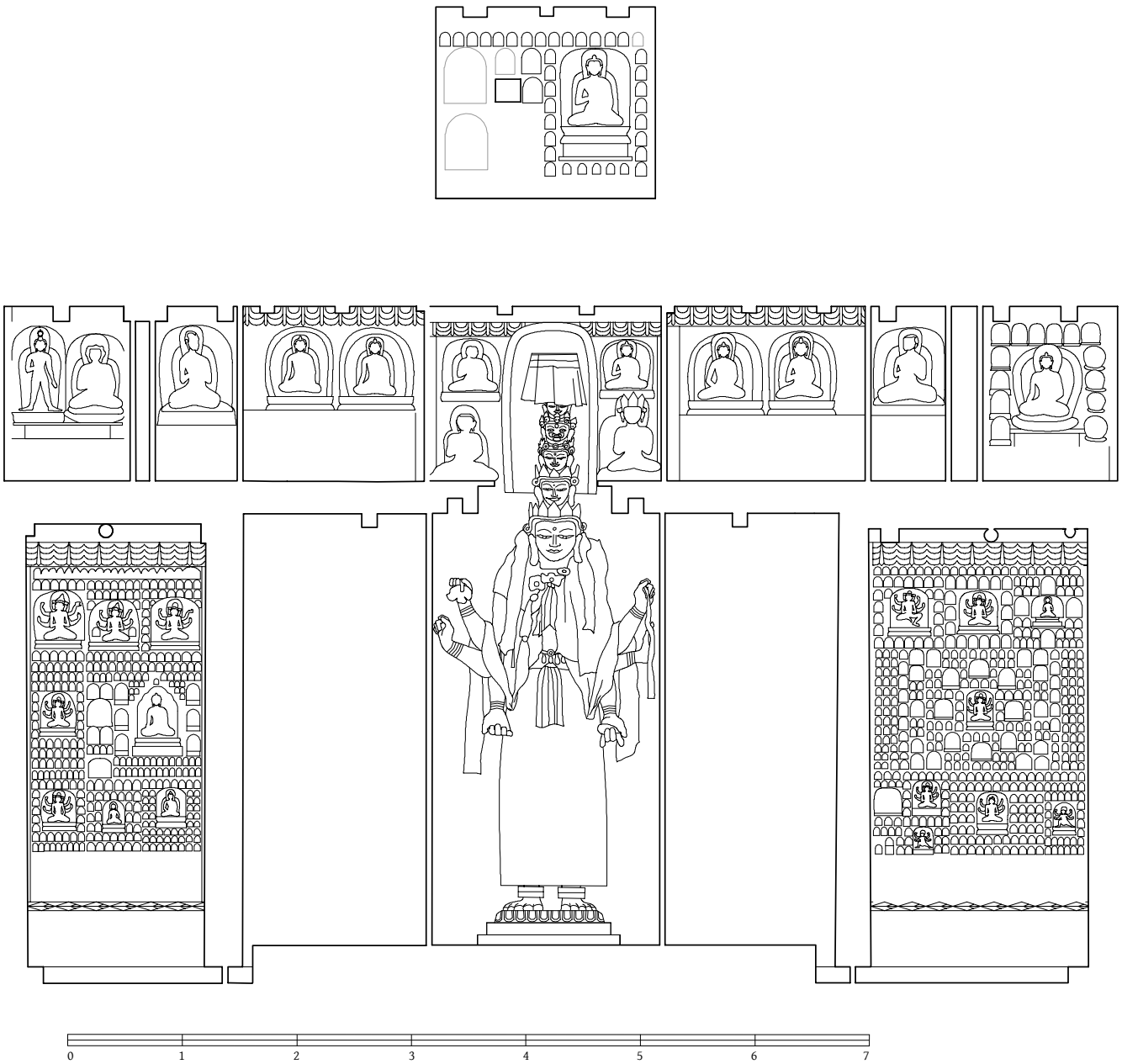
122 The murals of the upper row on the left side showing the Drikung Kagyu lineage. HN 2004.

SOUTH-WESTERN INTERIOR WALL

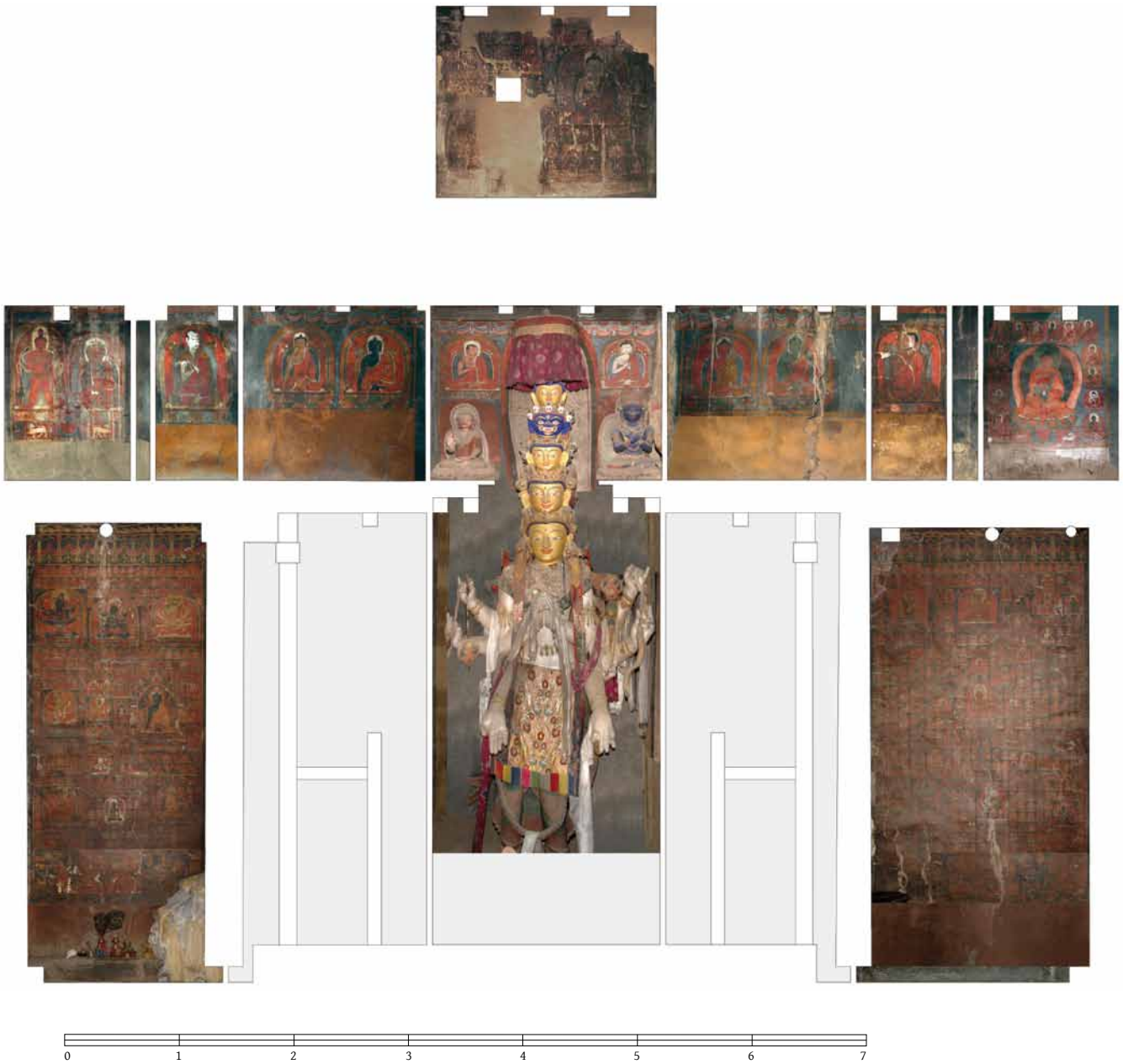




123 Orthogonal projection of the south-western interior walls and the main apse with the sculpture of the eleven-headed Bodhisattva Avalokitesvara. TU Graz 2010.

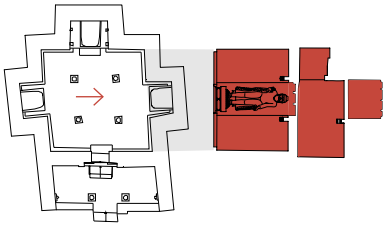


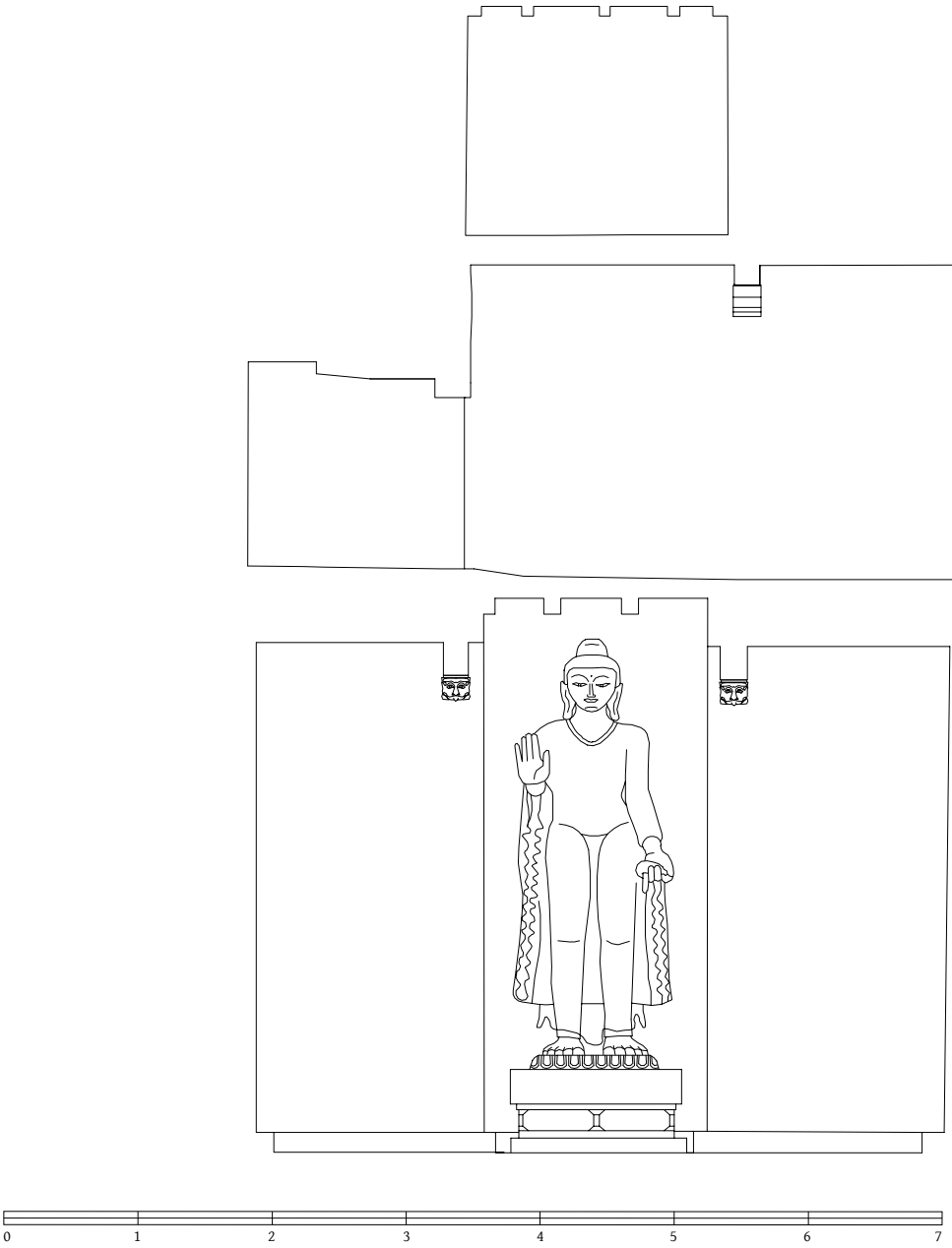
124 Developed view of the south-western interior walls with the disposition of the murals. TU Graz 2014.



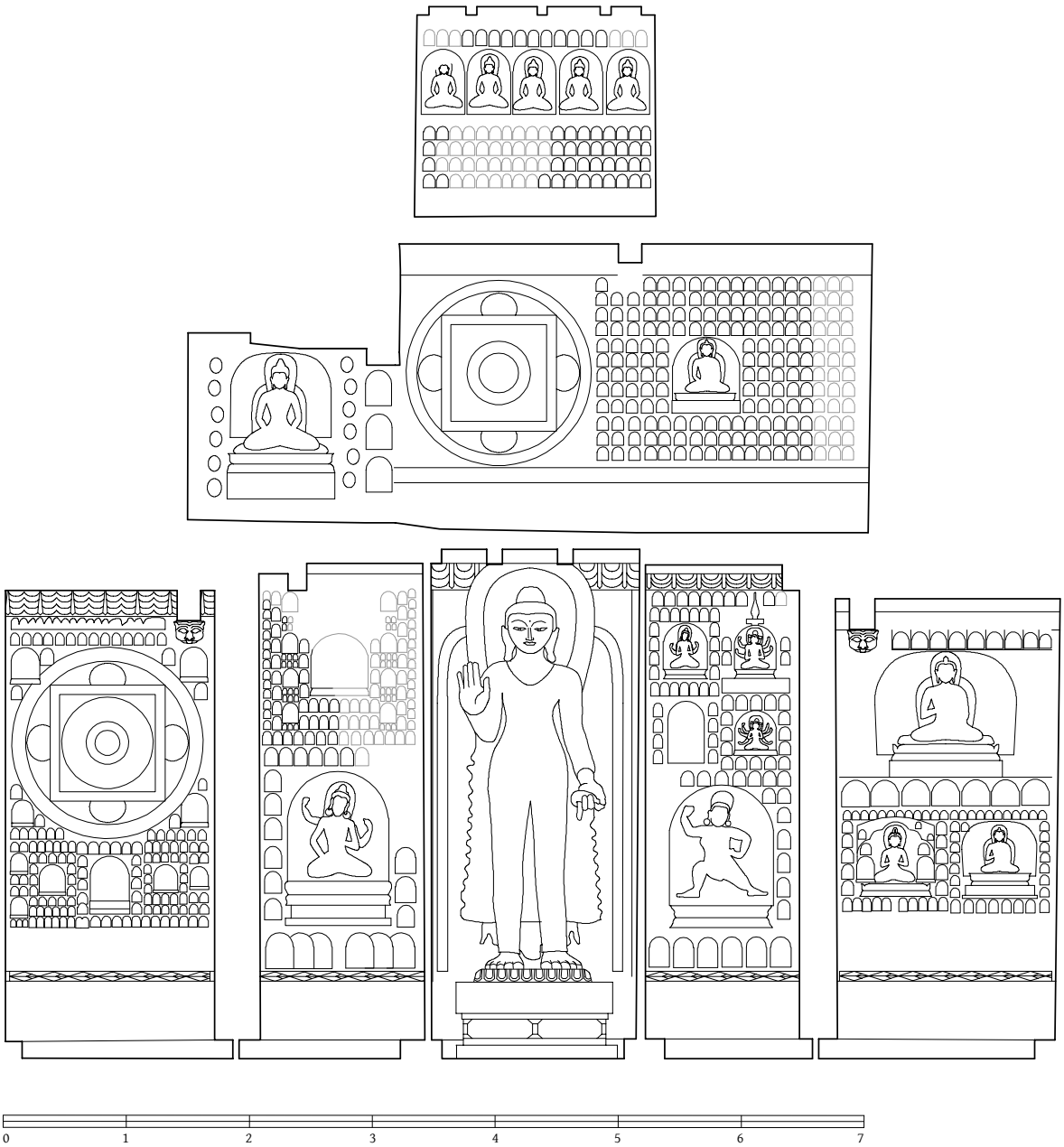
125 Full scale murals on the south-western developed view of interior walls with the sculpture of the eleven-headed Bodhisattva Avalokitesvara. The lower part of the side walls in the main apse could not be documented. TU Graz 2010.

NORTH-WESTERN INTERIOR WALL





126 Orthogonal projection of the north-western interior walls and the sculpture niche of Buddha Sakyamuni. TU Graz 2010.



127 Developed view of the north-western interior walls with the disposition of the murals. TU Graz 2014.

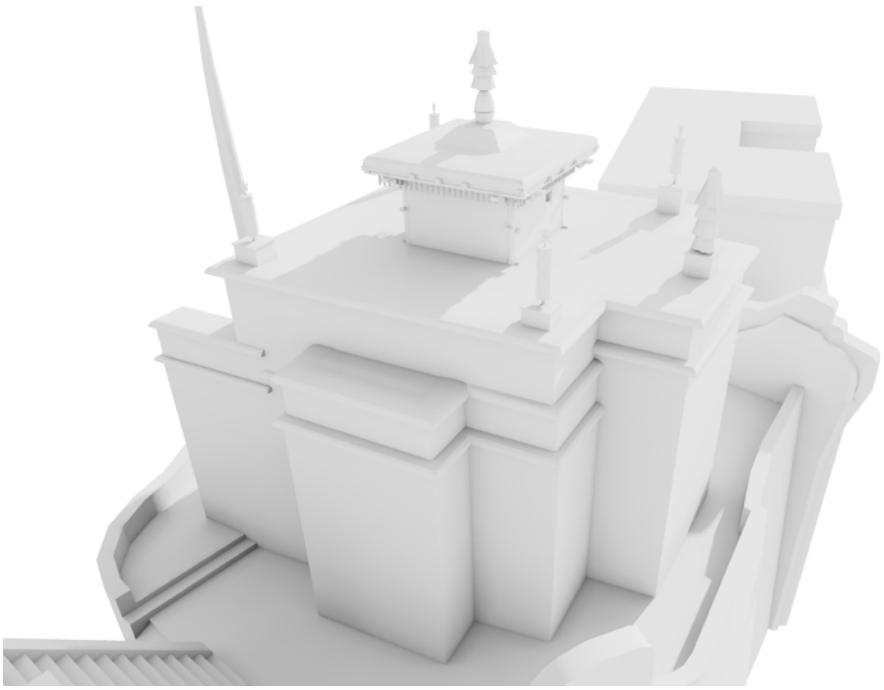
128 Full scale murals on the north-western developed view of interior walls with the sculpture of Buddha Sakyamuni at the centre. TU Graz 2010.

129 The entrance area with the rocky protrusion and the neighbouring chorten hall. Dieter Bauer/TU Graz 2010.

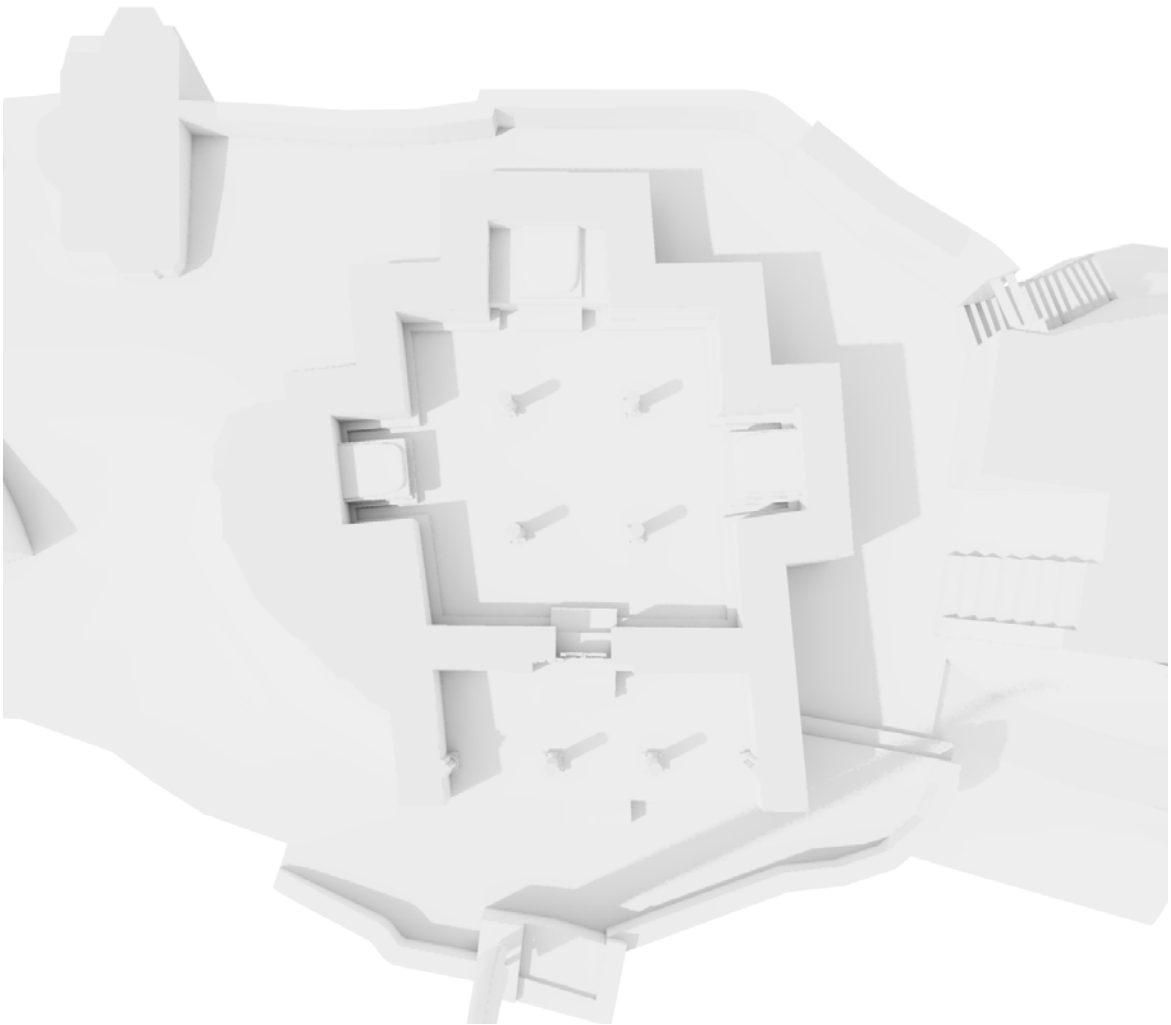
3 BUILDING DOCUMENTATION - PART 3

SPATIAL MODELS

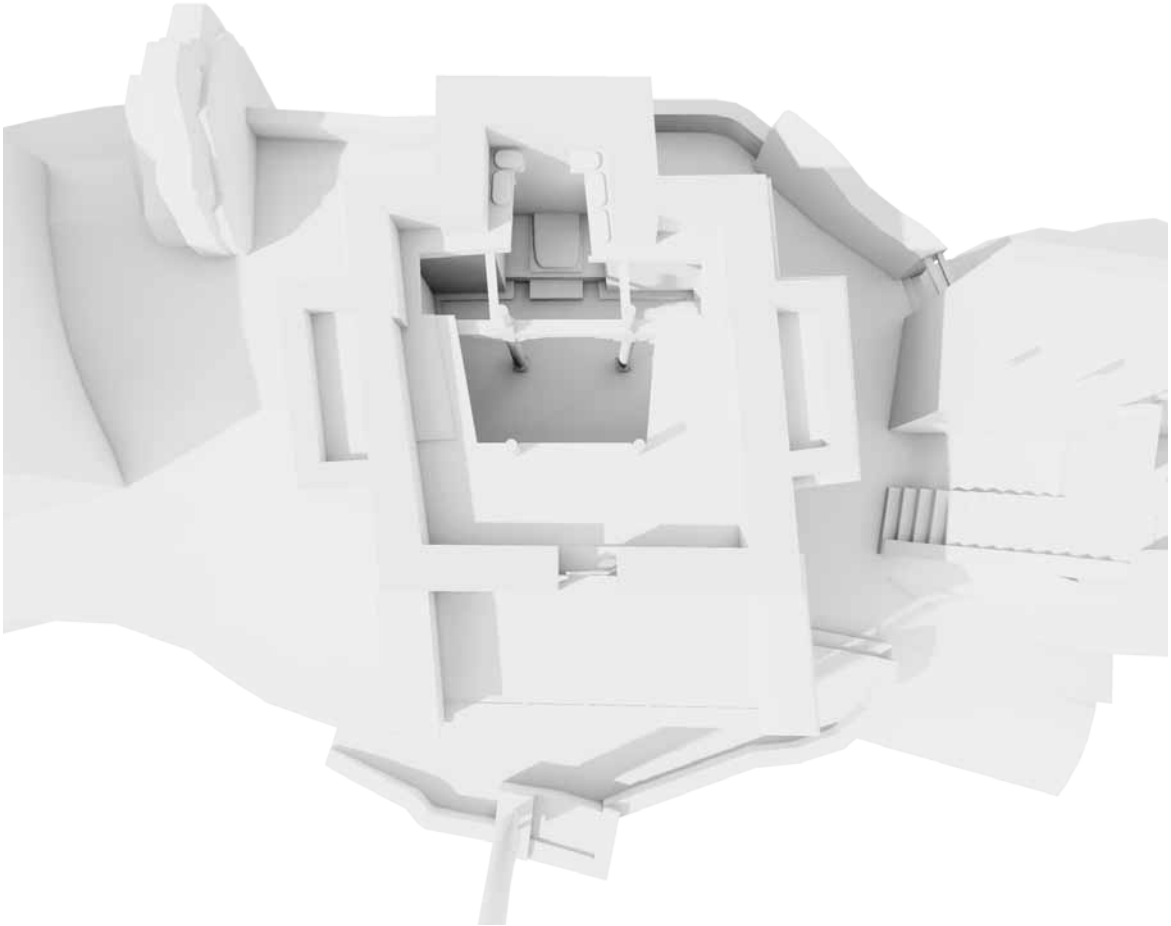
The spatial models reconstruct the original appearance of the temple. This proves to be most important for any future renovation work and restoration measures. Later additions, so-called secondary structures, such as the prayer wheels and the tsa tsa-niche, were ignored. Details of the former building that still exist in reality help in the process to determine what the temple would look like after renovation. For example, the main apse eave cornice was taken as a model for the overall eave cornice.
The lantern roof was reconstructed according to the Sumtsek in Alchi. The model also shows the side attic of the veranda roof with its double cornices.



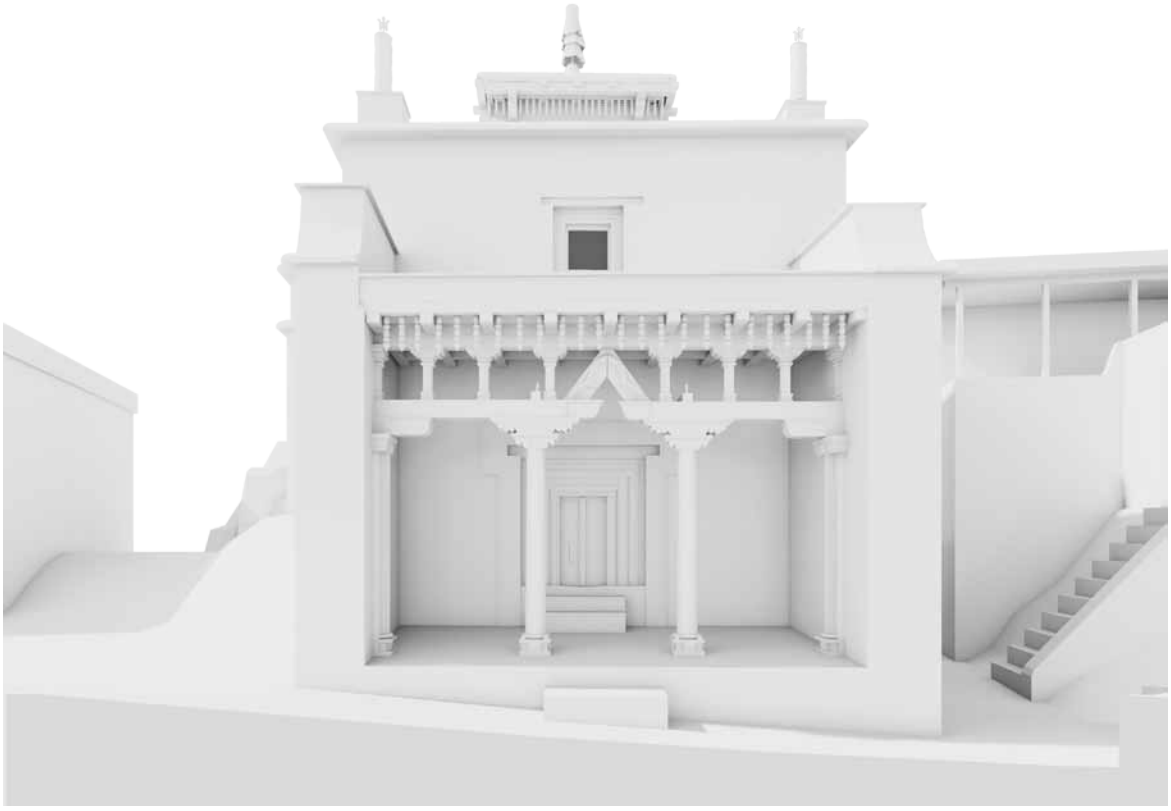
130 Top view from the west. Dieter Bauer/TU Graz 2010.



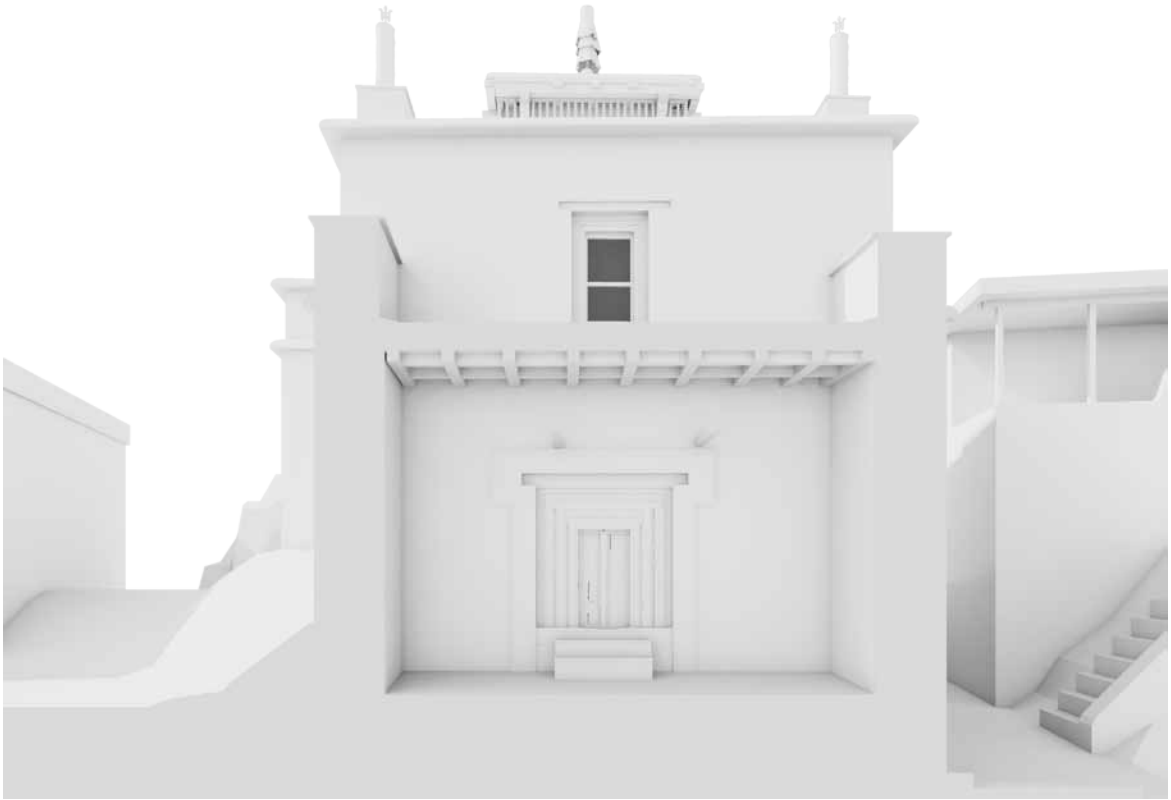
131 Horizontal section of the first floor. Dieter Bauer/ TU Graz 2010.



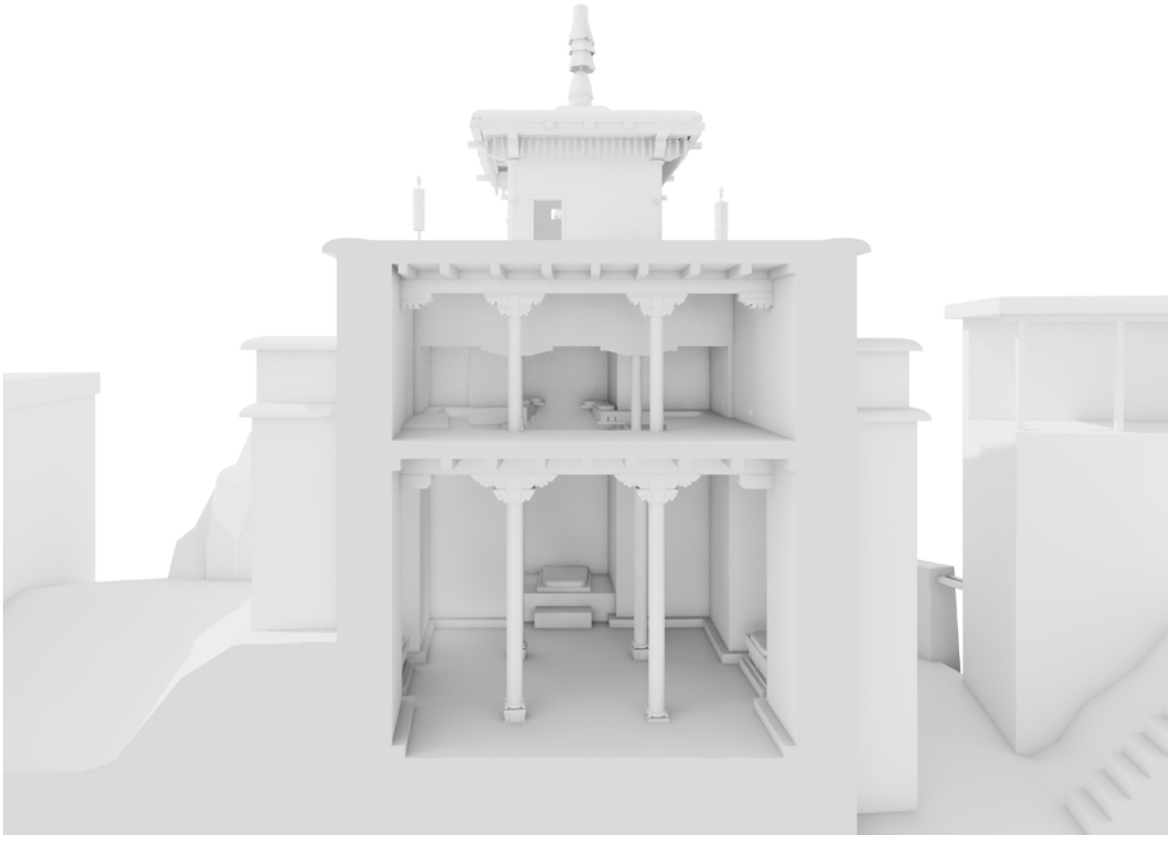
132 Horizontal section of the second floor. Dieter Bauer/TU Graz 2010.



133 North-eastern view showing the open veranda and the peg curtains of the veranda and lantern roof. Dieter Bauer/TU Graz 2010.

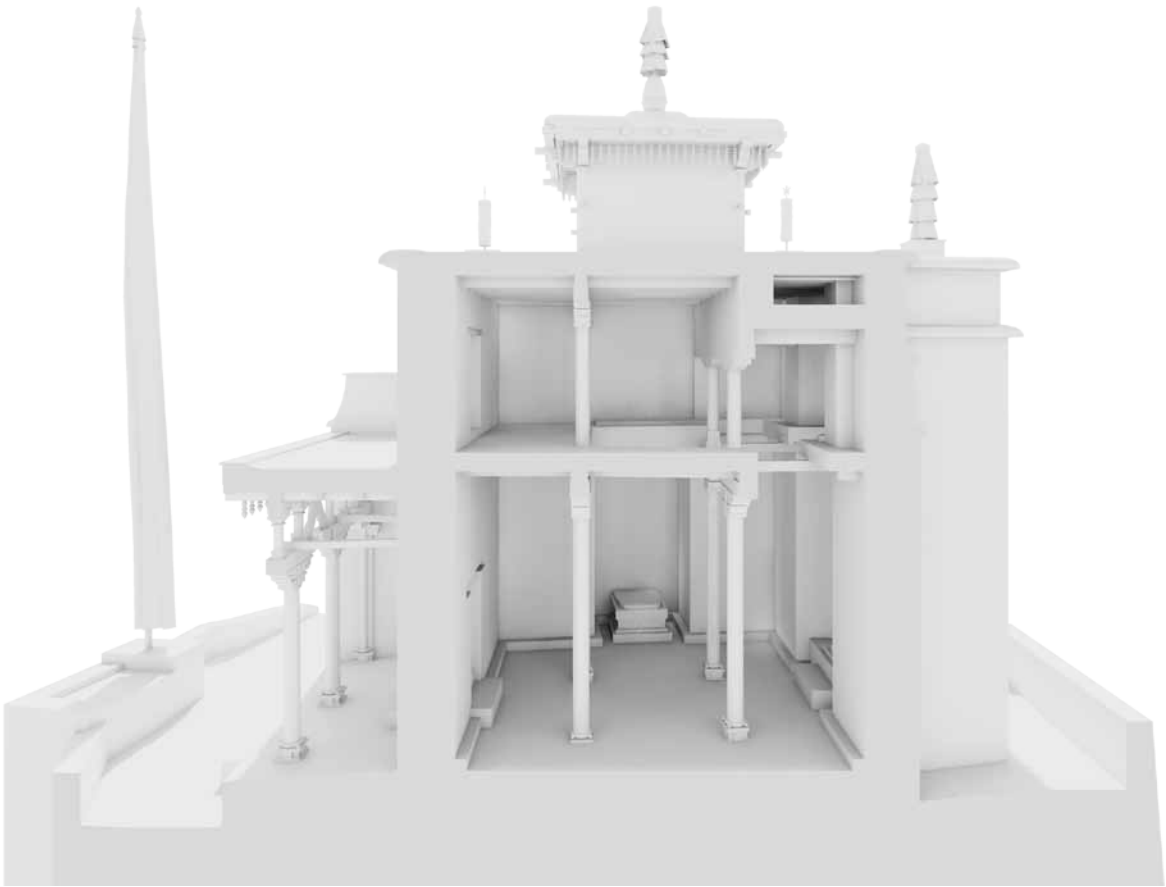


134 Vertical section through the veranda with the main entrance door. Dieter Bauer/TU Graz 2010.

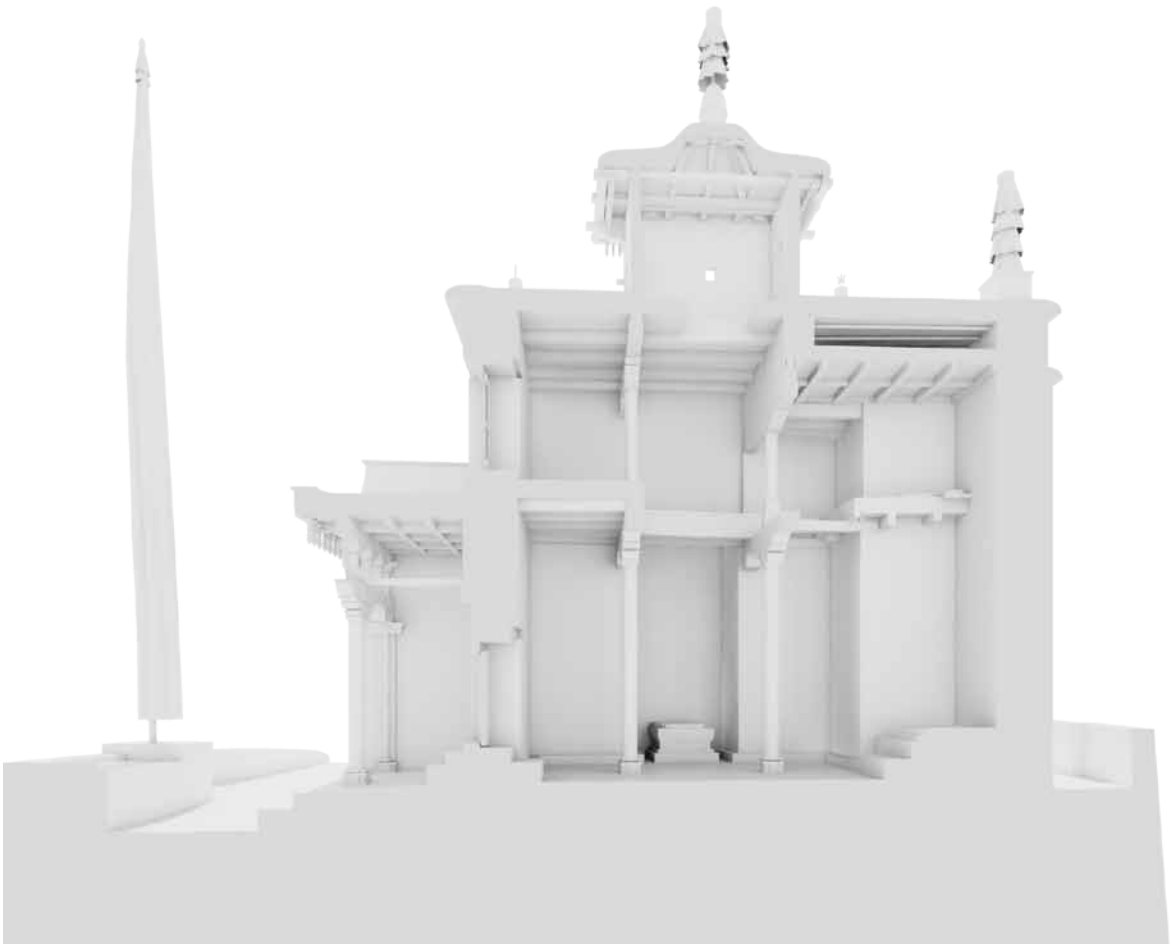


135 Vertical section through the interior of the entrance area. Dieter Bauer/TU Graz 2010.

136 Vertical section through the interior of the centre area showing the lowered main beam on the first floor. The cavities of the double-roof can be seen above the side niches. Dieter Bauer/TU Graz 2010.

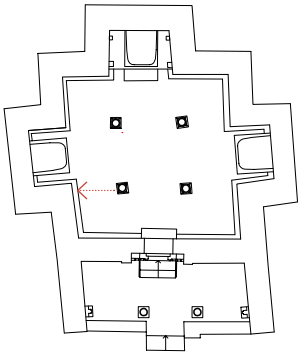


137 Vertical section in front of the central quad towards the south-east showing the side cavity of the double roof
Dieter Bauer/TU Graz 2010.



138 Vertical section along the central axis towards the south-east. The cavity of the double-roof can be seen above the false panelled ceiling of the main apse. Dieter Bauer/TU Graz 2010.

4 THE WANLA INSCRIPTION



139 Location of the Wanla inscription marked on the ground plan.

140 Location of the Wanla inscription on the wall to the left of the Maitreya niche. Montage TU Graz 2010.

* I am grateful to Christian Luczanits, who originally had intended to publish the inscription and generously made his preparatory work available to me; moreover, he provided valuable information on the art work of the Wanla temple. I am also obliged to Anne MacDonald, Ernst Steinkellner, Jampa L. Panglung, Bruno Lainé and Hubert Decleer for their most helpful comments. The fieldwork and research for this study were generously funded by the Austrian Science Fund (FWF) within the framework of three projects on Tibetan inscriptions (project nos. S 8705-G06, S 9804-G08, S 9811-G21). The illustrations and their captions have been added by the editors.

4 THE WANLA INSCRIPTION

Kurt Tropper

INTRODUCTION

The Wanla inscription has already been referred to in several publications, but a complete edition and annotated translation have only recently been published.[32] Here the (slightly revised) translation is reproduced along with some selected annotations and a short introduction.

The inscription was first mentioned by Francke,[33] who made a few stray remarks on it and reported that he had sent someone to the Wanla temple "to copy any ancient inscriptions he could discover in it". From his brief comments it becomes clear that Francke actually must have received a copy of the inscription, but the whereabouts of these transcripts are unknown and Francke apparently never published the epigraph. A partial edition covering approximately the first 25 percent of the inscription (i.e., up to verse-line 36) was provided by Könchok Sönam (dKon mchog bsod nams),[34] and an almost complete rendering of the inscriptional text can be found in the short description of the Wanla temple by Könchok Trashi (dKon mchog bkra shis).[35] While both of these editions must be considered deficient in various respects, they are nevertheless potentially valuable sources for passages where the inscription is now damaged. Each of the two authors also furnishes a brief introduction including some comments on the history of the temple. More recently, selected passages of the inscription have been the object of two studies by Vitali[36] and Luczanits[37]. The latter also delineates the temple's site and its layout as well as the inscription's position, which he describes as "immediately to the left of the Maitreya niche".[38]

32 Tropper, The historical inscription in the gSum brtsegs temple at Wanla, Ladakh. Brill's permission to republish parts of this article is gratefully acknowledged.
33 Francke, Antiquities of Indian Tibet I, p. 97.
34 dKon mchog bsod nams, La dwags dgon pa rnams kyi lo rgyus, vol. III, p. 90-93.
35 dKon mchog bkra shis, g.Yung drung thar pa gling, p. 664–671.
36 Vitali, The Kingdoms of Gu.ge Pu.hrang, p. 385–390.
37 Luczanits, The Wanla Bkra shis gsum brtsegs, p. 117 (n. 4), 121 (n. 1), 123 (n. 17, 18).
38 *Ibid*., p. 118.

141 The Wanla inscription. CL 2009.

DESCRIPTION

The inscriptional panel is of a brownish grounding and framed by a thin red line. It measures *c.* 60 x 44 cm (height/width) and its lower edge is situated approximately one meter above the ground. The text is written in black *dbu can*-letters and comprises 48 lines.[39] Except for a few very short passages at the beginning and at the end it is entirely of a metrical structure, breaking down into 133 verse-lines. Because the inscription is damaged in some places, the number of syllables per verse-line cannot always be established with certainty, but almost all the verse-lines that have been sufficiently preserved are composed of eleven syllables. As the few exceptions to this occur completely at random, it is clear that they must be the result of some mistake, either by the scribe or even by the author.[40]

142 The caption identifying the central figure of the donor depiction as the ruler Bhagdarskyab. CL 2005.

NOTES ON THE TRANSLATION

Due to the detailed documentation of the inscription I believe that the edition on which the following translation is based[41] is fairly accurate and improves on previous attempts, but I am fully aware that the translation and the annotations are occasionally rather tentative. Sometimes the best that could be done was to present different alternatives. The difficulties arise not only from the irregular spellings and the fact that the text has been damaged in some places, but also from the inscription's metrical structure with its usual ambiguities. Most importantly, there are hardly any other textual sources which refer to this particular time and place, resulting in little background information and but a few reference points. All the more, the inscription has to be regarded as an important document that sheds at least *some* light on this obscure period, and hopefully our understanding of the epigraph's wider context will improve in due time.

EDITORIAL SIGNS

(1), (5), etc.	number of the verse-line where the following passage begins
...	corresponding passage in the inscription is damaged
{g}	emendation; e.g., *{g}dan* (where the inscription reads *bdan*)
a	uncertain reading (underlined letter)

39 In August 2002 the inscription was recorded with a digital video-camera and some 300 single exposures were extracted from these video sequences. They can be viewed at www.univie.ac.at/Tibetan-inscriptions (links > Ladakh > Wanla > bCu gcig zhal khang > Inscr. 01).
40 Assuming that the scribe and the author were not one and the same person. The inscription itself does not provide any evidence in this regard, but it is well known that there is a long tradition of Tibetan authors habitually dictating their works to their disciples. For an instructive modern day account see Midal, Chögyam Trungpa, p. 282.
41 Cf. n. 1.

TRANSLATION

Oṃ svasti siddham.

(1) The *dharmakāya*, (which is) nonconceptual, without fabrication, of clarity indivisible from emptiness, the *sambhoga*(*kāya*), (which is) uncontaminated, of great bliss, radiant, without obstruction, the *nirmāṇakāya*, (which is) of bliss indivisible from emptiness, endowed with the power of compassion – homage to the glorious teachers of the three indivisible bodies.[42]

Oho, excellent!

(5) In the best continent, which is especially exalted, in Jambudvīpa of the south,[43] where the teaching of the Buddha spread, in the country of *spu rgyal*-Tibet[44], specifically: to the north of the King of the Snow, (Mt.) Tise,[45] on the (proper) left side of the thundering Indus river, in a place set aside, at the divine place of brGya shing,[46] even more in detail: on a projecting protrusion, at the vajra-seat[47] of Wanla, resembling a heap of lotus flowers, on the pinnacle of a castle, there resided, like an anther of jewels, a centre surrounded by relatives and near ones, like the heroes of the four families,[48] the sons of a *blon po*,[49] four brothers, with minds in single-pointed concentration (and) in perfect equanimity.

42 The inscription's *sku gsum dbyer med dpal ldan bla ma rnams* can be taken in a number of different ways, e.g., "the glorious teachers, (who are) inseparable from the three bodies" or "the three bodies, (which are) indivisible, glorious, supreme". Because *sku gsum bla ma* is the usual translation for *trikāyaguru* 'the guru of the three *kāya*' (i.e., the guru who is the three *kāya*), I prefer the translation provided above (where the genitive has to be understood in an explicative sense).

43 Referring, of course, to its position to the south of Mt. Meru, the centre of the universe in Buddhist cosmology and thought of as being surrounded by four continents.

44 For *spu rgyal* cf., e.g., Zhang, Bod rgya tshig mdzod chen mo, s.v.: "(*rnying*) *bod yul*", i.e., "(old [for]) the country Tibet". For the alternative spelling *spur rgyal* see *ibid*. and Das, A Tibetan-English Dictionary, s.v., where the term is also explained as "an ancient name of Tibet". Haarh, The Yar-luṅ Dynasty, p. 302, however, is of the opinion that Das "is wrong in principle when defining sPu-rgyal as a name of Tibet". He contends that *spu rgyal* rather "signifies the Ruler of sPu, while the country is sPu-rgyal-Bod" (*ibid*.) and goes on to demonstrate that "sPu", containing "the idea of the Dead" indicates that the ruler "besides being *King of the Tibetans* ... is particularly *distinguished by his origin from, and dominion over, the Realm of the Dead*" (*ibid*.: 325f.). Chab spel Tshe brtan phun tshogs, sPu rgyal zhes pa'i tha snyad la dpyad pa tsam byas pa, an article exclusively devoted to the etymology and meaning of the term, draws on a passage from the *rdo ring* in front of the Lhasa gTsug lag khang as well as on manuscript material from Dunhuang. He argues that the original spelling was *spu rgyal* and that the meaning of the first syllable approximates "*skal ba ldan pa*", "*'os pa*", "*res su babs pa*", or "*skabs su babs pa*" (semantically oscillating between 'fortunate', 'worthy', 'opportune', and 'timely') while *rgyal* is short for *rgyal po* and refers to the ancient kings of Tibet. In this case *spu rgyal bod* would approximately mean "Tibet of the worthy kings". Finally, according to Dung dkar bLo bzang 'phrin las, Dung dkar tshig mdzod chen mo, p. 1272, the term "*pur rgyal bod*" possibly originated as an appellation for the places that had come under the power of Pu de gung rgyal, the son of Gri gum btsan po. As it cannot be decided with certainty which of these explanations is correct, *spu rgyal* is left untranslated here.

45 Or: "to the north of the pre-eminent King of the Snow, (Mt.) Tise"; yet the context as well as the following *yang {s}gos* suggest that *khyad par* has to be understood as being metrically short for *khyad par du* rather than *khyad par gyi*. Tise is already to be found in Dunhuang manuscripts as an appellation for Mt. Kailash. Strictly speaking Wanla is rather situated to the northwest of it.

46 For the variant spelling rGya shing in verse-line 34, see below. During my brief visit to Wanla in August 2002 several local informants stated independently that (b)rGya shing is another name for Wanla and the area surrounding it. The etymological explanations that were offered differed, however. Pending further evidence none of them can be proved or disproved with certainty. The exact meaning of the expression *brgya shing lha'i gnas* thus remains unclear.

47 *rdo rje {g}dan* could refer to an actual seat or throne, but here it rather seems to be used as a eulogistic epithet of Wanla.

48 *dpa' bo* (Skt. *ḍāka*) probably has to be understood as the male form of *mkha' 'gro* (Skt. *ḍākinī*) here, thus alluding to the *mkha' 'gro rigs bzhi*; on the latter cf. Dung dkar Blo bzang 'phrin las, Dung dkar tshig mdzod chen mo, p. 429.

49 Petech, The Kingdom of Ladakh, p. 156, referring to a period much later than the one the Wanla inscription relates to, suggests that "in the case of Ladakh it is utterly improper to translate the term *blon-po* as 'minister', which is its usual meaning in Central Tibet". Following this suggestion, the term is left untranslated here, particularly as its exact meaning is even less clear for the earlier parts of the second millennium.

(15) Because the oldest of the four brothers, *khri dpon*[50] 'Bhag dar skyabs[51], had collected merit in his previous life, he obtained a human body of (the eight) freedoms and (the ten) riches. Because of good karmic conjunctions he was born as the first son of the *blon po*; because of completely pure prayers, he met with the sacred *dharma*.
(19) Because the territory and the fortune grew, the foremost lord(s) and ruler(s) were affectionate (towards him); because he was very prosperous and powerful, he was esteemed by (his) sons, servants and subordinates. In consequence of (his) previous *karma* he was appointed chief of the laity. Because he was skilled in temporal matters, he was sought after near and far, everywhere!
(23) He pegged body, speech and mind, the three, into the direction of the sacred divine *dharma*.[52] He made the noble Avalokiteśvara permanently (his) tutelary deity. *Sūtra* and *tantra*, scriptures and arguments, (oral) instructions and (written) treatises were internalised in his mind. He knew the eclipses of the sun and the moon and so forth, the inner and the outer *kālacakra*.[53] By calculations of the astrological charts of the elements he ascertained all that appears and exists.[54] When the four elements of the entire body of a human being were disturbed, he removed the sufferings of cold and heat by way of medical treatment. Speaking of his qualities of knowledge: He was like an incarnation of Mañjughoṣa.

50 For the meaning of *khri dpon* see below (verse-line 38).
51 The name can be found with a number of different spellings in various secondary sources and the caption below the donor depiction reads *bhag 'dar skyabs* (cf. Fig. 142). These variants notwithstanding, the name seems to be at least partly non-Tibetan, but one cannot draw too many conclusions from this with regard to the ethnic or linguistic characteristics of its bearer or his family. For Ladakh, and especially Lower Ladakh, has been a melting pot of different ethnic groups from very early on and thus the ruler's family may well have belonged to the Tibetan-speaking part of the society for many generations already, still keeping a (partly) non-Tibetan name.
52 On *lha chos* as an appellation for Buddhism (in contradistinction to *bon chos* and *mi chos*) see, e.g., Tucci, Die Religionen Tibets, p. 190 (n. 1a).
53 The explanation of the eclipses of the sun and the moon is part of the outer *kālacakra*.
54 The sentence obviously relates to the preceding reference to the inner and outer *kālacakra*, where the correlation of the elements of the cosmos and the body is strongly emphasised. See now the recent discussion and variant translation of this passage in Schuh and Ajaz Hussain Munshi,Travel into the History of Purig, p. 58-61. A critical appraisal of Schuh's arguments will be provided elsewhere.

143 The donor depiction on the left side wall is clearly divided into a large secular section and a much smaller religious section to the right of it. CL 2009.

144 The ruler Bhagdarskyab and possibly two of his four sons seated on both sides of a three-legged table. The identifying caption is found immediately below the ruler. CL 2009.

145 Servants distributing barley-beer (chang) out of large caldrons represented directly below the ruler. CL 2009.

146 Musicians and servants with two dogs above and servants with two horses below. CL 2009.

(31) (His) devotion to the sacred *dharma* was utterly amazing. In regard to the secular ethics of mankind he was especially excellent. After he had reached (the age of) thirty years in his manhood he acted as the leader of the dominion of his forefathers, Wanla; the whole region of rGya shing, too, (previously) lost to others,[55] was accrued and then he ruled (it) tightly in an excellent way. He subjugated Wa kha(,) mKhar po che[56] and Kan ji[57], Nam su ru[58], En sa[59], A lci, Mang rgyu[60].

55 Or (emending the inscription's *kyang* to *bskyangs*): "he protected the whole region of rGya shing; what had (previously) been lost ..."; "*wan la'i {'}go byas rgya shing lung pa thaṃs cad*" could perhaps also be understood as "the whole region of rGya shing, starting from Wanla".

56 For the geographical position of Wa kha in the immediate vicinity of dNgul 'bigs (Mulbekh) see the map facing page 148 in Francke, Antiquities of Indian Tibet II. mKhar po che ('the great castle') could either refer to the old fortress in Wa kha or to a distinct place of its own. Possible candidates are the present-day village of mKhar bu (situated between Wanla and Wa kha) and the castle of Skardu, which according to Khan, Ladakh in the Mirror of Her Folklore, p. 128, is known as "Khar pho chhe" [sic, K.T.]. Skardu (which now belongs to Pakistan) is not too far away from Wanla and easily accessible (geographically speaking) by following the Indus river downstream. According to Dani, History of Northern Areas of Pakistan, p. 218, however, the castle there (to which he variously refers as "Kharpocha" and "Kharpochu" [ibid.: 18 and 221]) was only founded in the late fifteenth or early sixteenth century.

57 The settlement is nowadays also spelled rKan bzhi and located some fifteen to twenty km to the West of Wanla.

58 The map facing the imprint in Francke, Antiquities of Indian Tibet I, shows the small place of "Namsur" on the eastern side of the Suru river (south of Kargil) right across from the much larger settlement called "Suru". On visiting the place in the summer of 2003, I was shown the site of the former *mkhar* of "Namsur" (then the sign with the place-name read "Namsuru"), which is situated in a part of the village called "Birukhar" (oral information from various local informants). Although there is not much left of the castle, its erstwhile existence points to some previous power, which – in combination with the obvious similarity of the toponyms – leaves little doubt that this is the *nam su ru* of the inscription.

59 The identification of the place is problematic. For a detailed discussion, see Tropper, The Historical Inscription in the Gsum brtsegs Temple at Wanla p. 130ff, n. 240.

60 Mang rgyu is located about 10 km to the west of A lci and like the latter it is also considered to be a foundation of Rin chen bzang po in the local tradition.

(38) On going to the land of Kashmir[61], the authority of a *khri dpon* was conferred (on him).[62] From (the) four northern nomad-clans he collected tax in the form of milk products in great quantities. Wherever the courageous man went, he was victorious in battle. He acted unrivalled with armies (that were) small, large, middle, the three; all those who had acted as his rivals he gradually brought down into an agreement. He overpowered sBal ti[63], 'Brog pa[64] and other little ones.

(44) In mNga' ris bskor gsum, up to Gu ge (and) Pu hrangs, you are famous for accomplishing your wishes![65] Calculating the measure of (his/your) heroic deeds: they have exceeded measurement and counting. Being wise, (he was/you were) not rivalled by others in (his/your) ingenious advice. Afraid of (being reborn in) the three lower realms of existence, (he/you) relied upon the (three) precious gems as a place of refuge.

61 Or "to the land(s) of the muslim(s)" (which probably amounts to the same) unless *kha ce('i)* is some misspelling for another place like Khwa tse/Kha tse.

62 *khri dpon*, as in verse-line 15, most likely has to be understood as a title here. In both cases, however, the meaning of this title is uncertain. It is commonly known as an appellation for the leaders of the thirteen *khri skor* ('district of 10.000') which were created in Tibet during the Yuan period, but this administrative system certainly never included Kashmir. Whether Lower Ladakh was ever part of it is doubtful and different secondary sources seem to contradict each other in this regard, at least partly. On the other hand, the author of the inscription of course could have credited 'Bhag dar skyabs with the title *khri dpon* in order to illustrate the power of this ruler by comparing him to the leaders of the *khri skor bcu gsum* system, thus merely using the term as a means of glorification. In addition, it is by no means impossible that in (Lower) Ladakh the title *khri dpon* was used independently of the *khri skor bcu gsum* system, perhaps even before the latter was created.

63 I.e., Baltistan (cf. Francke, Antiquities of Indian Tibet II, p. 304, and the references listed there), although it is impossible to define its exact demarcations during the time of 'Bhag dar skyabs.

64 Nowadays the people and the area around the Dard settlements of Dha and Hanu are called 'Brog pa in Ladakh and the term already seems to have been in use for this region during Francke's time (cf. Francke, Antiquities of Indian Tibet II, p. 273 and 292). As the area borders on Baltistan it seems most likely that the inscription's *'brog pa* (lit.: 'nomad') also refers to this particular tract of land.

65 This is the only unambiguous case where the chief character of the inscription is addressed in the second person. As the rest of the text does not contain any vocative particles or second person pronouns, there are no other passages which would immediately lend themselves to be understood as a form of (literary) address. In continuation of "... *khyed la grags*" the following three verse-lines can also be taken as a second-person narrative, though.

147 The women represented opposite to the ruler; the first one, probably one of his wives, is receiving a cup of chang. CL 2009.

148 A Buddhist hierarch in front of a ceremonial table and some ritual paraphernalia with a monk kneeling in front of him and offering a cup. This group probably represents the youngest son of Bhagdarskyab in front of a Drigung lama. CL 2009.

149 The religious assembly, too, gets their share of meat and drink, which are distributed separately. Three monks with red hats play long trumpets. CL 2009.

(49) That eminent man, endowed with courage, youth and wisdom, the three, understood that all the eight worldly conditions (Skt. *aṣṭalokadharma*) are without substance. He realised that the sufferings of birth, old age, sickness and death are inconceivable and that *everything* has the nature of dying (and is) impermanent. He considered all (his) accumulated possessions like magical illusions. Thinking of (his) next life, he accomplished a great work[66] in this way: (55) On square Mount Meru,[67] where the elements are heaped up successively,[68] he beautifully decorated with ornaments of many jewels the square divine mansion of a shrine having the mark of a *viśvavajra*.[69] The tip he thoroughly adorned with the top(-ornament) of a wish-fulfilling jewel.[70]

66 The translation of the expression *rgya ma mdzad* is somewhat uncertain, but the meaning of the verse-line is obviously that 'Bhag dar skyabs—with a view to his next life—improved his *karma* by his work on the Wanla temple, which is then described in detail in the following verse-lines. For the meaning of *rgya ma*, cf. Francke, Antiquities of Indian Tibet II, p. 36, 39, 99, 107, 108, and Vitali, The Kingdoms of Gu.ge Pu.hrang, p. 114, 120, 122.

67 This apparently refers to the hill on which the *gsum brtsegs* temple is situated, thus equating the latter with the *gzhal yas khang* of the gods on top of the mythical mountain which forms the centre of the universe.

68 On the conceptions of Mount Meru's layout see, e.g., Brauen, The Mandala, p. 18, 22ff. and 52f.

69 The passage is syntactically and semantically ambiguous, but *sna tshogs rdo rjes mtshan pa* obviously refers to the cruciform outline of the temple's ground floor resembling the form of a double-*vajra*, whereas the temple's inner space that is created in this way has an almost square outline (as has been noted already in Kozicz, The Wanla Temple, p. 128). Thus the temple's layout as well as its delineation in the inscription are evocative of a *maṇḍala*-palace, an analogy which also seems to resonate in verse-line 72 where the temple is referred to as *pho brang* (i.e., 'palace'). What is most conspicuous, however, is that the passage does not clearly state that the temple was *founded* by 'Bhag dar skyabs, thus leaving some room for interpretation as to whether he merely upgraded a previous, less elaborate structure or whether he built the temple from scratch.

70 *yid bzhin nor bu'i tog* again is understood as an explicative genitive (i.e., "the top[-ornament] that is a wish-fulfilling jewel"). Most likely, this refers to the square and lantern-like little structure forming the third floor of the temple.

150 The donor depiction on the right side wall has no religious assembly and several elements of a feast. CL 2009.

(59) The great beings, both right and left,[71] as well as the lintel and the threshold, the offering goddesses,[72] the precious *shar ru* (*shar bu*),[73] the (superstructures of the) portal(s),[74] the *dharmacakra*,[75] the eight auspicious things,[76] the engravings and reliefs, etc., they are like the fabrications of the Nepalese.

(63) (At) the lower stratum he set up an excellent arrangement, assemblies of deities, new and old.[77] The middle storey (is) like a model of the Vaijayanta-palace[78] (and) the top floor is one that is like a model resembling a celestial mansion. The bKra shis gsum {b}rtsegs (i.e., the felicitous three-storied [temple]) of Wanla, oh, it is amazing.

(67) Nobody gets enough of looking at it (and it is) excellent. The supported (elements), the *maṇḍala* of the deities—they are inconceivable, and if one is to name each of them (the names) are beyond measure.

(70) Uppermost[79] reside the images of the bKa' brgyud *bla ma*, headed by Vajradhara (and) up to (the one) being present now. As the main figure of the palace's centre resides the noble Avalokiteśvara (with) thousand arms,[80] the *cakravartin*, the *sambhogakāya*,[81] adorned with precious ornaments and (being) of great blessings.

(75) There are, headed by ...[82], Maitreya(nātha), etc., painted in pictures as supports for body, speech and mind, cast statues and reliefs, etc., all the assemblies of deities of the four great *tantra* sections, and the entire *maṇḍala* of the secret *mantra*, new and old.

(80) Vinaya, Sūtrānta, Abhidharma, Prajñāpāramitā and Mahāyāna... [83] there are, successively, the *thugs dam* of completely pure thoughts. The arrangement of the realm of the thousand Buddha figures[84] ... [85] the subtle details of the twelve ...[86] are amazing.

71 While *g.yas g.yon gnyis* could relate to the temple as a whole, the following *ya them ma them* rather suggests that it refers to the two door-posts, which are embellished by figurative carvings.

72 They are represented several times in the murals of the temple (oral communication Christian Luczanits).

73 It is difficult to decide what is exactly meant by *shar ru/shar bu* here. Zhang, Bod rgya tshig mdzod chen mo, p. 2838, defines the term as (1) a bottle-like decoration to collect and deflect the rainwater of the roof-covering, and (2) a lattice-pendant. While the inside of the temple displays various decorative hangings, it seems very doubtful that they date from the time the inscription refers to, and neither could I discover any ancient water-spouts on the roof. Moreover, according to the Rangjung Yeshe Dictionary, *shar bu* can also have the meaning 'cornice', 'frieze', and if no previously existing appendage to the temple has vanished by now, the inscription's *shar ru* thus perhaps refers to the very distinct cornices protruding from the outside walls above each floor of the temple.

74 In accordance with the definitions provided in the dictionaries, *rta babs* could simply refer to the slightly raised and roofed porch of the temple, which practically amounts to a portal in the true sense of the word. In the light of the above-mentioned allusion to a *maṇḍala*-palace, however, *rta babs* (Skt. *toraṇa*) could also relate to the superstructures of the palace's four portals, the latter thus having their equivalents in the temple's apsis, the two side niches and the porch.

75 Nowadays the Wanla temple does not feature any of the large representations of the *dharmacakra,* as they can be seen on the roofs of most of the big monasteries in Central Tibet. Small depictions may be found among the numerous murals and wood-carvings of the temple.

76 Perhaps erroneously for 'the eight auspicious signs' (*bkra shis rtags brgyad*) which are displayed in the form of wood-carvings on the capitals in the ground floor and on the struts connecting the two beams in the upper front-part of the veranda's roof-construction.

77 Or (reading *zhing* instead of *gzhi*): "Below he set up (Buddha-)fields which are excellent with regard to their arrangement, assemblies of deities, new and old".

78 I.e., the castle of Indra.

79 Obviously referring to thirteen paper-mâché statues on the second floor of the temple, this can be understood in a metaphorical as well as in a local sense.

80 Nowadays the statue has only eight arms, suggesting that the original discoidal appendage which is typically used for the representation of the smaller ancillary arms was removed at some point in time.

81 Especially in the rNying ma tradition Avalokiteśvara is frequently referred to as *sambhogakāya* as part of a triad he forms with Amitābha (*dharmakāya*) and Padmasambhava (*nirmāṇakāya*), cf., e.g., Kunsang, The Lotus-Born, p. 29. According to the well-known concept of the five *jina*-Buddhas, Amitābha is considered as *sambhogakāya* of the *ādi*-Buddha (*dharmakāya*), and Avalokiteśvara as an emanation or spiritual son of the former.

82 Read "the lord of secrets" (i.e., Vajrapāni [a representation of the bodhisattva can be found immediately above the inscription]), "the donor" or "the lord of the teachings"?

83 Perhaps something like "Mahāyāna- as well as Tantrayāna-texts are present;"?

84 Referring to the murals of the Thousand Buddhas (as described in the *Bhadrakalpikasūtra*) on the entrance wall.

85 Read "is most beautiful;"?

86 Read "deeds [of the Buddha]"? According to the information of Christian Luczanits scenes from the life of Buddha Śākyamuni are depicted on a painted band starting to the right of the niche on the temple's southeastern side and ending to the left of the one that extends to the northwest.

151 In the centre of the assembly the ruler sits opposite a haloed monk, possibly the youngest son of Bhagdarskyab. The caption below him is sadly illegible today. CL 2009.

152 In the dance depicted here, males and females are separated but the dancers are closely intertwined. The central couple, where males and females meet, kisses each other. CL 2009.

153 Some non-monastic religious specialists appear to perform a ritual as a form of entertainment. CL 2009.

(85) The incarnation of Viśvakarman,[87] Legs pa blo gros,[88] and the incarnation of Mañjughoṣa, the artisan (b)Sod ...,[89] the divine incarnation {d}Kon {m}chog ldor ba, father and sons, the three, (men) possessing knowledge on the sources of the science of making (images of) deities, they produced—endowed with ...[90] non-distraction—supports for body, speech and mind, without calamities and interruptions, in such a way that the wishes were fulfilled.

(91) Thus this great, excellent virtuous work has been produced for the sake of returning the kindness of both the benevolent father and mother as well as for the sake of friends of karmic connections (and) mental bonds.[91]

(94) And after the beings of the six realms (of existence), because of the virtuous roots of producing this, have quickly ...[92] the realms of the Jinas of the five families, may they attain the realisation of the five kinds of primordial knowledge of the four *kāya*.[93]

(97) As for expounding a little bit the approach of offering (permanent) gifts(?), too: Thirty-seven of the intelligent kings of the four footed animals, (that is) stallions, (all) of the same size,[94] were also given. The extensive (amounts of) gold, silver, silk(,)garments (was/and) a little bit more than that, the yaks, sheep, *mdzo*, etc., ...[95] are inconceivable; the material things, the woollen clothing, etc., it was heaped up like a mountain.

87 I.e., the divine artisan and architect.

88 Or (somewhat less likely because of its tautological character): "the good incarnation of Viśvakarman, Blo gros".

89 Perhaps *lha bzo'* was followed by a name of four syllables (for an example of the spelling *sod nam* instead of *bsod nams* cf. Denwood, Temple and rock inscriptions of Alchi, p. 142) and *gnyis*, although the latter would stylistically be a little awkward in view of the following *gsuṃ*. While names of five syllables are rather uncommon, *sod* could refer to the chieftainship of that name in Pu-rig (cf. Francke, Antiquities of Indian Tibet II, p. 306), thus designating the origins of the bearer of a following quadrosyllabic name (e.g., Pad ma bkra shis of Sod).

90 Read "firm"?

91 Or: "... friends attached to the attitude connected with the work".

92 Read "gone to" or "done the rounds of"?

93 Four bodies of the Buddha are known in tantric Buddhism, where the last and highest one is usually called *svabhāvikakāya/ngo bo nyid kyi sku* but also comes under other names (cf., e.g., Wilkens, Die drei Körper des Buddha, p. 22 (n. 107) and 23, as well as the literature cited there).

94 Lit. "without (there being any) high (and) low (with regard to their) size" or "without (there being any) big, small, high (and) low".

95 Read "the small and little things"?

(103) To the superior *dge bshes* he successively offered (permanent) gifts(?). He removed the worldly poverty of those possessing the knowledge of making (images of) deities. To the composer of praise[96] he gave, as a gift, a horse. Friends and attendants who were genuine and attached he put on the path to liberation.

(107) He turned the feelings of the region's people, near ...[97] towards the *dharma*. He organised felicitous banquets for his visiting allies. He removed the sufferings of hunger and thirst of those not in a position for sensual enjoyments. He was famous throughout ... (for his) approach of unlocking (his) material wealth. (His) giving for the noble *dharma* was utterly amazing.

(112) (His) four sons resembling the small children of a god, too, successively erected (a) temple(s) in order to repay the kindness of (their) father. At the *spur khang*[98] in ... sTag lung ...[99], too, a *stūpa* was erected, and then eternal worship was established (there).[100]

96 Possibly referring to the author of the inscription.

97 Read: "and far,"?

98 As Brauen, Death Customs in Ladakh, p. 324, explains, in Ladakh *spur khang* has the particular meaning of "funeral hut", designating the little structure in which a deceased person is cremated.

99 Verse-line 114 begins with *nyo*, followed by two damaged *akṣara* and *stag lung*; the latter, in turn, is followed by two damaged *akṣara* and *du*. While sTag lung is a fairly frequent toponym, there is no place of that name near Wanla. Moreover, there are hardly any place-names in Ladakh that begin with Nyo and the few regular Tibetan words starting with these letters do not seem to make much sense here either. Remarkably, however, there are two sites named Nyoma and Staglung, which are situated to the north of mTsho mo ri ri and presently within the restricted area close to the Chinese border. They are described at some length in Francke, Antiquities of Indian Tibet I, p. 56–58 and 60, who reports of "ancient *mchod-rten*" in both places and attributes the ones in Nyoma to the times before Seng ge rnam rgyal ("*c.* 1590–1635 A.D." according to Francke, Antiquities of Indian Tibet II, p. 108). Moreover, he found "cremation tablets of clay, painted red" in two of the larger *mchod rten* in Staglung. Apart from this, very little is known about the early history of the area and it remains doubtful whether it is in any way connected with the partly damaged passage of the inscription. If *spur khang* refers to the "funeral hut" of 'Bhag dar skyabs, it would certainly mean that after going to Kashmir and being appointed *khri dpon* there (cf. verse-line 38) he would have had to return to Ladakh, implying that the narration of the inscription might more or less follow a chronological order. Of course, this would also beg for the question why the *spur khang* was not in Wanla then.

100 The meaning of *mchod pa'i ma shi bstugs* (here translated as "eternal worship was established") is uncertain. For other possible interpretations of this phrase, see Tropper, The historical inscription in the gSum brtsegs temple at Wanla, p. 142, n. 294.

154 Riders that already have passed the target are shooting back at it, thus performing the "Parthian shot". CL 2009.

155 Richly jewelled and interlocked female dancers with white capes and youths at the right end of the row dance. CL 2009.

156 Actors or acrobats disguised as a lion, a monkey and a horse; note the boots. CL 2009.

157 "This divine mansion furnished with support and supported (elements) (is of?) great blessings, because of the truth of the *triratna*" (verse-lines 125f). CL 2009.

(116) The older brother, A li dar skya{bs?}, knew the five branches of science; for the sake of (his) younger brother(s) he erected the temple bKra shis mthong sman.[101] O... dar and 'O{d} zer 'bum, the two, were excellent with regard to their manly prowess. The youngest, {Sha} kya rgyal {m}tshan, after the arrival at/of (the) 'Bri gung,[102] touched the lotus feet of the *dharma*-master(s) and then he requested religious instructions in great numbers.

(121) The one(s) called incarnation(s) of On cong,[103] desired by all because of being endowed with wisdom and virtues, Kha tun(,) (and) sBrong mo, the two,[104] they turned—(in their) successive service (for) the temple—the food (offerings) into nectar; ... which were successively given ...[105] were excellent.

(125) This divine mansion furnished with support and supported (elements) ...[106] great blessings, because of the truth of the *triratna*. After it has brought benefit to the living beings while the teachings of Śākya(muni) continue to exist, may it bring benefit to the living beings during the time of the teachings of Maitreya, too.

(129) Although I, Byang chub bzang po, monk of Śākya(muni), did not know to combine the words because of the shortcoming of (my) low education, it will not be realised by foolish people. The ordinary ones will see it, but it is not proper (for them) to criticise (it/me). If the omniscient ones are disgusted (with it/me), I ask that (they) tolerate the mistakes. *maṅgalaṃ ... . ōṃ aḥ huṃ.*

101 There is a monastery named bKra shis mthong smon in sMe ru (to the north of rGya) but according to 'Jam dbyangs rgyal mtshan, dGon rabs kun gsal nyi snang, p. 185, it was founded around 1620 by Bla ma sTag tshang ngag dbang rgya mtsho.

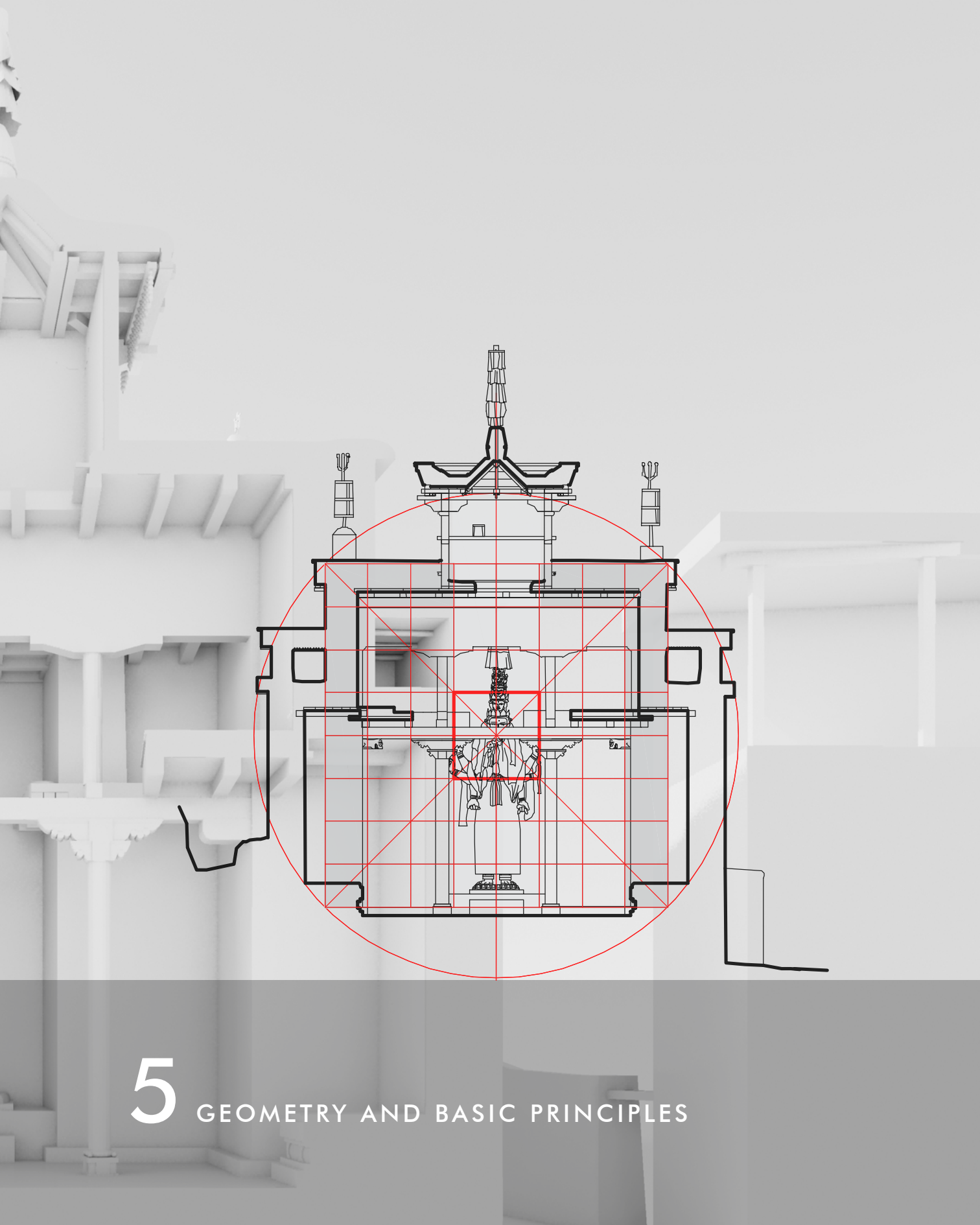
102 *'bri gung* can be understood either in a locative sense (i.e., metrically short for *'bri gung la*) or as having the same meaning as *'bri gung pa* (*rnams*). According to a passage in the *La dwags rgyal rabs* (cf. Francke, Antiquities of Indian Tibet II, p. 36, the practice of novices *from* Ladakh going to dBus and gTsang (*rab tu byung ba dbus gtsang du 'gro ba'i srol*) was introduced during the times of Lha chen dNgos grub ("*c.* 1290–1320" according to Francke, Ibid., 98). In either case, the passage suggests that the youngest son had become a monk.

103 Wencheng? The Chinese wife of king Srong btsan sgam po is venerated all over the Tibetan cultural realm because of her virtues and erudition. That she was particularly well-known and esteemed in Ladakh may be gathered from the popular tale summarised in Francke, Antiquities of Indian Tibet I, p. 103, according to which Srong btsan sgam po sent a certain Rig pa can from Shargola (Lower Ladakh) to China to bring his queen *in spe* to Lhasa.

104 The grammatical structure of verse-lines 122 and 123 is somewhat uncertain. Perhaps the most natural interpretation is to take Kha tun and sBrong mo as the names of 'Bhag dar skyabs' two wives and what precedes as qualifying either the first one (i.e., Kha tun) or both of them; *kha tun* (Urdū 'lady', 'queen') is included in the list of "[b]orrowed Urdū (or Persian) words" provided in Francke, Antiquities of Indian Tibet II, p. 145f., and much like the Latin *regina* it appears to have been used as a proper name as well. In the history of Ladakh the (foreign) wives of several kings are called Kha tun (cf. Ibid., p. 295, and the places cited there). Assuming that one of 'Bhag dar skyabs' wives was from Kashmir and the other one from Ladakh could also explain the fact that some of their offspring had purely Tibetan names, while the oldest son was called A li.

105 I am unable to determine the meaning of the partly damaged passage with any degree of certainty.

106 Read "is of"?



5 GEOMETRY AND BASIC PRINCIPLES

158 Representation of the cosmos according to the Abidharmakosa literature. © Ethnographic Museum at the University of Zurich. Inv.-Nr. 13560. Photo: Peter Nebel / Brauen 1992: 35.

5 GEOMETRY AND BASIC PRINCIPLES

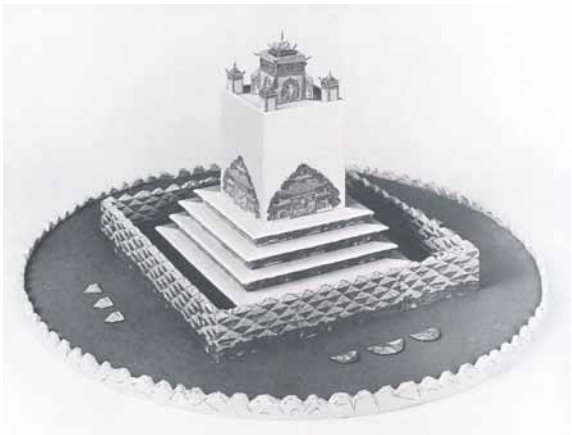
Carmen Auer

INTRODUCTION

Similar to other cultures and religions, the Buddhist architecture of the Western Himalayas represents a synthesis of philosophical and religious ideas. Aesthetic and artistic principles of a much older building tradition, are put into building practice within given local conditions. Relations between man, landscape, and nature and their place in the universe form the basis of the Buddhist cosmology. It plays a decisive role in architecture, especially in sacred architecture. Cosmic references are most striking in Tibetan Buddhism, particularly the importance of mandalas and chorten (Tib.: *mchod rten*). Known as the "mirror of ideas", the mandala presumes that there are close ties between cosmos and mankind.[107] It derives its symbolic wealth from the religious cosmology of esoteric Buddhism (Tib.: *vajrayāna*), which, according to Tibetan historical tradition, established that ideas during the 8th century in Tibet.[108]

From the 10th century onwards, when the West Tibetan Kingdom of Guge and Purang was established, the region in question played a central part in the dissemination of Buddhism from India to Tibet. The monasteries in the Western Himalayas are important centres of teachings and translations of Buddhist texts from Sanskrit and other Indian languages to Tibetan as well as being a crystallization point of artistic expression. Therefore the foundations were laid for the development of the specific form of Tibetan Buddhism.

The three storied temple of Wanla is an early expression of that fully fledged form of specific Tibetan Buddhism. The Wanla inscription not only tells us about the historical context, but also about its symbolic references to Buddhist cosmology at the time it was built. In that respect, the temple is comparable to the palace on the world mountain Meru. Bearing in mind the cosmic references, it would make sense to include the idea of the mandala into the geometric concept of the temple and to examine those connections more closely in respect to the Wanla temple.



159 Model of the Mount Meru showing the 12 continents assigned to the four cardinal directions.
© Ethnographic Museum at the University of Zurich. Model: Urs Wohlgemuth; Photo: Peter Nebel / Brauen 1992: 20.

107 See BRAUEN 1992: 21.
108 See EVANS-WENTZ 1954: 25.

COSMOS AND MANDALA

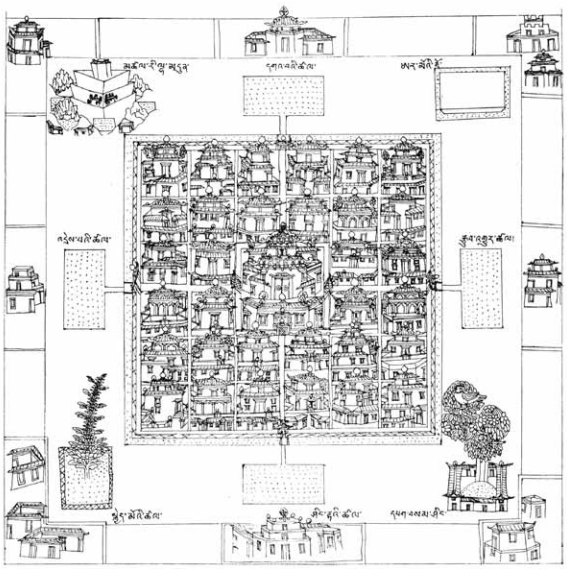
The religious idea of the cosmos and the mandala is expressed in many different ways as well in architecture as in painting. The main question for architects is, how those ideas were transformed and realised in the geometry of the temple. Therefore it is necessary knowing more about the basic principles of the Buddhist cosmology, the meaning of the mandala, and the geometric concepts in Indian architecture.

COSMOLOGY OF THE WORLD MOUNTAIN

The idea that a mountain is the cosmic centre and interface of all realms of existence – heaven, earth, and underworld – is reflected in the cosmographic models of many early civilizations. The origins of a central axis, called the axis mundi, that connects the heaven and the underworld, can be traced back to the Sumerian Civilization. Here it was first found in the form of the Assyrian-Babylonian Ziggurat. In the cosmography of Buddhists, Jains, Bonpos, and Hindus the cosmology in question becomes manifest in the idea of the world mountain Meru which was shaped and described in great detail.

Different Buddhist traditions formulated various ideas of the cosmology of Mount Meru. According to the description found in the *Abidharmakośa*, an early text written by Vasubandhu in the 4th or 5th century, the Universe encompasses an infinite number of world or cosmic systems.[109] Each cosmos consists of a cylindrical base on the surface of which the earth is located (Fig. 162). In the centre of that surface, a square mountain develops, Mount Meru, which has terraces on all four sides. On the quadratic square of the mountain top there is a city with a palace of the chief of the 33 main gods in the centre. (Fig. 158).

109 See BRAUEN 1992: 18.

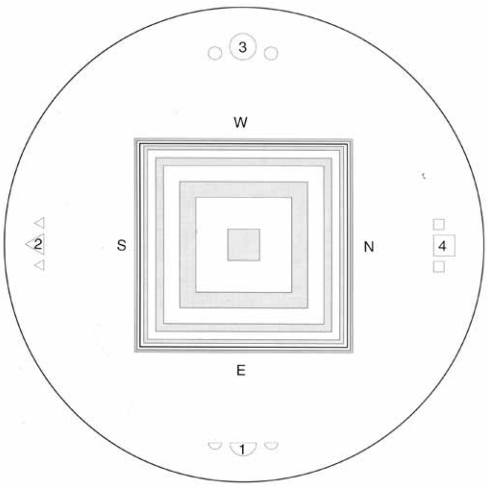


160 Organisation of the square surface on the summit of Mount Meru according to Tibetan Bonpo tradition. The central urban complex with the residences of the 32 deities surrounding the chief deity's centre palace is based on a square grid of 6x6 squares. The main axes and diagonals are emphasized by gates and buildings. Snellgrove 1967/Brauen 1992:19.

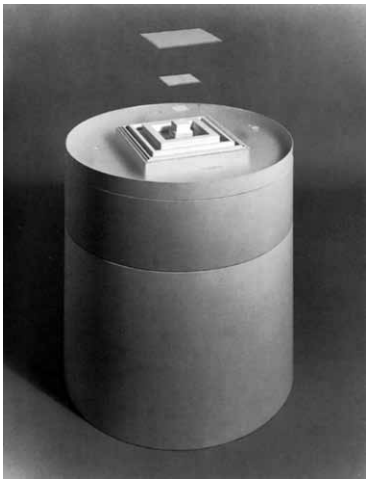
Seven golden ramparts surround the mountain between which there are large lakes known as the Inner Ocean. Behind the outermost rampart a vast stretch of salt water covers the earth – the Big Outer Sea. Here lie the 12 continents, three in each of the four cardinal directions. The world of men lies in the southern continent. The outer edge of the cosmos is enclosed by an eighth mountain rampart.[110] According to the ideas outlined in the *Abidharmakośa*, the mountain as the seat of the gods was established on a square base. The square was therefore regarded as the basic shape of sacral architecture in Indian tradition (see page 133).[111]

The second Tibetan–Buddhist conception of the cosmos dates back to the 11th century tradition of the *Kālacakra Tantra*. Formally, both ideas are based on concentric, axial, and symmetric structures with Mount Meru at the centre. However, the cosmologic idea of the *Kālacakra* differs from that of the *Abhidharmakośa*. Accordingly, that cosmic world system comprises four round discs corresponding to the four elements air, fire, water, and earth. The base of the great world mountain Meru would then be round instead of square. The mountain itself resembles a tapered cylinder surrounded by seven concentric mountain chains, six mountain ramparts and six oceans. The orbits of twelve celestial currents and their stars, which form a kind of umbrella, circulate around the mountain. Above Mount Meru lie the 24 heavens of the Kālacakra Universe, which are head-shaped, emphasizing once again the special relationship between universe, deity and mankind.[112]

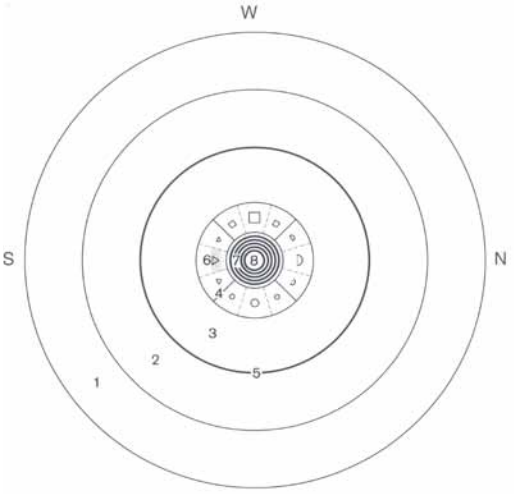
110 See BRAUEN 1992: 18-20.
111 See KRAMRISCH 1946: 42.
112 See BRAUEN 1992: 22.



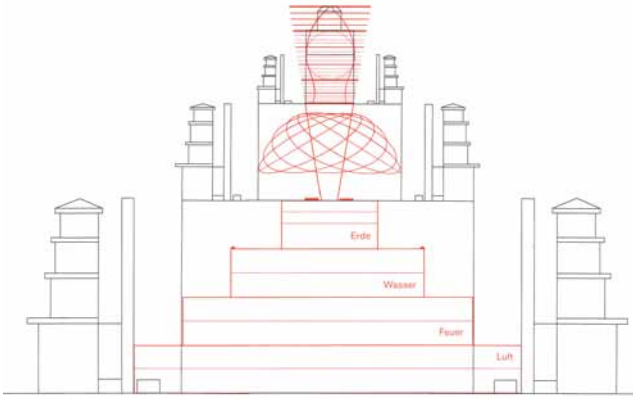
161 Plan view of the cosmos according to Abidharmakośa. The twelve continents are assigned to the cardinal directions: 1. eastern continents; 2: southern continents; 3: western continents; 4: northern continents. © Ethnographic Museum at the University of Zurich. Drawing: Peter Nebel / Brauen 1992: 19.



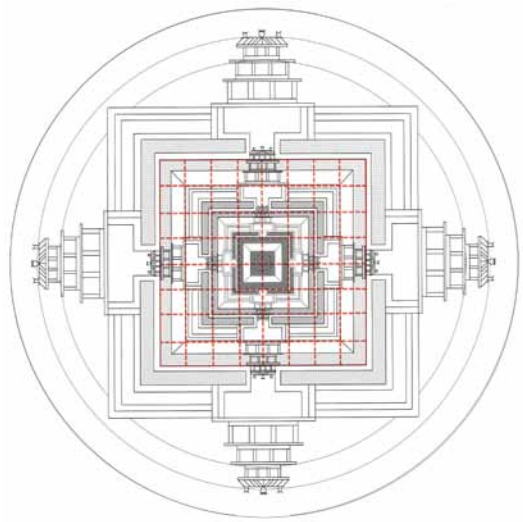
162 .Scale model of a cosmos according to Abidharmakośa; the rectangular discs above the summit of Mount Meru represent the two lowest of the 25 heavens above the world mountain. © Ethnographic Museum at the University of Zurich. Model: Peter Nebel / Brauen 1992: 18.



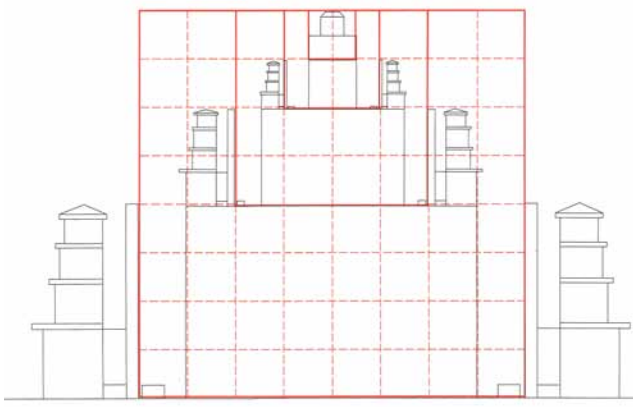
163 Plan view of the Kālacakra cosmos with the discs of air (1), fire (2), water (3) and earth (4), the mountain of fire (5), the southern continent Jambudvipa with its seven mountain chains (6), six mountain ramparts and six oceans (7) and the base of Mount Meru (8). © Ethnographic Museum at the University of Zurich. Drawing: Peter Nebel / Brauen 1992: 22.



164 Structural representation of the palace mandala with the Kālacakra cosmos. © Ethnographic Museum at the University of Zurich. Drawing: Andreas Brodbeck, Peter Nebel / Brauen 1992: 53.



165 The rectangular linear network of 8x8 grid squares superimposed on a floor plan of a Kālacakra mandala palace. © Ethnographic Museum at the University of Zurich. Drawing: Andreas Brodbeck / Brauen 1992: 75.



166 Grid of 8x8 squares superimposed on an elevation of a Kālacakra mandala palace. © Ethnographic Museum at the University of Zurich. Drawing: Andreas Brodbeck / Brauen 1992: 74.

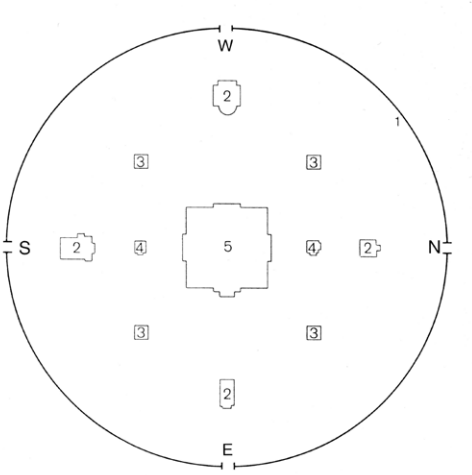
THE CONNECTION BETWEEN COSMOS AND MANDALA

According to traditional etymology, the meaning of the term mandala is derived from "capture" (Skr.: *la*) and "essence" (Skr.: *maṇḍa*).[113] It basically describes a symmetric diagram with a central focus that consists of concentric circles and squares as well as other shapes like simple circles or discs, such as the four element discs of the lower part of the Kālacakra Universe. Under certain circumstances, the term mandala can be associated with the cosmos itself.[114] In esoteric Buddhism, mandala is derived from the term meeting (Skr.: *milana*). The Tibetan word for mandala, which is "kyilkhor", is understood as being a central point (Tib.: *dkyil*) and its surroundings (Tib.: *'khor*) meaning the chief deity resides in the centre surrounded by secondary deities.[115]

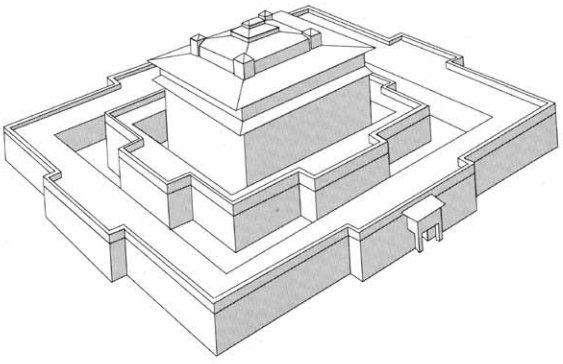
In the same way, the palace on the summit of Mount Meru, the home of the gods who were themselves part of a clearly defined hierarchy, is described as being a mandala. The structural concept of the palace mandala is part of the Kālacakra cosmos. The rings surrounding the palace, which are discs upon which the universe rests, are integral parts of the Kālacakra mandala (Fig. 164). Moreover, the geometric structure of the Kālacakra mandala (Fig. 165/Fig. 166) is directly linked to the basic principles of Indian religious architecture *vāstupuruṣamaṇḍala* (see page 135), which is organised as an square grid. It is a remarkable fact that the ancient Indian rituals for drawing plans based on a tantric Buddhist mandala – starting with rope lines to mark the outlines of the mandala – are still used today.[116]

113 See LUCZANITS 2006: 71.
114 See BRAUEN 1992: 10-12.
115 See LUCZANITS 2006: 71.
116 See BRAUEN 1992: 73.

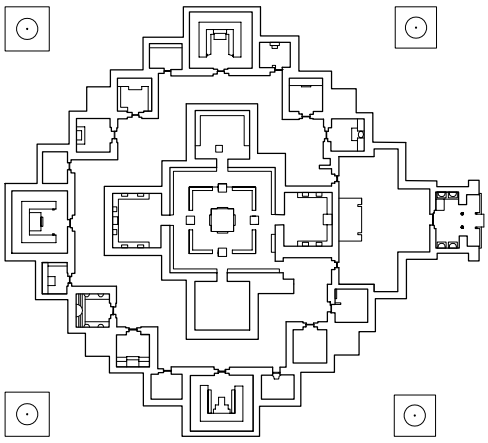
167 The palace mandala at the western wall of the temple in Kanji. The religiou hierarchy of the figures decreases from the centre outwards. The square corresponds to the floor plan of the palace. The doors are aligned with the main axes. Behind the doors, one can see the crossed vajra (viśvavajra), which forms the diamond foundations of the palace. The palace is surrounded by a protective circle. TU Graz 2010.



168 The site plan of the temple in Samye shows that the main parts of the complex stand in clear association with the cosmic principle of Mount Meru. © Ethnographic Museum at the University of Zurich. Drawing: Peter Nebel / Brauen 1992: 31.



169 Reconstruction of the 8th century main temple in Samye in Central Tibet. © Ethnographic Museum at the University of Zurich. Drawing: Andreas Brodbeck / Brauen 1992: 31.



170 Floor plan of the 11th century mandala temple in Tholing based on the assessments from 2007. TU Graz 2008.

171 The mandala temple in Tholing prior to its restoration. CL 1993.

COSMOLOGICAL IDEAS IN BUDDHIST TEMPLE CONSTRUCTION

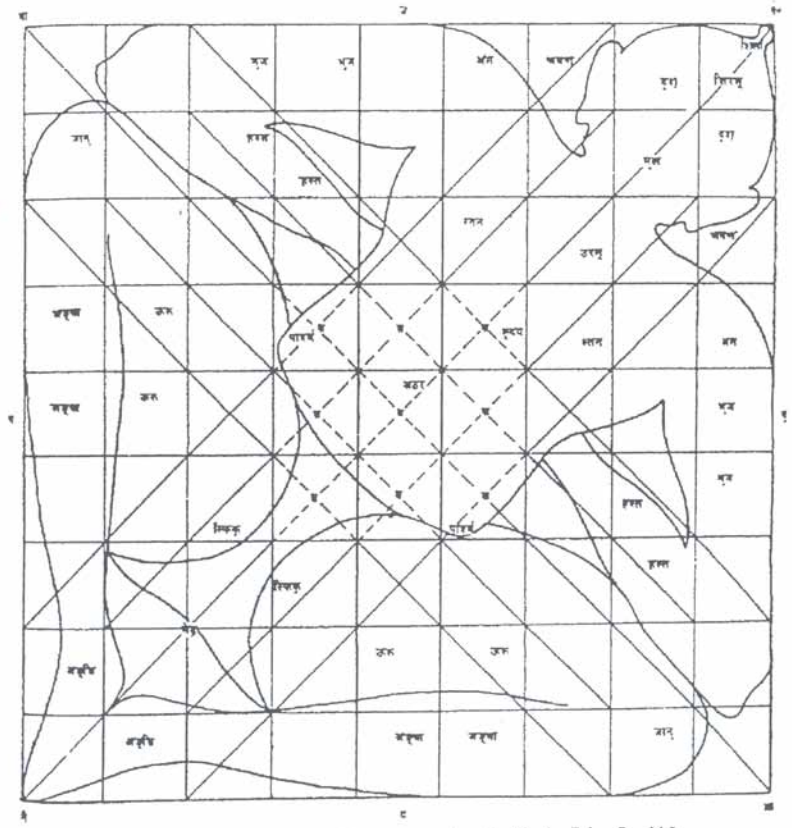
Eliade had already stated that the sacralisation of an unknown area was always understood as a cosmic consecration: "Whoever administers order to space, repeats the exemplary deeds of the gods".[117] Geometry, which a territory defined by lines, is a sacred surface. It is the mystical reflection of the world itself and a projection of its cosmic powers.[118] The temple which represents the heavenly palace and seat of the gods on the summit of Mount Meru symbolizes the centre, the axis and the hub of the universe. According to Eliade, the architectural symbolism of the "Centre" can be interpreted in the following ways: a) the Holy Mount – where heavens and earth meet – lies at the Centre of the world, b) every temple or palace and, subsequently, every Holy City or royal residence – is a "Holy Mount" and thus becomes the centre point and c) the Holy City or the Holy Temple being the "axis mundi" is subsequently regarded as the meeting point of heaven, earth, and the underworld.[119]

Additionally, the temple site is transformed into consecrated space. By aligning the temple or sanctuary with the direction of the solar orbit, the believer attains close personal relations to the cosmos.[120] If the buildings are multi-stored, they then symbolise the idea of the wandering spirit which is completely at one with the absolute from top to bottom. In this way, each complex corresponds to cosmic principles on all levels and reflects them outwardly. According to Tucci, temple buildings received the classical "five-fold disposition" with a centre and four doors as cardinal points representing the way in which Indians perceive the order of the visible world. A six-fold division would be achieved by adding a top part above the centre and ten-fold divisions could be created by adding the four intermediate directions to the cardinal points.[121]

Monastic complexes in Tibet are modelled on mandalas in accordance with cosmological concepts. The early Tibetan temples of Samye and Tholing are especially well-defined examples of such architectural symbolism. The 8th century complex of Samye (Fig. 168) displays architectural forms clearly corresponding to the cosmic system of the *Abhidharmakośa*. The surrounding outer wall of the temple symbolizes the ring of the "Iron Mountain" which encloses each universal system (1). The four temples aligned with the cardinal directions (2) represent the four continents of the universal system. The four stupas (3) emphasize the main diagonals; two smaller buildings along the north-south axis symbolize sun and moon (4). The central temple (5) on its square base symbolizes the world mountain Meru, the seat of the gods. [122]

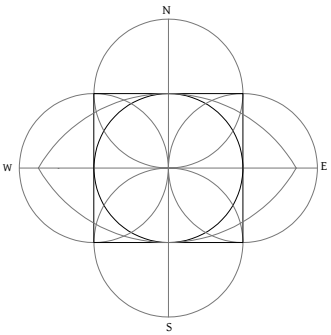
The temple of Tholing (Fig. 170) represents a complex model of the mandala from the 11th century. Some 17 hierarchically structured side-chapels grouped around the central square of the main chamber with its four chapels are accessible via an open entrance area and the veranda in the east as well as an open circumambulation. The cardinal directions are also clearly visible here; the diagonals are emphasized by towers and outer stupas. Although the geometric principles are symbolized in a different way, its development on the basis of circular and square shapes bears witness to the ideal plan with respect to the organisation and proportion of early Buddhist temple buildings.

117 ELIADE 1998: 33.
118 See TUCCI 1949: 28-29.
119 See ELIADE 1994: 25.
120 See GERNER 1987: 55.
121 See TUCCI 1972: 46-48.
122 See BRAUEN 1992: 31.

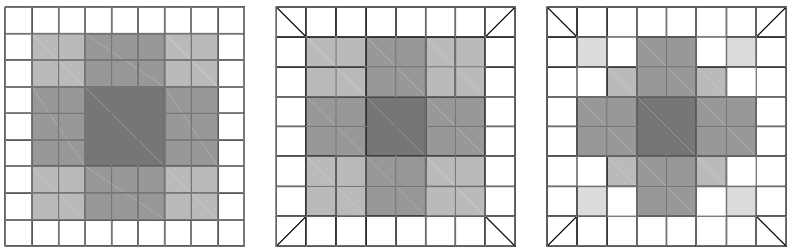


172 The vāstupuruṣamaṇḍala as described in Varāhamihira's Bṛhatsaṃhitā consists of 81 square parts. Meister 2003: 265.

The puruṣa or personified cosmos is the superhuman entity which manifests itself as an illusion (vastu) when sacrificed. The puruṣa is pressed into a square form and is held in place by gods lying on its body. According to Indian tradition, the vāstupuruṣamaṇḍala represents the form in which order as opposed to chaos exists.



173 The geometric construction of an altar and its cardinal directions as described in early scriptures according to Kramrisch.



174 Stella Kramrisch also deals with the subject of how the vāstupuruṣamaṇḍala was developed on the two principles, the maṇḍūka (8 x 8) and the paramaśāyika (9 x 9). The centre is always occupied by Brahmā, who is surrounded by 44 deities. The assignment of the gods to the squares may vary according to description, although the principle that the zone hierarchy decreases from the centre outwards remains largely unchanged. See Kramrisch 1946: 86-88.

THE PRINCIPLES OF INDIAN ARCHITECTURE

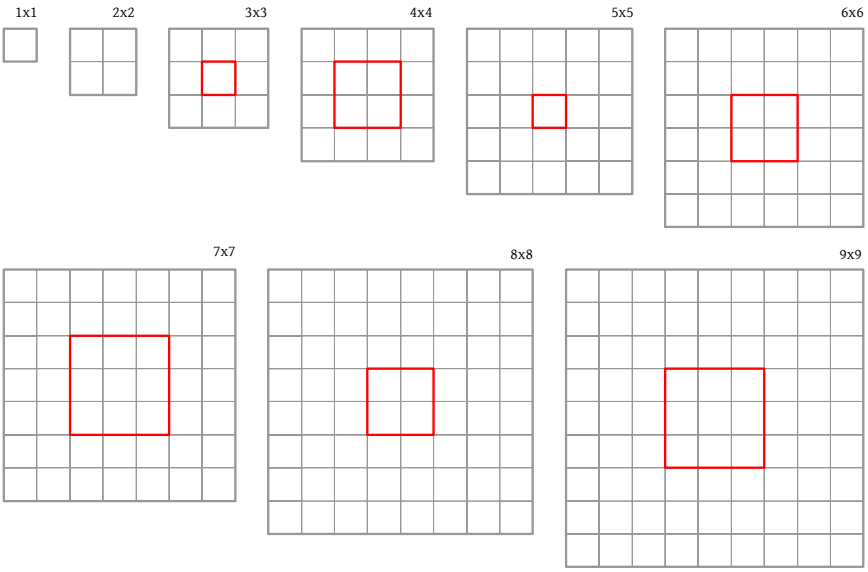
At the beginning of the 20th century, the study of traditional Indian texts on architecture widely known as *Vāstuśāstra* (vāstu in Sanskrit means scripture, instructions, or teachings) or *Śilpaśāstra* (śilpa means all handicrafts) provided access to sources which allow an initial analysis of documented buildings.
They are collections of instructions dealing with the formal translation of religious ideas into a three-dimensional form. The general idea that many Indian buildings and complexes were arranged like a mystical diagram (yantra) or mandala has been well documented.[123] Stella Kramrisch, who in 1946 presented her publication "The Hindu Temple", which was refferd to various manuscripts relating to the planning principles of Indian temples, explains the geometric configuration of the vāstupuruṣamaṇḍala as being an image of cosmic law and metaphysical plans (Fig. 172).

According to Kramrisch, the basic plan is derived from the Vedic rites of sacrifice in which a round altar symbolizes the earth and a square altar the heavenly realms. Whilst the circle stands for movement and cyclic time, the square represents the final, definite form, which in Hinduism equals the absolute. If the world is seen as a physical entity, it is depicted as a circle; but if regarded as a manifestation of the supreme principle, of Brahman, it is a square fixed by the cardinal points. Early texts such as the *Śulvasūtra* describe the construction of the square and the main axes for the creation of an altar. The geometric configuration is determined by the intersection points of circles which are drawn by using a rope rotating around a pole (Fig. 173).

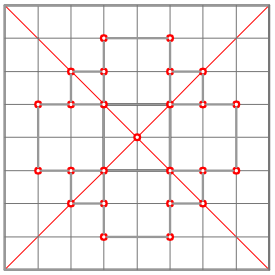
The basic shapes of the mandala are the circle and the square. They provide the geometric basis for all structures.[124] The earliest available description of vāstupuruṣamaṇḍala has survived in the *Bṛhat-Saṃhitā* of Varāhamihira. Referring to different text sources, Kramrisch defines two main types of the vāstupuruṣamaṇḍala: the maṇḍūka which consists of 64 square parts and the paramaśāyika which consists of 81 square parts including their respective different configurations (Fig. 174). The use of the mandala in the Bṛhatsaṃhitā principally distinguishes between the field of residential and urban building and the field of temple architecture. Whilst a grid of 9 x 9 squares is used for housing and urban complexes, a grid of 8 x 8 squares is recommended exclusively for temple buildings. Later texts allow the use of other grids for temple construction. For example, Utpala, a 10th century commentator of the *Bṛhatsaṃhitā*, describes the use of circles, polygons and triangles as basic shapes as well as their function in architecture. This clearly demonstrates that although the central significance of the square was never questioned various forms of the square were integrated into geometrically related shapes.[125]

123 See BAFNA 2000: 26.
124 See KRAMRISCH 1946: 22.
125 See KRAMRISCH 1946; 46-50, 62.

175 Example of an arithmetical progression of the padavinyas scheme as described in the scriptures of the South Indian Draviḍa school. TU Graz 2008.

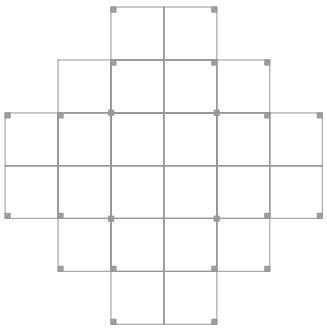


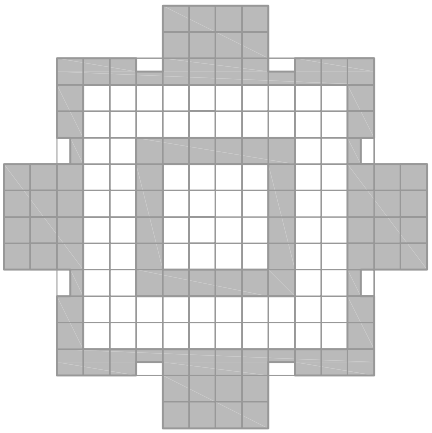
176 Points of intersection of the structure shown on an 8x8 grid. TU Graz 2008.



177 Variants of this rectangular structure are standardised in many Indian texts. Examples from the book "*The Hindu Temple*" by Stella Kramrisch show how temple floor plans are grid-generated by determining the positions of supports or wall zones; Left: Prasada Nandihosa. See Kramrisch 1946: 252.

178 Right: Prasada Ksitihusana. See Kramrisch1946: 251.



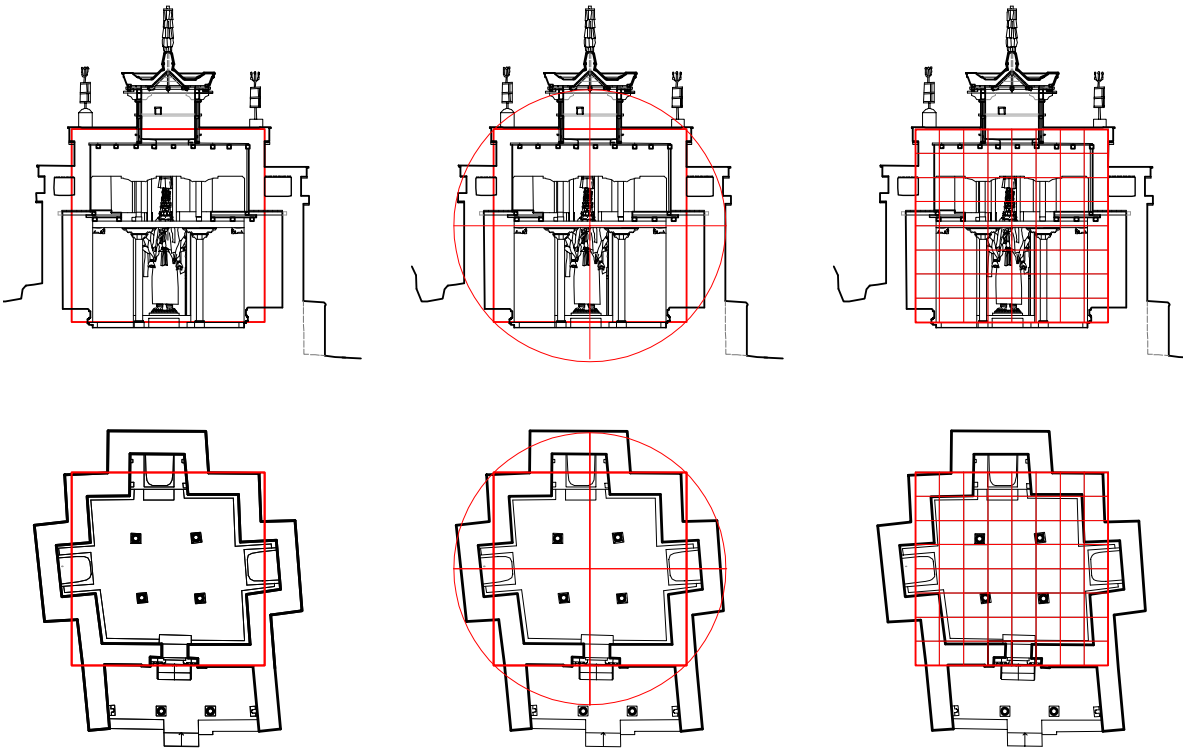


A complex geometric system that shows the possible variations of the vāstupuruṣamaṇḍala as a planning basis can be found in early manuscripts of the South Indian Draviḍa-School, the *Mayamata* and the *Mānasāra*. They describe and name 32 ways of structuring the square. The system is known as the padavinyas-scheme, pada meaning the basic measurement and thus the basic unit of the square, and vinyas meaning "arrangement" or "distribution" (Fig. 175).[126] The simplest of squares exists in one field or pada, whilst all others result from the multiplication of that square up to 1024 partial squares, which would correspond to a grid of 32 x 32 squares. In addition to their respective community of gods, certain other functions are attributed to each square grid, ranging from the single building and the temple complex to urban planning for which, however, the instructions always remain somewhat abstract and schematic.[127]

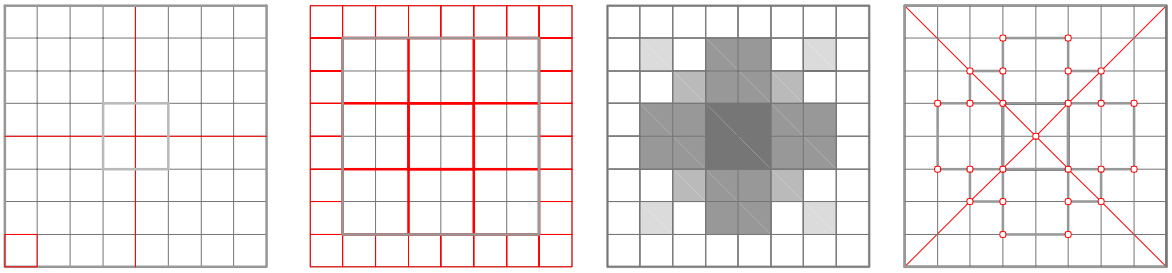
The inner lines of the outer square created by multiplication or repetition provide important conclusions about relations between the structure and the building which are related to cosmographic ideas. The intersection of both the grid lines and the main diagonals are to be regarded in spatial terms; they are the vital nodes of the mandala. The nodes located around the central square (Brahmā) are of special importance; the further away the nodes lie from the centre point, the less sensitive they become (Fig. 176). These instructions demonstrate that the padavinyas-scheme harmonizes with the idea of the vāstupuruṣamaṇḍala in its significance as a ritual form.[128]

Although many written sources define certain rules for dealing with square structures, including ritual instructions and additional specific measures like orientation, proportion, and execution, they often remain contradictory. Accordingly, Michael Meister regards the vāstupuruṣamaṇḍala as being a tool for architectural practice in addition to its ritual character. His research examines the use of the mandala in relation to planning, organisation, and the proportion of Indian temple buildings.[129] In his opinion, buildings are more likely to provide comparable information than texts because they visibly document the manifold and complex use of the mandala. He emphasizes the necessity of documentation of accurate measurements is important to enable analysis of the significance of the vāstupuruṣamaṇḍala in the planning of buildings and to draw scientific conclusions thereof.[130]
Similar to the European tradition of the Stonemasons' Lodge, different interpretations seem to have developed. The use of a schematic general plan, i.e. a structural scheme to generate the entire complex, floor plans, sections, and individual details would correspond to the idea that the cosmic powers and regularities should be visualized. We can conclude that references to the Indian idea of vāstupuruṣamaṇḍala are realised in building structures established upon a visible square grid. The question as to whether this idea was realised in context with regional and cultural characteristics can only be addressed by explicit analyses using near to exact surveys of each building.

126 See BAFNA 2000: 28.
127 See KRAMRISCH 1946: 58-61.
128 See KRAMRISCH 1946: 51-53.
129 See MEISTER 1979: 204.
130 See MEISTER 2003: 251-263.



179 Geometric analysis of the plan assessment shown as a section and floor plan with the main cube, axes and grid. TU Graz 2008.



180 The idea of using a grid system as an order principle for construction purposes can be traced back to the Indian vāstupuruṣamaṇḍal (see page 133). The 8x8 grid of 64 squares possesses several compact blocks of four grouped around the central block, each of which are assigned to the four cardinal directions, as well as having an accentuated diagonal position. The outer zone of the grid marks the wall thickness of the temple. The node points of the lines are seen as points of power which are not supposed to be built upon. TU Graz 2008.

THE GEOMETRY OF THE TEMPLE IN WANLA

As already mentioned, the temple inscription of Wanla provides valuable information about the geometric order according to which the temple was built (see also page 35).[131] In some text passage, clear references are made to the cosmology and symbolic order with which the temple had to comply. In verse 55, a definite reference is made to "the square mountain Meru" including a description of the divine palace of the gods bearing the attribute of a viśvavajra, a crossed thunderbolt. The cosmic version of viśvavajra corresponds to the diamond foundations of the palace of the gods on Mount Meru (Fig. 167). The term vajra means both thunderbolt and diamond and symbolically stands for the eternal gnosis and invulnerability of the divine essence.[132] In verse 63, the intermediate storey is described as being a model of the palace of Indra. In Indian tradition, Indra is the "King of the gods" who resides in his palace on the summit of Mount Meru. Equally, the uppermost storey is described as being a heavenly dwelling. Hence, the "three storied temple of Wanla" as it is named in the inscription does in many ways correspond to the cosmic conception of Mount Meru (see page 126). The following analysis, which only enables the compiled plan documentation, describes how the implementation of that idea is reflected in the geometry and proportions of the building.

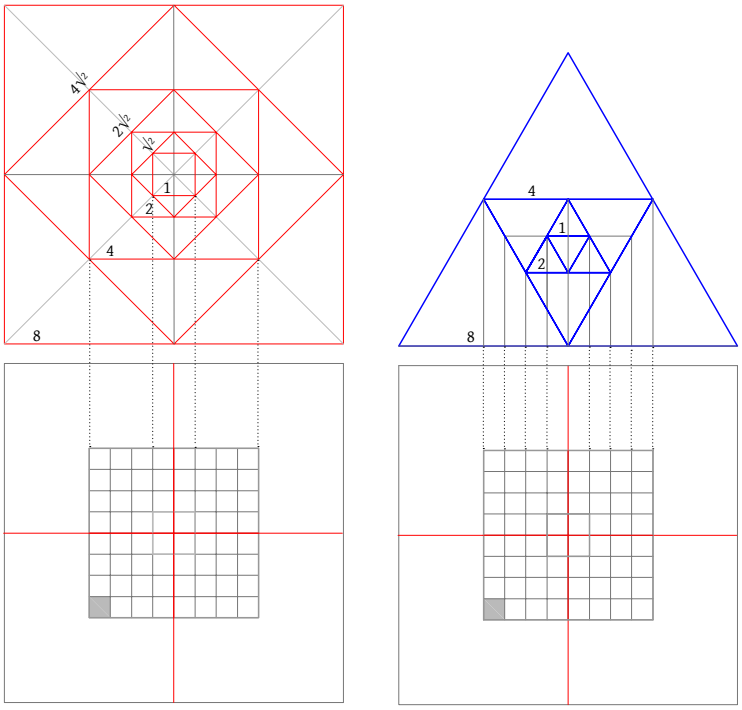
THE SQUARE AS A BASIC SHAPE

In Wanla, the basic square in its three-dimensional cubic form can be perceived on both the interior and exterior of the building. The floor plan of the niches in the form of a cross corresponds to the spatial structure of the viśvavajra. The main and secondary axes of the building are defined by the entrance and the main niche as well as the symmetrically arranged side niches; its interior spatial structure is centrally organised by means of the multi-stored four-pillar arrangement and the lantern on the top of the building. An analysis of the interior spatial zoning reveals that the geometry of the building is most probably based on an 8 x 8 square grid when taking the wall thickness into consideration. The interior space would thus correspond to a 6 x 6 square grid and the wall thickness to one grid square. That would correspond to the description of the Indian maṇḍūka-mandala, according to which the wall thickness should equal half of the inner sanctuary i.e. the inner 2 x 2 squares.[133]

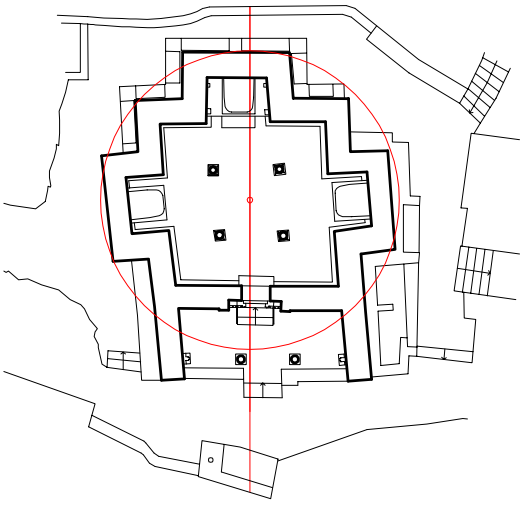
131 See TROPPER 2007: 104-150.
132 See TUCCI 1949: 38.
133 See KRAMRISCH 1946: 271.

181 Schematic illustration of the crossed vajra (viśvavajra).

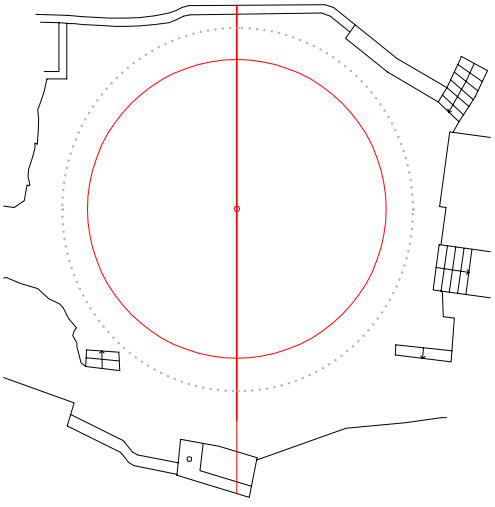
182 Basic structure of a mandala with the viśvavajra as palace base. © Ethnographic Museum at the University of Zurich. Model and photo: Peter Nebel/Brauen 1992: 46.



183 The divisible quantities of quadrature, triangulation and Manduka mandala are congruent. TU Graz 2008.



184 The site plan and floor plan of the temple showing the main axis (NO-SW) which defines the direction, and the outer circle which determines the square of the building.TU Graz 2008.



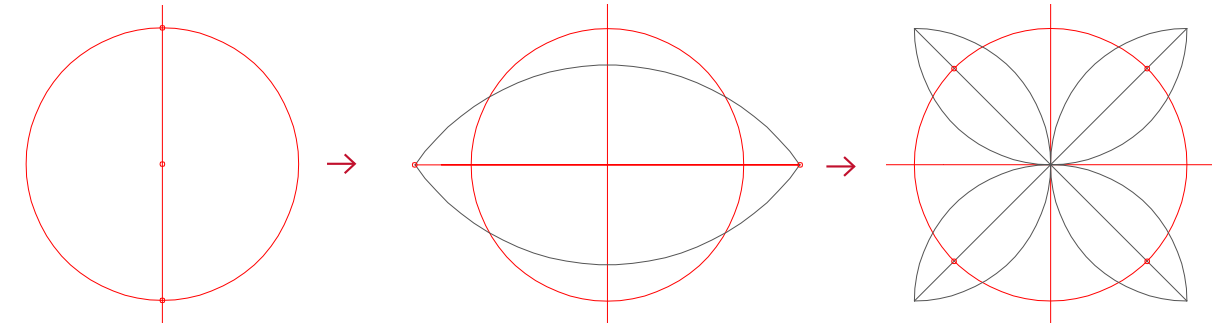
185 The size of the outer circle depends on the building site which requires enough space for the ritual circumambulatory. TU Graz 2008.

The geometric shape of the square reflects the construction principles of the quadrature and the triangulation in their role as proportional principles of medieval European architecture. Accordingly, the proportional ratio of the beauty ideal, known in medieval times as *splendor veritatis* or "splendour of truth", was organised on the basis of whole numbers, thus being geometrically congruent with the quadrature and the triangulation. The quadrature encompasses all geometric operations which generate proportional squares via the diagonals of a basic square. The triangulation encompasses all geometric operations which are structured like an equilateral triangle.[134]

The distinct geometric congruence between the 8 x 8 grid, the quadrature and the triangulation shows that functional differences in systemic methods can nonetheless lead to the same divisible geometric quantities (Fig. 180). The geometric ratios of the quadrature and triangulation, which would be undoubtedly crucial for planning methodologies on mediaval building sites, was primarily determined by means of the so-called rope-method, for which, basically, only a piece of rope and a pole are required. In Indian culture, that method corresponds to the so-called śulvasūtras which could be translated as "rope rules" or "a guideline to the art of measurement". They contain geometric rules for measuring out sacrificial sites which could be practiced directly on the spot.
Written sources mention three definite kinds of lines required to determine the temple plan. Firstly, the main axes or coordinates of the temple (pramāṇasūtra); secondly, the outer circle which encloses the square (paryantasūtra) thus defining the building site on a spatial level, and thirdly, the inner lines which divide the mandala into individual fields (vinyāsasūtra) and determine the internal structure of the temple.[135]
According to Kramrisch, most floor plans of Hindu temples correspond to that proportional system, especially regarding the determination of wall thickness. All three main kinds of lines are clearly discernible in the plan analysis (Fig. 179).

134 See NEUWIRTH 1980: 14-15.
135 See KRAMRISCH 1946: 227.

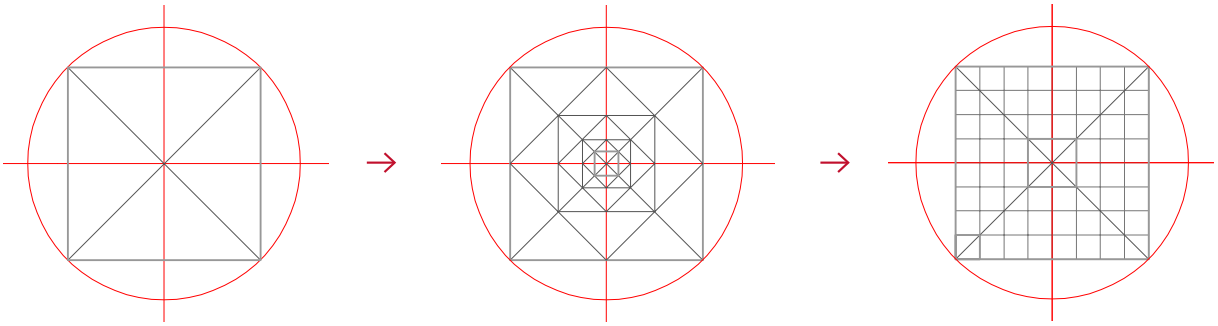
186 Image of medieval building activities showing the most important tools rod and rope.
12th century vault painting of the parish church of St. Clement in Bonn-Schwarzrheindorf. Binding 1993: 341.



1. Main axis and outer circle

2. Secondary axis

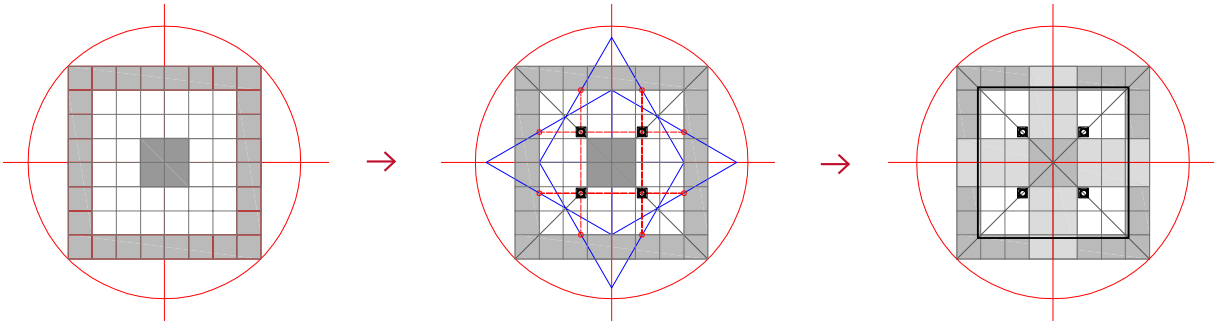
3. Diagonals



4. Determination of the main square

5. Geometric quadrature of the main square

6. 8x8 grid of the main square



7. Grid zoning of the main square

8. Determination of the pillars

9. Definition of the inner wall

187 Geometric reconstruction of construction steps 1 – 9 shown as a floor plan. TU Graz 2008.

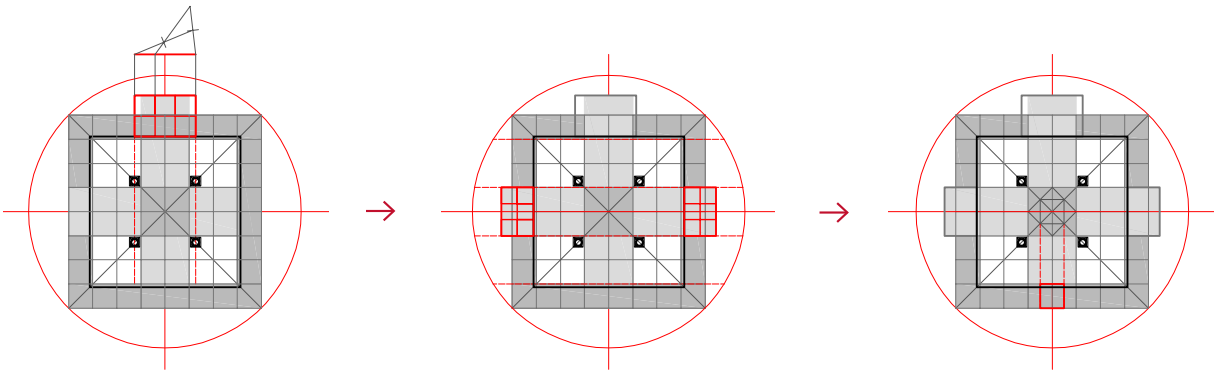
GEOMETRIC RECONSTRUCTION

The following experimental reconstruction of an ideal temple plan refers to the knowledge of the systems explained above. The plan does not take the deviations in the geometry of the building into account, but strictly adheres to dimensional accuracy of the interior cubature. The exposed position of the temple on the narrow ridge means that the building site is spatially restricted. According to the Indian proportional system, the starting point would be the main axis of the temple with its focal point and outer circle. The size of the outer circle depends on available space which could include enough space for a circumambulation around the temple. A prerequisite for the construction is that it can be carried out by means of the simple geometric "rope-measuring" methods directly on site.

Step 1: Determination of the main axis and outer circle which intersect the main axis at two points.
Step 2: The secondary axis is determined by the intersection points of two circles.
Step 3: The outer circle intersects both axes at four points. The radius is then redefined on the basis of these four points in order to determine the diagonals. The diagonals intersect the outer circle at the four corner points of the main square.

Step 4: A main square is thus inscripted within the outer circle.
Step 5: The main square can be divided by using the geometric quadrature method which equals 8 : 4 : 2 : 1.
Step 6: The 8 x 8 grid is transferred to the main square by means of the smallest square part.

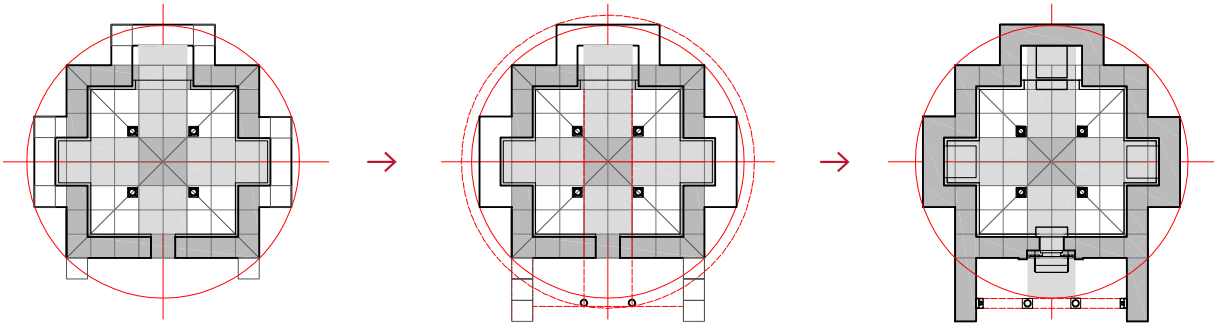
Step 7: The centre area and the outer wall area are determined by grid zoning.
Step 8: Beginning at the central axes of coordinates, an equilateral triangle of which the side length equals that of the inner square (6 x 6 squares) is drawn on each of the four sides intersecting the grid lines of the inner square at eight points. These intersection points define four axes which in turn establish the four main pillars of the interior at the intersection points of the centre points. The centre points lie exactly on the main diagonals of the grid, but not on the point of intersection of the inner square (4 x 4 squares). This proves that the laws of vāstupuruṣamaṇḍala are followed in respect to the grid line intersections, since they are not directly built upon.
Step 9: The base of the interior corresponds exactly to the grid lines; the structure of the inner wall is shifted outwards by the width of the base.



10. Establishing of the main niche /2:3

11. Determination of the side niches /2:3

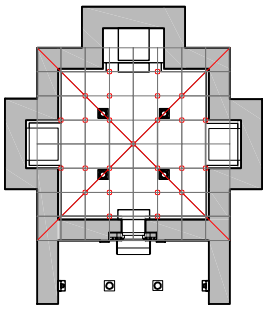
12. Entrance opening



13. Outer course of the wall

14. Veranda walls and pillars

15. Side supports and pedestals



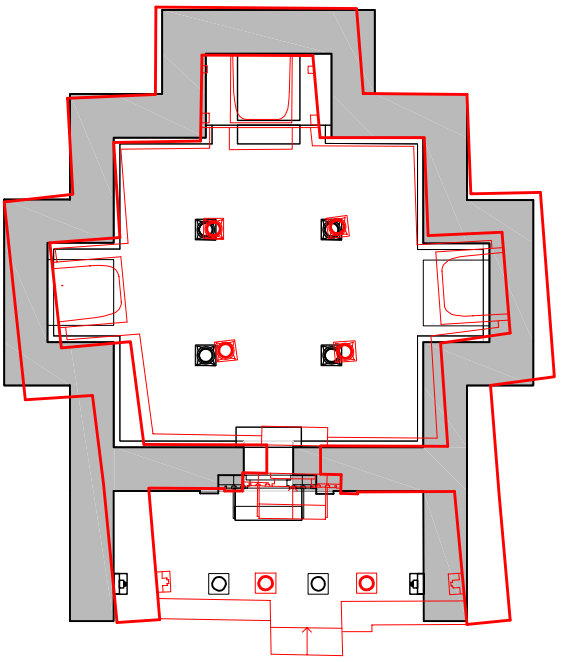
16. Points of intersection

188 Geometric analyses of construction steps 10-16 shown as a floor plan. TU Graz 2008.

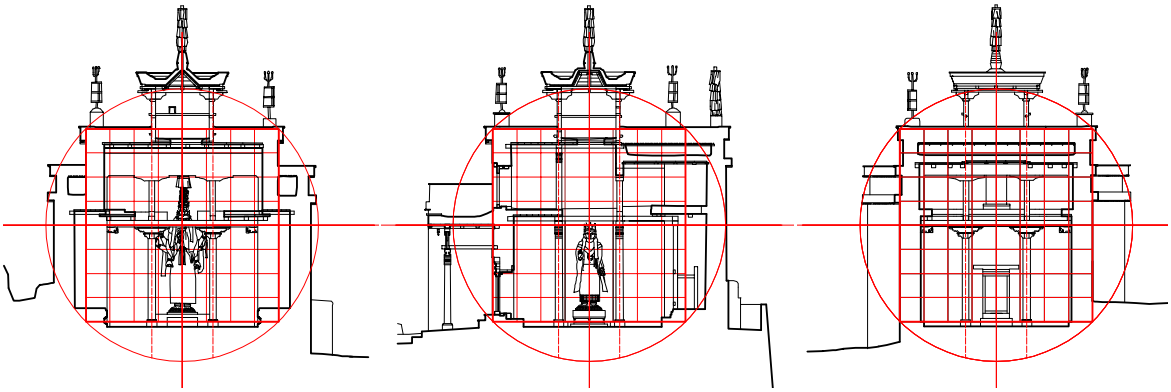
Step 10: The position of the central pillars determines the width of the main niche. The depth of the niche is determined and calculated geometrically by a ratio of 2 : 3 (depth : width).
Step 11: The width of both side niches is calculated by dividing the interior square into three parts; the ratio of 2 : 3 also forms the proportion of the niches (depth : width).
Step 12: The entrance lies on the main axis and corresponds exactly to the width of an 8x8 grid square.

Step 13: The outer course of the wall is in turn aligned with the outer square of the grid. The same applies to the wall thickness around the niches and of the veranda wall.
Step 14: The pillars in the veranda lie on the extension of the central 4 x 4 squares. Their position is determined by the radius of a circle that exactly inscribes the outer corners of the main niche. The depth of the side walls of the veranda corresponds to three times the wall thickness.
Step 15: The side supports in the veranda lie on the axis of the central veranda supports. The built-in pedestals of the sculptures in the side niches lie along the extension of the wall surfaces; the pedestal of the main sculpture follows the lines of the interior structure determined by the grid.

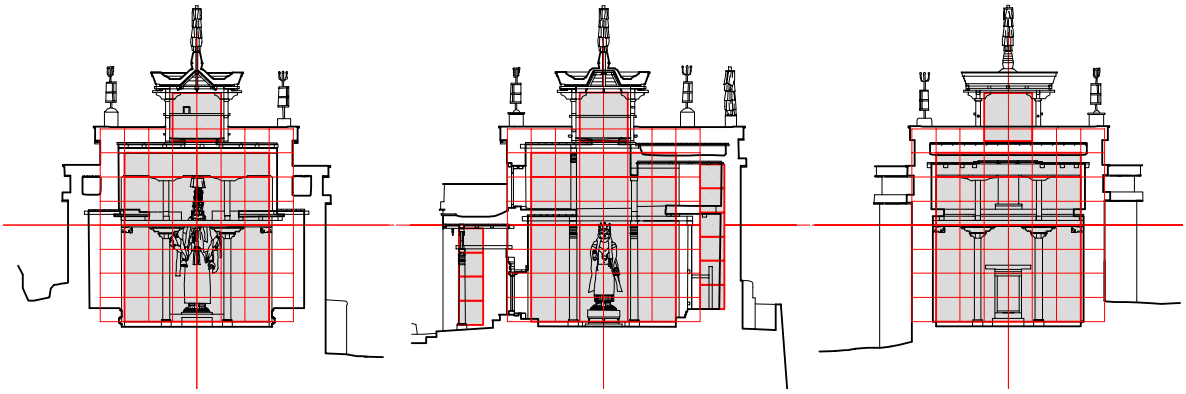
Step 16: The basic rule of the maṇḍūka-mandala not to build directly on the points of intersection of the inner lines (see page 135), was thus obeyed in the ideal plan. If we compare the original plan with the ideal plan, we see how far the form deviates from the square. It also proves that length and area proportions do coincide to a greater extent.



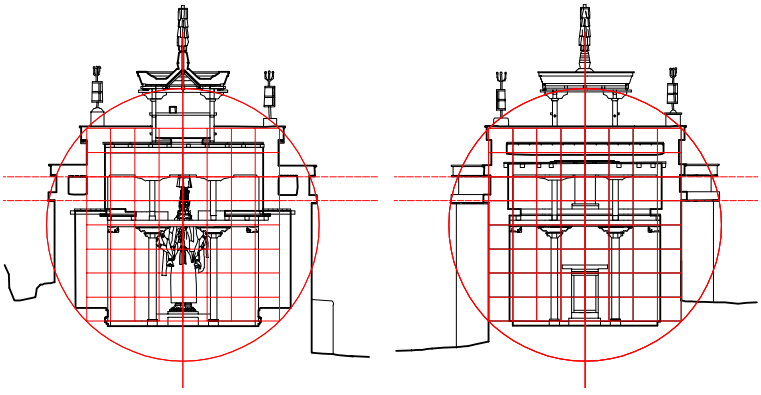
189 Overall displacement of the building displayed by superposing the plan of the temple in red over the geometrical model in grey. TU Graz 2008.



16. Section 1-3: Main square, grid and axes of the pillars in the height development



17. Section 1-3: Establishing of the interior cubature



18. Section 1-2: Correspondence of the niche cornices with the inner grid

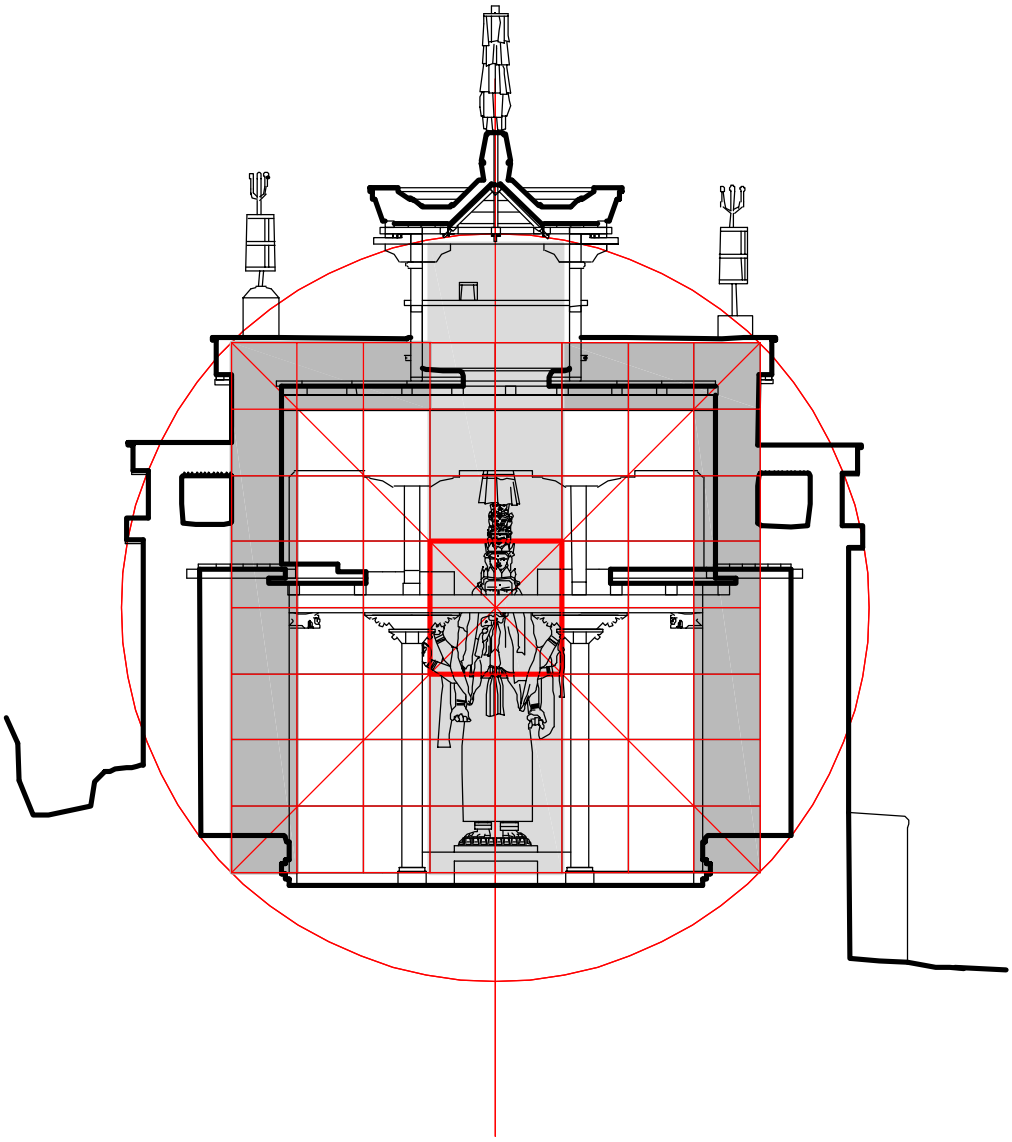
190 Geometric analysis of the height development in the sections. TU Graz 2008.

The height development of the temple tells us that the structures were determined by using a grid. The sections in Fig. 190-16 show that the height of the building corresponds exactly to the main square of the grid proving that the system is spatially conceived. The grid lies in line with the floor level of the interior. The vertical axes of the pillars determine the position and dimensions of the lantern. The horizontal centre axis of the grid determines the position of the main beams (lower edge) between the lower and upper stores as well as the ceiling height of the veranda.

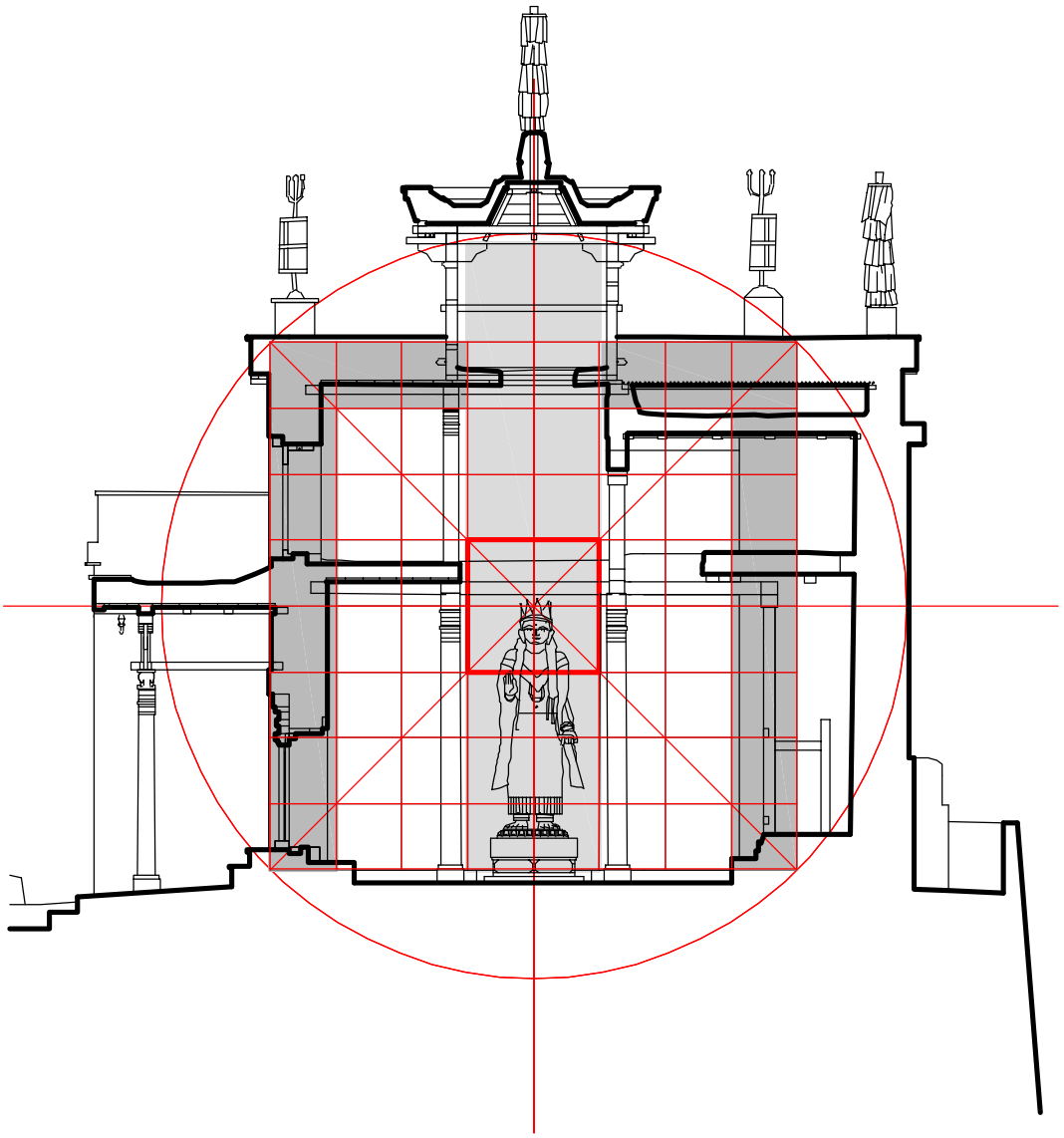
Fig. 190-17 indicates how the interior cubature is established. The lower four fields of the grid on the ground floor up to the horizontal middle axis correspond to three squares in the front area of the upper storey (17.1) and to two squares in the rear area of the painted cross beam (17.3), the height of which corresponds to one square. The proportion of the height development of the room thus corresponds to a ratio of 4 : 2 : 1. These heights are also transposed to the lower edge of the cross beams respectively. Whilst the height of the entrance door up to its architrave equals two squares, the somewhat lower height of the veranda corresponds to four squares up to the uppermost cross beam (17.3). The height of the side niches is determined by the horizontal centre axis which also defines the main layer of horizontal beams and is a result of the construction height of the gallery (17.1). Based on the height of its somewhat higher podium which corresponds to a half-square, the main niche equals exactly six grid squares (17.2). The height of the lantern is determined by its timber base construction and equals two grid squares up to the lower edge of the lantern roof construction. The resulting heights of the outer cornices also follow the interaction of the grid pattern with the constructional measures of the roof construction.
Thus the position of the lower cornice on the exterior of the main niche results from the interior ceiling height of the main niche (17.2). Due to the double roof above it, the upper level of the cornice is raised to the height of the outer main square of the roof.

The auxiliary grid lines in Fig. 190-18 show that the niche cornices of the side niches also correspond to the inner grid. The double roofs follow both formal and constructional interventions. It is, then, a proven fact that the spatial plan was originally well thought out and even includes the place and size of the figures. Their heads fit into the inner 2 x 2 squares of the square grid and the main figure even fits exactly into the centre of the grid (Fig. 191).

We can conclude that the geometry of the square grid, which forms the basis of the orthogonal principles of the Wanla temple, was accurately implemented, the above-mentioned references to the Indian idea of vāstupuruṣamaṇḍala thus becoming effective. Additions to the grid system such as the cross-shaped side niches, which symbolize thunderbolts show the influence of cultural elements that reflects regional and religious influences.

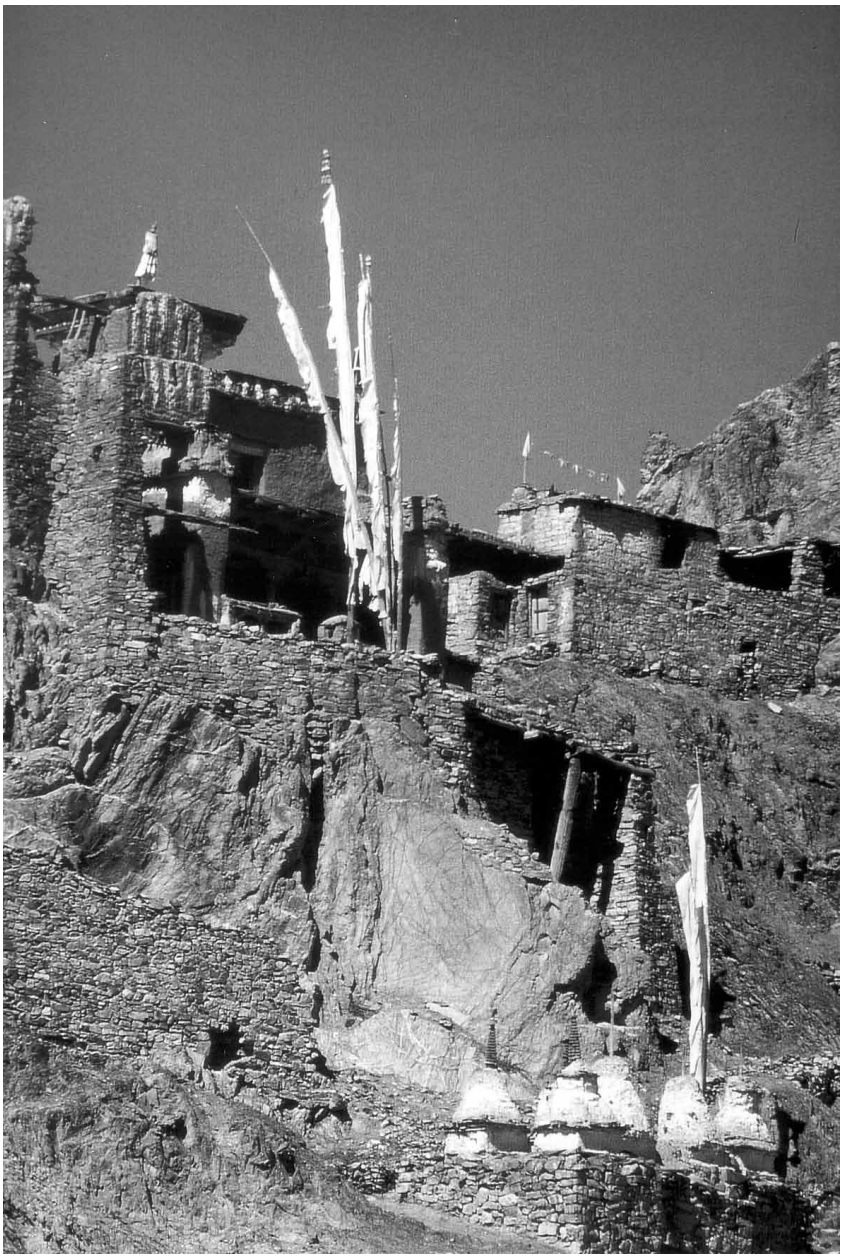


191 Geometry of the height development shown in the cross section. TU Graz 2008.



192 Geometry of the height development shown in the longitudinal section. TU Graz 2008.

6 CONDITION OF THE BUILDING



193 The remains of the castle wall on the south-eastern side of the temple. Manfred Gerner 1982.

6 CONDITION OF THE TEMPLE

Holger Neuwirth

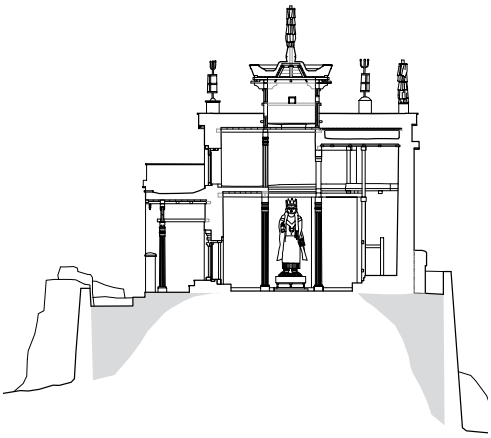
THE CURRENT STATE OF THE BUILDING

One can deduce from the largely unchanged interior decoration that the temple has for the most part remained in its original conception. Despite the fact Wanla is located within the high damage risk zone of the earthquake hazard map, the temple has survived for over 700 years. How this may have affected the temple's stability and outward appearance is the subject of the following detailed analysis.

MASONRY

An assessment of the temple's masonry begins with a look into the heterogeneous structure of the site and changes in its immediate surroundings. During the construction of the monastery building, the castle wall next to the circumambulatory path in the south-east was demolished. When the shrine room for lamps was built, the rocky protrusion was eliminated. The narrow promontory of the castle hill runs from north-west to south-east. The temple axis is oriented from north-east to south-west, thus from the entrance to the main apse. For the extension of the construction site with its narrow circumambulatory path, supporting walls were built on both sides parallel to the rocky promontory, and the ground was filled up with material (see longitudinal section). The solid exterior temple walls are built with unhewn stones bonded with clay at a thickness of approximately 85 cm. The masonry is relatively flexible owing to the clay mortar. The walls are finished off with exterior loam rendering and smooth, interior plasterwork, which is appropriate for mural painting.

In order to assess the temple's stability, an analysis of the entire interior wall surface was crucial. Thus the cracking was recorded in situ and later documented. The crack formation allows an overview of the long-term performance of the masonry. There are various different causes for cracking, primarily depending on the quality of the building site. Moreover, the temple of Wanla is located in an active seismic zone. Structural modifications carried out in the direct neighbourhood, such as the demolition of the south-eastern castle wall in the 1980s, could also have caused damage. Since the exterior walls are whitewashed every year, there are no visible cracks in the façade. On the inside, however, there are signs of damage which origin from the entire past of the building.

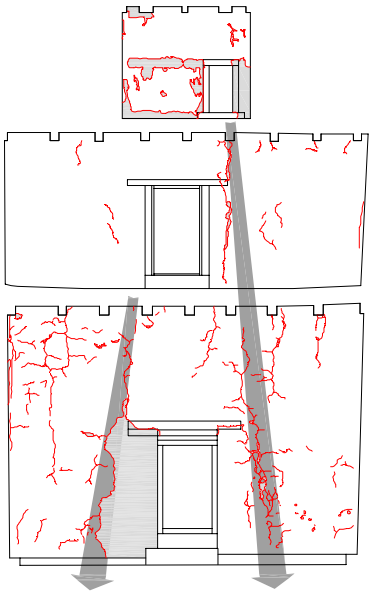


194 Longitudinal section with the filled up areas of the foundation. TU Graz 2014.

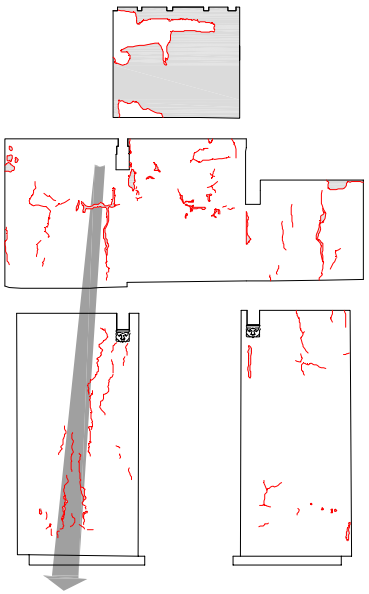
195 Removal of the rock pinnacle 2002 and enlargement of the retaining wall. HN 2004.

196 South-western supporting wall of the temple area next to the rock pinnacle between the temple and the monks' house. CL 1998.

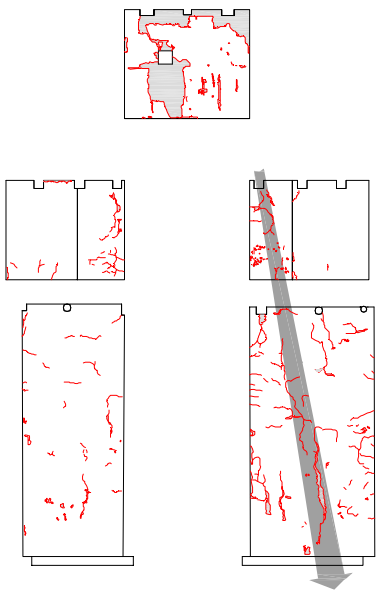
197 North-western view of the temple showing parts of the natural stone masonry in the area of the water damage on the facade, caused by the waterspout. HN 1998.



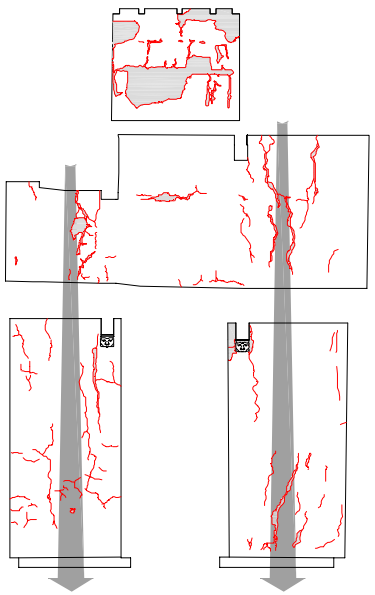
198 Projection of the north-eastern walls, with the entrance openings. TU Graz 2010.



199 Projection of the south-eastern walls, beside the Maytrea niche. TU Graz 2010.



200 Projection of the south-western walls, beside the opening of the main apse. TU Graz 2010.



201 Projection of the north-western walls, beside the Sakyamuni niche. TU Graz 2010.

cracks
destroyed murals

CRACK PATTERN

At the entrance wall (north-eastern wall), cracking illustrates that the lateral porch walls show a tendency to drift apart, caused by a settling of the material used to fill up the terrain. Missing murals to the left of the entrance door point to older repairs to the masonry. Crack formation on the left of the south-eastern wall confirms that the lateral walls of the south-eastern corner of the temple are moving. The lateral niche walls indicate that the niche is detaching itself from the main body of the building. Since this part sits on firm rocky ground, the cause must lie somewhere else, probably somewhere in the area of the double roof.

The south-western wall is built on firm rocky ground and is still stable. The right-hand lateral wall of the main apse and the right-hand south-western wall both display crack formation throughout. It is highly probable that the earthwork settled because of its reduced load-bearing capacity and due to an increase in the weight of the roof.

202 Entrance door on the ground floor of the the north-eastern wall.
Between the main cracks and the left side of the door the paintings are completely destroyed. CL 2003.

203 Water damage in the left corner of the first floor and the main crack on the north-east wall. DL 2009.

204 Main crack on the north-east wall of the second floor beside the entrance door. CA 2005.

205 Main crack and water damage in the corner on the north-west wall of the second floor. CL 2003.

206 Main crack and water damage on the second floor of the south-eastern wall of the corner. CA 2005.

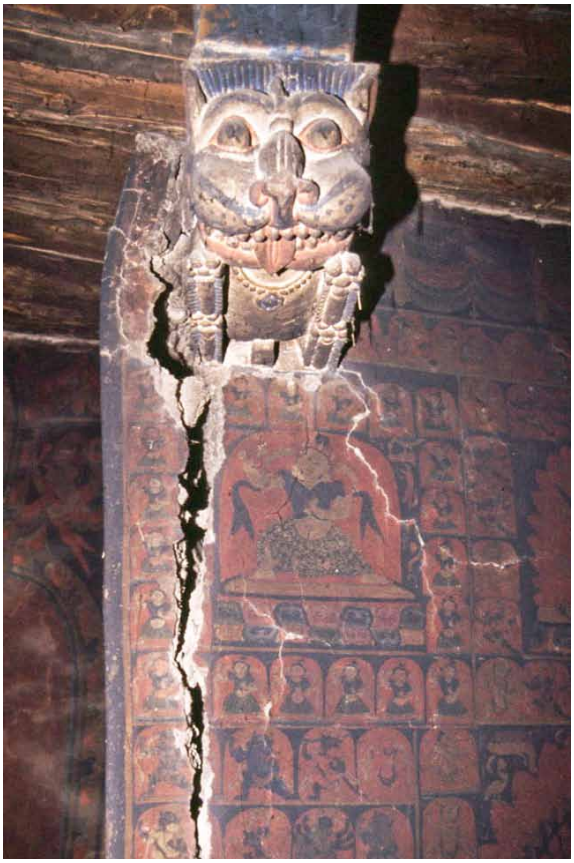
207 Second floor north-western wall with main crack in the main apse area. CL2003.

208 First floor north-western wall with water damage in the right corner. CL 2003.

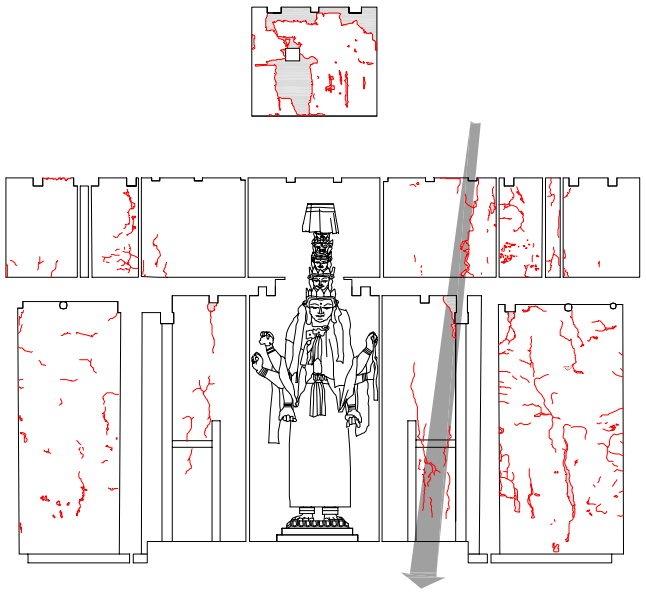
209 North-western niche without painting on the left side wall. CL 2003.

210 North-western niche with former repairs beside the lion corbel. DL 2009.

211 North-western niche with settlement crack beside the lion corbel. CL 2003.

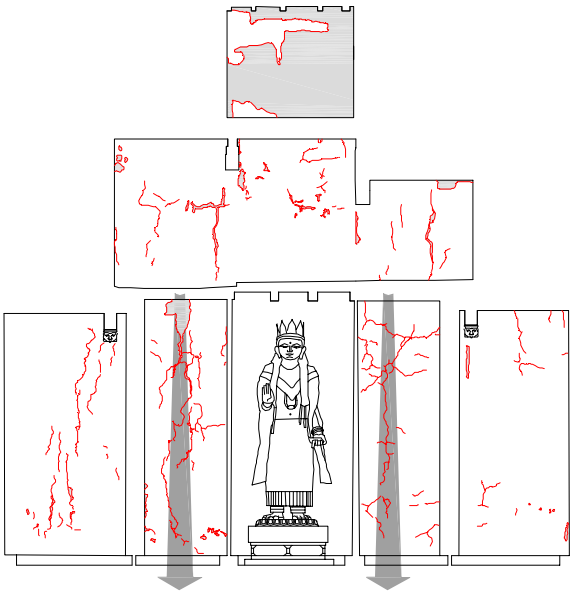


212 South-eastern niche with settlement crack beside the lion corbel. CL1998

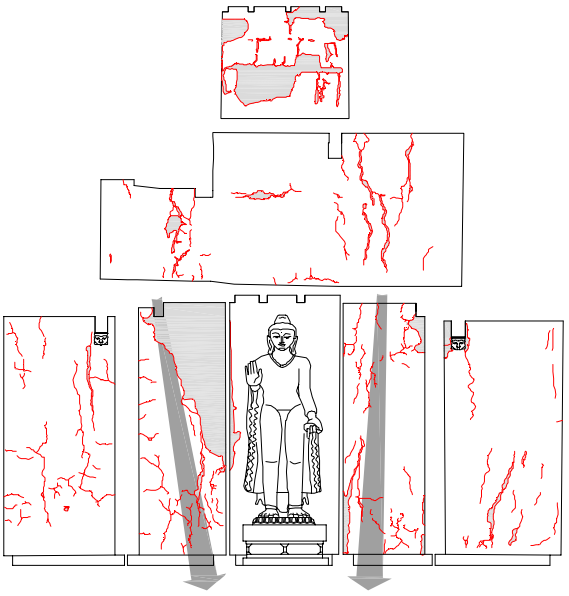


cracks
destroyed murals

213 Developed view of the walls in the main apse. TU Graz 2010.



214 Developed view of the walls in the Maytrea niche. TU Graz 2010.



215 Developed view of the walls in the Sakyamuni niche. TU Graz 2010.

Similar to the south-western apse, the lateral walls point to a detachment of the north-western niche. The interruption of murals in the left hand corner of the niche indicate later repair work. It is plausible that the cause of this damage also lies in the masonry of the double roof construction. Beneath the main beams and the corbels, the crack formation next to the lion corbels indicates that the clay mortar bonding yielded to the extra load resulting from roof repairings. This will eventually lead to settling and subsequent chipping of the rigid compressed mortar beneath the murals. This is particularly evident on the south-eastern wall laterally of the lion corbel and the lower main beam.

216 Right corner of the main apse below the gallery corbels with former repairs. HN 2003.

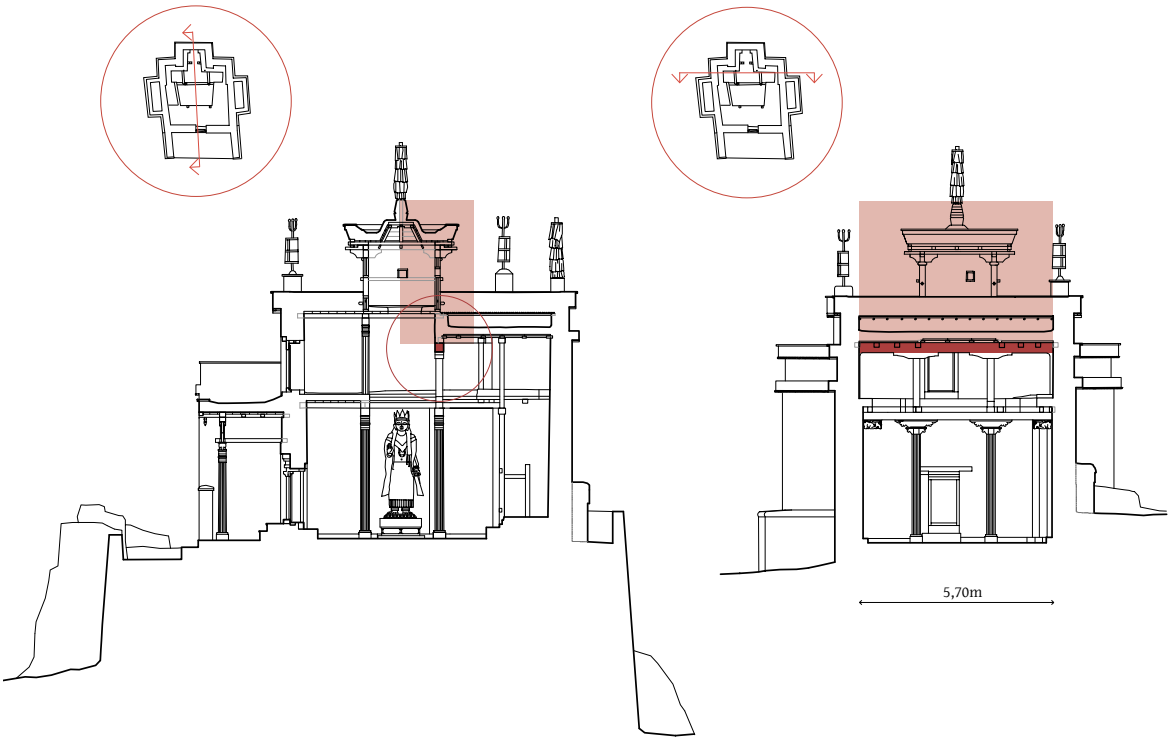
217 Settlement crack on the right wall of the main apse. CL 1998.

218 Settlement crack on the left wall of the south-eastern niche. CL 2003.

219 Crack on the right wall of the north-western niche. CL 2003.

TIMBER STRUCTURE

The wooden structure within these massive walls bears the main load of the lantern, gallery floor and platform roof. Four wooden supports with plinths and corbel capitals support the main beams, the gallery's layer of horizontal beams with its floorboards, plus the mud floor. Lion corbels complement the wall bearings of the cross beams on the first floor. Four wooden supports are mounted upon both main beams of the second floor. The upper main beams bear the horizontal beams of the platform roof, thus also supporting the horizontal beams over the main apse. During the course of repair work in which layers of clay were repeatedly added to the platform roof, the roof load has more than doubled. As a result, the front upper main beam has broken, and is therefore no longer able to absorb tensile forces. In order to stabilise the building effectively, it was crucial to relieve the load on the upper main beam in front of the main niche. The paintings in this area posed additional challenges to this process. According to initial calculations, the upper main beam bore a load of approximately 14 tons. A secondary construction was therefore erected in order to secure the temple for the future. In 2008, the Achi Association renovated the roof area above the main niche.



220 Problem area of load transfer shown in the sections with: single load lantern on each column: 1.62 t / total 3.24 t, 1st clay layer: 0.46 t per m / total 2.64 t, 2nd clay layer: 0.46 t per m / total 2.64 t, Stone wall: 0.88 t per m / total 5.0 t. In total: 13.52 t. TU Graz 2010.

After removing the upper roof, it became evident that the roof load had increased due to repeated repair work involving the addition of new layers of clay following the collapse of the layer of rods. The broken beams of the false panelled ceiling were hung onto replacement beams, thus enabling repeated removals of the supporting construction beneath and restoration of the original interior. Two aluminium lattice girders were inserted into the cavity between the double roof to absorb the platform construction's weight and redistribute it onto the outer walls.
The connections between the plinths of the two round wooden pillars and the gallery main beam are weak spots as well (see Fig. 79-81 on page 50). The porch's wooden construction does not show any serious signs of damage.

221 Location of the fracture on the back of the main beam. HN 2004.

222 Detail of the broken main beam. DL 2009.

223 Broken rods from the flat roof construction over the false panelled ceiling of the main apse. Roland Pabel 2008.

224 Assembling of the aluminium-lattice girder in place of the flat roof's broken wooden construction by the Achi association. Roland Pabel 2008

225 Murals damaged by water on the first floor in the right corner oft the north-western wall. HN 2003

226 Detail of the water damage on the north-western wall. CL 2003.

227 Cracking and water damage on the south-western left side wall. CL 2003.

228 Crack of the south-western right side wall on the first floor. DL 2009.

229 The red columns based on the gallery support the blue additional joists to secure the broken beams of the ceiling. They could be removed after the restoration work of the roof in 2008. HN 2004.

230 Before the restauration, the painted planks of the coffered ceiling had lost their bearing on the broken joists. CL 1998.

231 The false panelled ceiling over the main apse area. The substitutional construction for the broken beams were able to be removed in 2008. HN 2003

FLAT ROOF STRUCTURE

Watertightness of the platform roof is crucial for the protection of the murals. The roof has only partially been renovated over the past 15 years. Above all, the critical parapet wall area has been ignored. It is probable that the painting layer will be destroyed by trespassing rainwater.

Measures for the required renovation of the roof zone are described in the following chapter dealing with the protection of the interior. At the same time, preventive measures must be carried out in the area at the top of the walls to prevent parts of the building from drifting apart.

232 General view of the roof area. The eaves of the lantern, the main roof, the main apse, and the side niches are all shaped differently. HN 1998.

233 Crack on the eave caused by broken scantlings. HN 1998.

234 Pillar of the lantern. HN 2004.

235 Former eave of the Dukhang in Tabo. HN 2002.

236 Fragment of the cornice above the entrance hall and remains of the continuing cornice on the north-western front. HN 2003.

SUSTAINABLE RESTORATION MEASURES

The Venice Charter: [136]

Article 4. *"It is essential to the conservation of monuments that they be maintained on a permanent basis."*

Article 5. *"The conservation of monuments is always facilitated by making use of them for some socially useful purpose. Such use is therefore desirable but it must not change the lay-out or decoration of the building. It is within these limits only that modifications demanded by a change of function should be envisaged and may be permitted."*

Article 9. *"The process of restoration is a highly specialized operation. Its aim is to preserve and reveal the aesthetic and historic value of the monument and is based on respect for original material and authentic documents. It must stop at the point where conjecture begins, and in this case moreover any extra work which is indispensable must be distinct from the architectural composition and must bear a contemporary stamp. The restoration in any case must be preceded and followed by an archaeological and historical study of the monument."*

Article 10. *"Where traditional techniques prove inadequate, the consolidation of a monument can be achieved by the use of any modem technique for conservation and construction, the efficacy of which has been shown by scientific data and proved by experience."*

Before devising an action plan, a comprehensive list of all factors needs to be compiled. When assessing damage, it is essential first to establish the cause and then the effects. The necessary restoration work can be divided into three main time phases: During the first phase, measures should be taken to secure structural stability – a prerequisite for all further phases. The second phase would be concerned with the protection of the interior against precipitation and moisture penetration, especially with regard to the mural paintings. Future architects will have to take into account essential factors of structural physics as well as the preservation of the building's traditional appearance. The third phase involves establishing the ultimately desired appearance based on the results of the structural analysis, especially with regard to authenticity and changes in style, and in due consideration of technical requirements. Additionally, maintenance problems must be taken into account. More information about the restoration of the murals can be found in chapter 7 (see page 175). The restration of the sculptures and wood carvings are not dealt with at this stage.

STRUCTURAL STABILITY

All cracks in the masonry should be repaired in depth; this will apply, above all, to the lateral walls of niches and areas beneath the corbels. The dimensions of the new clay roof cladding must comply with structural and physical requirements. A tie rod applied to the cavity of the double roof construction above the main niche should provide additional rigidity. Since the main beam is no longer able to absorb tensile force, this measure will improve the structural stability of the masonry. The platform above the side niches will also have to be renewed in order to eliminate possible damage in the cavities and thus remove the roof load.

Critical zones of the roof cladding in direct proximity to the alignment of the murals should be additionally secured by inserting a foil. However, the weight of the lantern and stonewall borne by the main beam is still straining the main beam. A lasting solution must be found for this problem, otherwise it will not be possible to remove the supports in the south-eastern side niche and secure the endangered painted layer of mortar beside the lion corbels.

136 The Venice Charter as the INTERNATIONAL CHARTER FOR THE CONSERVATION AND RESTORATION OF MONUMENTS AND SITES (1964) is a code of professional standards that gives an international framework for the preservation and restoration of ancient buildings.

237 General view of the main apse area. DL 2009.

INTERIOR PROTECTION

Although a traditional flat roof would require constant maintenance, it could still be seen as a feasible solution. A convincing example would be Matthias Kilchhofer's roof restoration work on the White Temple in Tholing, which he presented to me in 2007 [137]. His project took into consideration technical innovations and the reduction of maintaining measures.

At the roof in Wanla, the clay was originally applied on a round timber plattform with an additional transversal layer of horizontal rods. Both layers needed to be changed. In place of the rods, joists and boards are currently used for the new plattform.

Special attention should be paid to the quality of the clay and careful handling of the multi-layered roof structure. The flat roof could be permanently improved by inserting a suitable construction foil over the boards that would be able to diffuse vapour. Above all, this watertight and weldable construction foil provide protection for critical areas on the interior painted wall alignment.

The clay-structure begins with a layer, which is 15 to 20 cm thick, this layer must be consolidated and reinforced by adding straw chaff. The ultimate layer wich is 8 to 10 cm thick can be ameliorated with linseed oil to improve the cohesive and water-repellent qualities. Particular wooden mallets were used for compaction.

Careful work can prevent the formation of shrinkage cracks. It is also essential to bear the question of maintenance in mind when considering the arrangement and design of the waterspouts, in order to keep them in permanent working order and prevent formation of weak spots in the roof system. When mounting the eave cornices, enclosed basins should be avoided at all costs to ensure that precipitation water is rapidly drained off. Problems relating to waterspouts and design of the eaves cornices are described in more detail in the next chapter dealing with the final appearance of the temple.

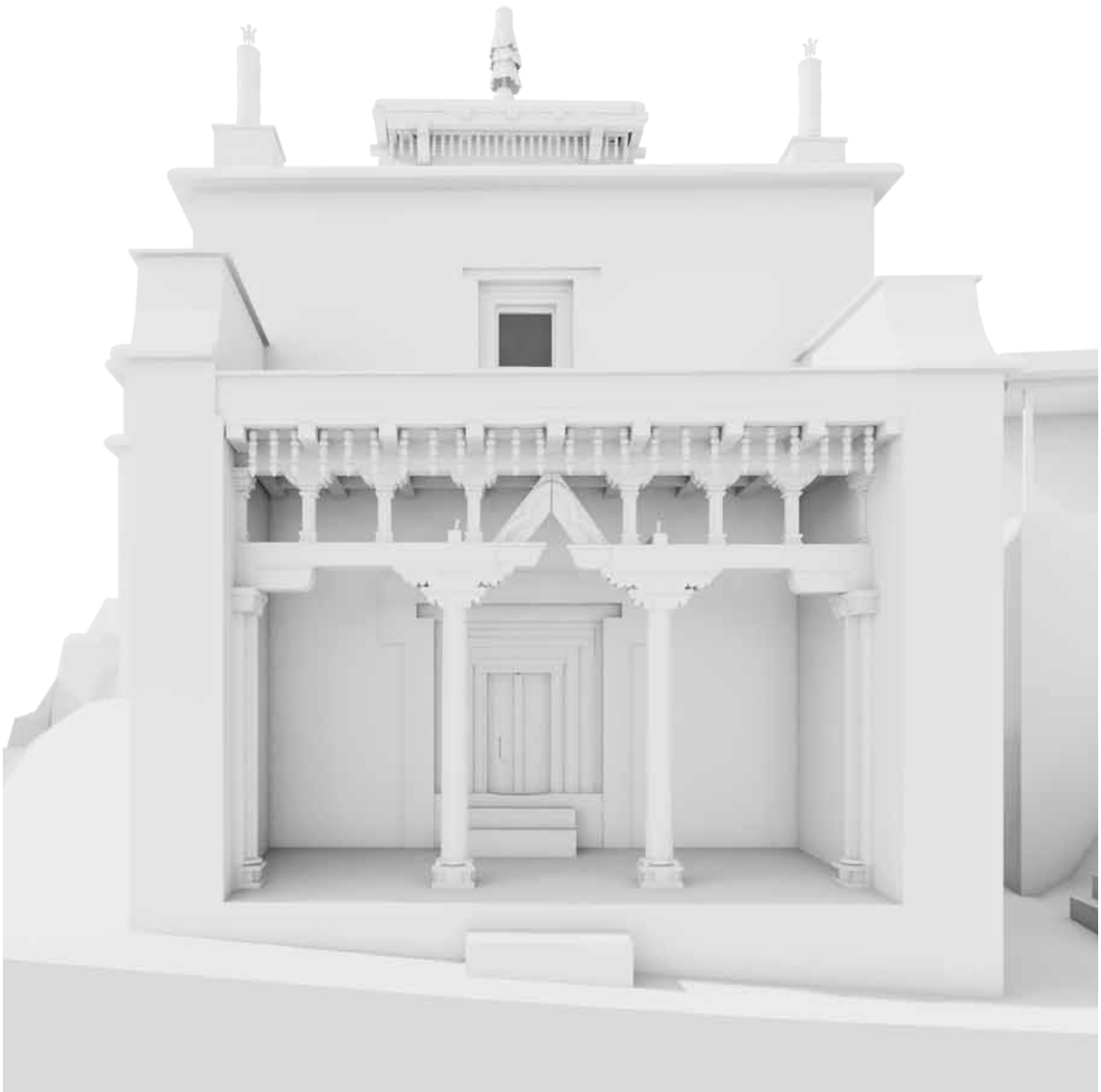
FINAL APPEARANCE

During the course of centuries, the original appearance (original structure) has largely survived; stylistic changes have however been made in some areas. The double cornices are a major stylistic element, beginning above the porch and increasing in height up to the level of the roof at the main apse. In some places however, there are noticeable changes in style. For instance, there are three different types of cornices and eaves, the oldest form being a protruding layer of sticks with a low wall.

This detail can also be found in Tabo (Fig. 235) within an area which had not been restored in the 1990s. The double-roofs in Wanla still display original cornices and eaves constructions above the side niches and the main apse.

In contrast, the flat roof over the second storey has a protruding ledge made of square timbers, boards, and a layer of birch rods with a slightly higher wall. Both of which are stylistic changes resulting from roof repairs in the past. Successive layers of clay brought up to a height of 80 cm instead of 25 cm clearly prove this.

137 See KILCHHOFER 2004.



238 Original appearance of the entrance hall without prayer wheels. Spatial model TU Graz 2010.

These repairs were also responsible for subsequent damage to the interior due to the enormous increase in the roof's weight. Originally, platform roofs were only about 25 cm thick. A slight increase to the height of the eaves area has been reinforced with thin stone slabs. The lantern roof rests upon a carpenter-crafted wooden construction above the crossed corbels on the lantern's four corners. Elevated above a circumferential bundle of rods with a wooden frame, the layer of clay presently forms the edges of the roof. This causes rainwater to gather in a trough, preventing it from directly running off the roof. This defective wooden construction needs to be restored. The exisiting roof exacerbates the extra load at a critical point of stability.
Above all, the rigidity of the vertices of the four crossed corbels is crucial for maintaining the stability of the lantern, which is not the case at present. In connection with the construction of the lantern roof, the bottom layer of timberwork still shows a row of peg holes for a curtain made of turned wooden pegs. One single turned wooden peg on the left side of the porch has survived and can be used as a sample. The exact number of missing rods is ascertainable due to the remaining peg holes.

The same applies to the curtain in the porch of the Sumtsek in Alchi, which has already been restored according to these principles. Since the latter remained in its simple form, it will serve as a model for the lantern roof of Wanla.
In 1998, the sides of the porch roof were still crowned with parapets. The meteoric water was drained via the front which then lacked today's parapets and birch facing. The original character of the building should therefore be restored for stylistic and technical reasons. This means re-erecting the lateral parapets of the porch removed during the 1999 renovation. For technical reasons, too, the trough of the present porch roof needs to be removed in order to drain the roof easily and directly via the front of the porch. Moreover, the peg curtain in front of the porch needs to be replaced on the basis of the peg holes and according to the pattern of the remaining turned peg. The main roof of the temple should be rebuilt as a platform roof with the original, only slightly increased eaves height. One disastrous effect of the existing parapet is the formation of a trough, which not only causes lengthier retention of precipitation water and snow, but also creates additional hazards in critical areas because of insufficiently maintained or blocked waterspouts.

This would entail the removal of approximately 40 cm of the existing parapet, but at the same time it would also make it easier to safeguard critical areas. The critical area where the painted surface of the interior walls touches the roof can be supplementary protected by using construction foil. Basically, the waterspouts could be designed as open wooden water drains in connection with the layer of rods belonging to the eaves parapets, since they would then be trouble-free and require much less maintenance, if any at all. It would be easy to restore the original appearance of the open entrance area by shifting the prayer wheels.

7 WALL PAINTING ANALYSES

239 A male Jñānaḍakiṇī and his assembly of thirteen. Ground floor, south-west wall on the left side. CL 2003.

7 WALL PAINTING ANALYSES

Martina Oeter & Alexandra Skedzuhn-Safir

THE WALL PAINTING TECHNIQUE IN THE TEMPLE OF WANLA

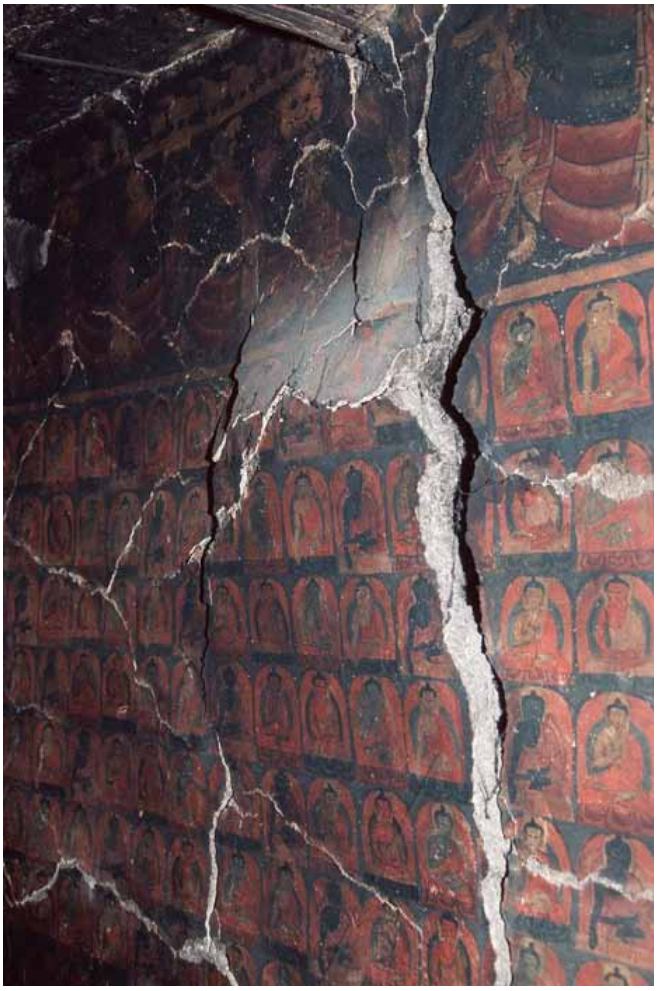
There are many different publications and copiously illustrated books that deal with the art historical classification and iconography of the wall paintings in the Western Himalayas. Up until now, an overview of the wall painting techniques and the employed materials of this cultural area has not been published.[138]
Whenever painting technique is mentioned in literature, it is usually treated as a less significant topic. Therefore, in some publications the list of pigments, binding media and the description of painting technique may seem incomplete or imprecise. To investigate the basics of the painting techniques of this region, only a few valuable sources and publications are available. Results of the conducted research on the painting technique of the three storied temple in Wanla will be presented as an outline and put into further context.

COMPARATIVE TEXT SOURCES / PRESENT STATE OF RESEARCH

To better understand the general principles of the painting technique in the Western Himalayas, where Indian and Tibetan painting traditions have overlapped, it is necessary to study the sparse standard literature pertaining to this research field. The Tibetan painting in this region is based on ancient Indian painting techniques, as described in early Indian texts, provided through the translations and considerations by Ananda K. Coomaraswamy.
The *Abhilaśitārthacintāmaṇi,* an encyclopaedia from Mysore dated approximately 1125 AD, describes how, with what and by whom wall paintings were executed. Coomaraswamy states that it is partially based on the *Viṣṇudharmottara Purāṇa*, which in turn was written presumably in the 7th century AD. Also, both the *Śilparatn*a, dating from the 16th century AD, and the *Śivatattvaratnākara*, from the 17th /18th century, provide passages on painting technique. Also these texts directly refer to the *Abhilaśitārthacintāmaṇi,* although passages were shortened, modified or expanded on. This illustrates that the written sources on Indian painting since the late Gupta Period (5th century AD) up until the pre-modern times have hardly altered, which may indicate that the descriptions have an idealizing character.
It should be mentioned at this point that the fresco-technique (buon-fresco)[139] was not employed in Indian and Tibetan wall paintings, but the secco painting technique. According to Agrawal the reason for this is presumably that secco paintings allow to work on minute painting details.[140] In comparison, the fresco painting technique does not allow for the painting of many details as the lime plaster dries too quickly.

138 A preliminary overview is provided by the unpublished BA thesis „Tibetisch- Buddhistische Wandmalereien auf Lehmputz: Grundlagen und Überlegungen zur Maltechnik“, Alexandra Skedzuhn, 2010, University of Applied Sciences Hildesheim/Holzminden/Göttingen, Germany (HAWK), Conservation of Wall Paintings and Architectural Surfaces.
139 Wall painting executed on a „fresh“ lime plaster, producing in a generally stable and water insoluble paint layer.
140 AGRAWAL 1989: 1.

240 Cross section of a plaster fragment: the two layers of fine upper respectively coarse plaster can be detected along with the presence of small pebbles within the plaster matrix. AS 2010.



241 Detached plaster at ground floor, showing the entire plaster package. CL 2003.

The essential point is though, that all wall paintings within the cultural area of the Western Himalayas are executed on earthen plaster, which for technical reasons eliminated a priori the fresco-technique. For a better understanding of the methods and materials of Tibetan painting technique, the publication by David und Janice Jackson „Tibetan Thangka Painting" presents a fundamental basis. It focuses mainly on thangka paintings, but the technical details are valid in most of the cases also to wall paintings.

THE PAINTINGS IN THE WANLA TEMPLE

The painted decorative elements inside the temple are dated for most part from the time the temple was built.
The technical execution of the wall paintings visibly differs from one storey to another. The depictions on ground floor are modelled with more precision and furnished with more details than those on the upper floors. That the images on the two upper floors are rendered with less details may be explained by the fact that they are usually not accessible and may therefore only be seen from a certain distance.
However, the differences of painting technique could also be an indication that the paintings were carried out at different times and/or by various painters. Only on gallery level there are some wall painting sections, which were made at a later stage. In other areas there are overpaintings due to damage caused by water infiltration. Several mortar fillings in the lantern had been done in the late 1990s. They overlap in many cases the original paint layer.[141] Also the three larger-than-life sculptures in the niches have been partially overpainted in the recent past, and parts of the wooden construction appear to have been covered by a relatively new paint layer.
The opportunity to analyse the technical characteristics of the painted surfaces within the temple became largely only possible through the cleaning of the heavily blackened surfaces. For several years the Achi Association[142] focuses on conserving and cleaning of the temple interior. Up until now only limited areas of the artefacts in the interior could be cleaned and investigated, as the highly water-sensitive paint layer and the severely damaged plaster require an intricate conservation treatment. This text will solely deal with the painting technique of the murals. The painting techniques on the wooden construction and sculptural work still require in-depth investigation.

THE SUPPORT AND THE GROUND

The walls are made of natural stones that are covered with several layers of earthen plaster. The plaster is much thicker on the ground floor compared to the plaster on the upper floors. On the ground floor it reaches a thickness of up to 5 cm (Fig. 241), whereas the plaster on the inside of the lantern is merely one centimetre thick.
To modify the material characteristics of the plaster, different filler materials were added. Small pieces of straw had been employed for the lantern plaster. They can be detected quite clearly as they are located directly below the white primer. A preliminary investigation has shown that some plaster fragments from the lower storeys contain stone splinters and plant fibres, both in the coarse render and the top plaster coat. The coarse plaster was finished to an even and smooth surface. The fine plaster here is about one centimetre thick and covered by a burnished primer (Fig. 240). A detailed plaster analysis, though, still has to be undertaken.

141 In 1999 Benoy K. Behl, Indian author and photographer, had works carried out at the temple of Wanla. Detailed documentations to these interventions do not exist.
142 ACHI ASSOCIATION (n.d.), Wanla.

Analyses of plaster samples from the Nako temples in Himachal Pradesh have shown, that the plaster demonstrates many similarities in quality to the clay and earth found in the proximity of the temple area.[143] Therefore, it is very likely that also the materials utilised for the earthen plaster in Wanla had been collected in the vicinity of the site. The final layer of the plaster consists of very fine-grained clay to silt, known as *markalak* ("butter-mud"). This material can be quarried in various deposits all over Ladakh. Different scientific investigations of *markalak* samples characterised it as a mixture of abundant quantities of a fine binding medium (50-80 % clay, 7-40 % silt that contains some calcium carbonate) and no or only a small percentage of sand grains.[144]

We may assume that the smooth and homogenous plaster surface was burnished. Many authors mention that river stones or conch shells were used to smoothen or burnish the primed surface. The use of a conch shell within a Buddhist environment is probably not coincidental, as it is used for ritual purposes.[145]

The whitish layer on top of the plaster is a burnished primer.[146] According to *Abhilaśitārtha-cintāmaṇi* a mixture of kaolin and size should be employed for the ground. This should be slowly and diligently applied onto the wall. Also Jackson & Jackson describe, that thangka painters employed white materials such as kaolin or chalk.[147] In Tibetan this sort of material is called „dkar rtsi", which roughly translats to "white wash".

In Ladakh *Karsi* („dkar rtsi") can be found on all historic buildings for the external whitewash and as a primer for paintings. However, the investigated materials differ in quality. The whitewash material on the exterior of the temple obviously depended on the characteristics of the locally available materials collected from various deposits all over Ladakh. It can probably be best described as decomposed stone material. Each of the various deposits seems to have a slightly different composition and consistency, depending on the composition of the former stone material, which itself reflects the local geology.

But the investigations of primers of wall paintings[148] seem to verify the choice of gypsum or calcium carbonates. The primer in the temple of Wanla has so far been found to be composed of fibrous gypsum or in other places nearly gypsum-free calcium carbonates, containing calcite as well as aragonite. Thus we may presume that the priming was part of the painting process and that the painters might have brought the adequate materials to the sites.[149]

Whether the primer in the temple of Wanla contains size or size was applied onto the primer after it had dried, still has to be verified.

143 BOGIN 2005: 207.
144 NICOLAESCU, ALEXANDER 2008: 62; JÄGERS 2003.
145 RAWSON 1991: 28.
146 KÜNG 2010: 4; Identification of the burnished surface material in a dispersion, with the help polarized light microscopy.
147 JACKSON, JACKSON 2006: 20.
148 Investigations of primer of a sample from the Alchi monastery (DASSER 1996), and another investigation of the primer of the temples in Nako, Himachal Pradesh (BOGIN 2005) identified Karsi as being calcium sulphate. In a 2003 XRD analysis the primer of the Kanji temple (JÄGERS, JÄGERS 2003) was identified as a mixture of earth and the mineral aragonite ($CaCO_3$).
149 For additional information on composition and preparation of grounds see SKEDZUHN 2010: 59-62.

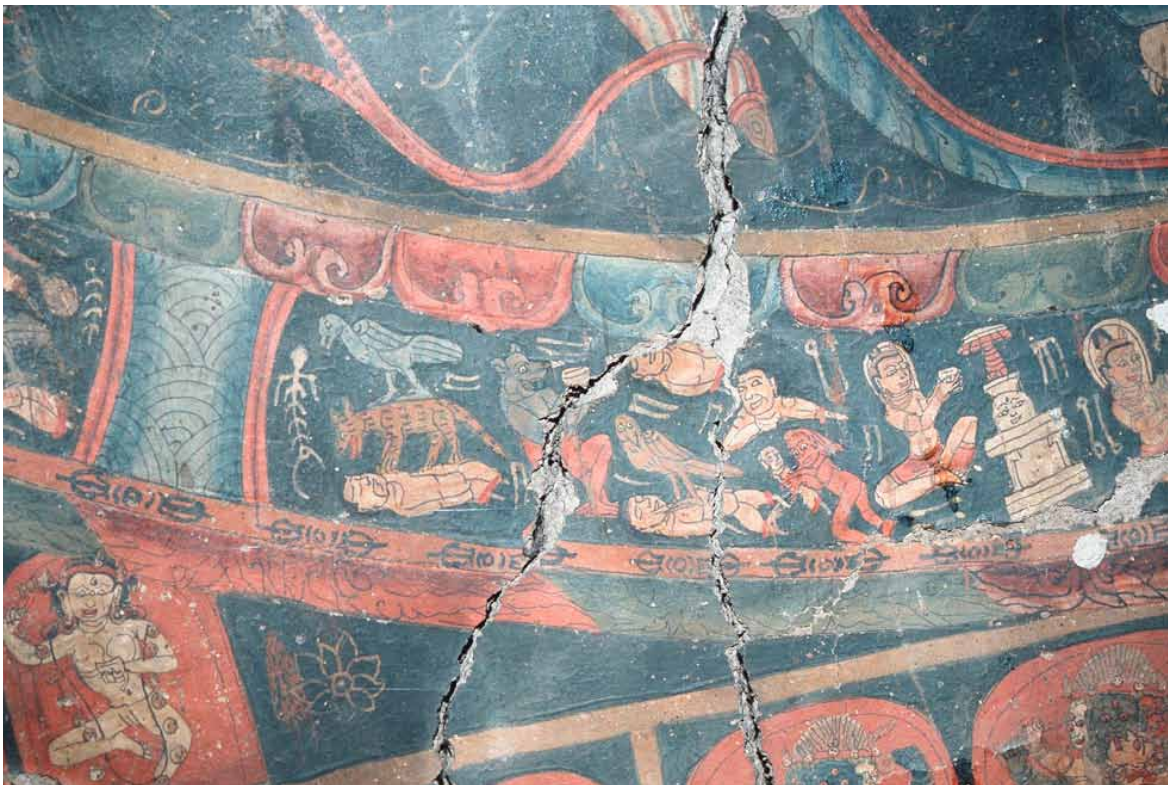
THE DESIGN

The white primed surface was usually geometrically divided into different sections prior to the execution of the actual painting. In many temples of Ladakh snapped lines with either a yellow ochre[150] or a red colour[151] could be detected, and also rulers were employed to draw lines.[152]

So far, we have not detected any kind of construction lines for the sectioning of the wall paintings in the temple of Wanla, except at the main inscription, where red lines were used to frame and divide the surface.

A further technique to section the paintings, besides drawn or snapped lines, is the incision of lines with a sharp tool into the plaster. Examinations with direct and raking light have shown that in Wanla only the circles for the mandalas were incised (Fig. 242). According to our observations in other temples in Ladakh it appears as if the incised line technique was primarily used for circles.

150 KRONEWIRTH, SCHMIDT 2008: 21.
151 Red Maitreya Temple Leh, NICOLAESCU, ALEXANDER 2008: 62, Kanji ACHI ASSOCIATION (n.d.), Tsuglag-khang, www.achiassociation.org.
152 KRONEWIRTH, SCHMIDT 2008: 21.



242 Image depicts the use of incision of lines for the mandala. CL 2003.

The paintings in the temple of Wanla, as all religiously motivated images, were carried out according to the iconographic and iconometric rules, as these were of primary significance for the consecration and religious value of the depictions.[153] For the image of each divinity there is a separate set of proportions. The units of measurement are basically divided into small and big sections - twelve units making up a large one. The units do not represent an absolute but a relative size. Their terminology derives from anthropometry, and a small section may thus be named "finger unit", a large one "face unit".[154]

153 LO BUE 2006: 92.
154 JACKSON, JACKSON 2006: 50.

243 The image illustrates the division of the walls which does not appear to follow geometric rules. CL 2003.

The paintings underlie thus strict canonical rules, which explains why the comparatively unaltered artistic tradition has survived in the same form for centuries. According to the historic texts on iconometry, artists who did not observe these rules would thus exert a negative influence on the religious image as well as on themselves, resulting thus in sickness and poor harvests. Incomplete statues had to be either repaired, or burnt if made of wood. Metal objects need to be melted down, whereas those made of stone buried.[155]

Most striking in this context is that the division of the walls in Wanla appear to underlie not so much geometric rules but rather reflect the importance of specific representations. Presumably, to start with, the large, more significant images were sketched and then the rest of the painting was arranged accordingly. Vertical and horizontal lines appear to be drawn in a freehand manner and are thus often not perpendicular.[156]

155 HENSS, 2006: 112.
156 For the use of templates as a method to transfer designs see also SKEDZUHN 2010: 70-72.

244 Horizontal lines are drawn in a free-hand manner which suggests that rulers or similar devices were not employed. AS 2010.

THE ACT OF PAINTING

The painting quality in Wanla varies, as previously mentioned, from storey to storey. On ground floor the paintings are more detailed and differentiated than those on gallery and lantern level. The representations are fashioned here with a wider range and higher intensity of colour and the figures are diligently modelled and shaded. In addition, the paint layer appears to be thicker, in some areas even so thick, that a few small details appear to be rather embossed.
Generally, after the preparations for the painting ground were carried out, the wall sectioned and the mandalas incised, the paintings were executed.
The act of painting usually consisted of carrying out the preparatory sketches, the colouring and the contour lines. Preparatory sketches of the images in Wanla have so far only been found on gallery level. Here they were made with a red colour that was applied onto the primer (Fig. 245).
Jackson and Jackson point out, that usually the master painter was in charge of the preparatory sketches.[157] This was considered to be an honourable and holy act and represented therefore a more significant part of the painting than the actual colouring of an image.[158] Part of this established system were also the rules pertaining to the colouring of the divinities.[159] The system of colour design in painting is carried out as efficiently as possible. This explains the colour coding system in Tibetan painting that still today is widely in use. Prior to the execution of the colouring, every painting detail was assigned with a number or an abbreviation of the intended colour.[160]

157 JACKSON, JACKSON 2006: 50.
158 LO BUE 2006: 92.
159 LO BUE 2006: 93.
160 During conservation work in a temple in Ladakh a small clay figurine representing a turtle was found, presumably employed as a colour legend for the painters. One side of the figurine is divided into 9 squares and painted in 9 colours with the corresponding abbreviations, see SKEDZUHN 2010: 74-76.

245 Image shows red preparatory drawing in areas where paint layer has been lost. AS 2010.

The master painter usually determined the colour design; his assistants and apprentices then carried out the actual colouring.[161] Coomaraswamy mentions the colour coding system in his notes on the A*bhilasitarthacintamani* translations. In unfinished paintings signs and colours mark the areas intended for the corresponding colours.[162]
So far, the application of this method has not been found in the wall paintings in the temple of Wanla. Other temples in Ladakh, though, indicate that this system had been employed. Examples for this are the Red Maitreya Temple in Leh and the Lhado Lhakhang of the Tsatsapuri-complex in Alchi and the Tsuglag-khang in Kanji.
After sketching the images, presumably first the red background was painted. Further steps included the painting of figures and details. Depending on the desired colour several areas were first covered with their respective underpainting. This system is used for glazes, or pigments, such as specific ochres, which are too transparent for being used without an underpainting. Additionally, a painted area, which consists of more than one paint layer, appears to have more depth. The *Abhilasitarthacintamani* mentions the use of these underpaintings: orpiment, a bright yellow pigment, should be put onto a surface before blue or ochre is applied.[163]
This is consistent with the structure of the paint layer in the temple of Wanla, where orpiment can be found underneath the layer of ochre. Light colours were employed for the underpaintings and accordingly, light green lies below a dark green (Fig. 246). Another important reason for using differently coloured underpaintings is the shading of painting details.

161 JACKSON, JACKSON 2006: 93.
162 COOMARASWAMY 1934: 74.
163 COOMARASWAMY 1934: 64.

246 Image shows a painting detail with partially exposed underpaint in light green colour. AS 2010.

According to Jackson and Jackson there is a variety of shading methods in Tibetan painting.[164] Basically, the shading technique can be divided into a dry and wet shading system, which can also be combined.[165] The dry shading system is divided into various methods and among them are the "grain" or "dot" shading, where small points are laid onto the paint surface; the "cloud" shading, characterized by painted horizontal bands, and the "rain" shading system with vertical thin brush strokes.[166] The "dot" shading for instance was employed in the Sumtsek paintings in Alchi, as can be clearly seen with the representation of the Green Tara. An example for a wet-shading method is the shading with washes of various transparencies, as it was used in the temple of Wanla (Fig. 247-249).

164 JACKSON, JACKSON 2006: pp. 97.
165 JACKSON, JACKSON 2006: 111.
166 JACKSON, JACKSON 2006: 111.

247 The concentric shading is visible on the body of the horse. AS 2010.

248 Example of shading with washes in blue, orange, green and pink. CL 2003.

249 The image shows a painting detail with diluted washes in a reddish colour. Note also how fine details in black and white were added as a final stage of the painting process. AS 2010.

250 Painting detail with black contour lines and details in white, red, black and yellow. CL 2003.

These painting details are carried out in many layers and are characterized by modelled and shaded representations, where concentric, transparent washes follow the different shapes. The analysis of a pinkish sample from the temple has demonstrated a multi-layered transparent colour wash with an increase of colour intensity towards the paint surface.[167] The coloured underpainting serves here as the basic colour for all subsequent layers of the shading process.

Which kind of representation was embellished then with contour lines followed traditional guidelines. Objects could therefore stand out from their surroundings, and details and textures could be defined. Also minuscule details such as eyelashes, eyes and jewellery were accentuated.[168]
In the temple of Wanla, black was employed for the contour lines of figures, whereas tiny details like eyes, lips and jewellery are painted in red, white, black and yellow.

167 KÜNG 2010: 4.
168 JACKSON, JACKSON 2006: 129.

251 The contour lines were first executed in white, then in black. AS 2010.

252 Figure with gilded details finished to a high shine. CL 2003.

253 Gilded details with a matte appearance. CL 2003.

Investigations on ground floor show that the contour lines were not only used for final editing, but applied also during earlier steps of the painting process; below some areas covered with colour glazes, ornaments are indicated with fine lines. Presumably they were executed before the glazing process, to lessen the stark contrast of light and dark.
The final outlining, writes Chakrabarti, "is given a pride of place in Indian painting, which begins with the line drawing and ends with the finishing outline. In fact it is the vital element, and even it may not be an over-exaggeration to call it the soul of Indian art."[169]
In this respect, the passage of the Indian *Visnudharmottara* indicates the chief importance of contour lines stating that the "masters praise the outline; connoisseurs (Vicaksana) the shading; women desire the jewels, other the richness in colour (Varnadhya)."[170] Jackson and Jackson mention, that the painting process was concluded with the "eye opening" ceremony, where the eyes of the main divinities were painted. With this act the divinity was brought to life and thus being part of the consecration of a temple or a painting.[171]

APPLICATION OF GOLD

Gold can be found on several walls on ground floor in the temple of Wanla. It is visible on the garments and jewellery of various divinities. It is remarkable that the gold-covered areas appear to be either matte or burnished. Linear gilded areas are matte, the representation of jewellery like earrings are worked to a high shine.
Whether the gold was applied as gold powder for both purposes or whether gold leaf, subsequently burnished, was employed for the shiny parts, still has to be analysed. In Tibetan paintings the use of gold is considered to be a sacrificial offering, augmenting the commendable act of the client.[172]
General practise in gilding techniques of Western arts and crafts is to cover the surface before gilding with a colour. Often yellow ochre or a reddish colour is employed. The yellow ochre serves to mask any kind of mistake that may occur during the gilding process, such as slightly torn gold leafs. Red or orange colours enhance the brilliance of the gold and give it a fiery quality.
Whether the surface of the wall paintings in the temple of Wanla was covered with a yellow or red colour prior to gilding has not been established yet. Jackson and Jackson only mention a yellow (ochre) that is applied onto large surfaces before the gold powder is put down.[173] From other examples in Ladakh we know of the use of the yellow orpiment or red vermilion as an under-painting for the gilded details.[174]

169 CHAKRABARTI 1980: 90.
170 COOMARASWAMY 1932: 14, lines 11-12.
171 JACKSON, JACKSON 2006: 139. An astronomer, who chooses the most appropriate date and time, establishes the day for this act. This is also true for any kind of important ceremonies such as weddings.
172 JACKSON, JACKSON 2006: 102.
173 JACKSON, JACKSON 2006: 103.
174 NICOLAESCU, ALEXANDER 2008: 68.

PIGMENTS AND BINDERS

Particular pigments had to be bought, as they can only be found and quarried in determined regions.
Another important point, which very often impacts the spectrum of pigments in wall paintings, is the used binding medium. Many pigments do not support the alkalinity of a lime plaster, which is one of the most common supports for wall paintings all over the world.[175] The wall paintings in the Western Himalayas, though, are carried out on an earthen plaster support with an aqueous binder. So there are much less restrictions concerning the variety of employable pigments.
To fix the pigments on this type of plaster, an organic binder has to be employed. In Indian mural painting technique, traditionally a wide variety of binders, such as glue, gum, resin, casein or egg was used.[176] However, in Central Asia and the Western Himalayas the use of plant gums and starch or of animal glue was obviously most common.[177]
According to other sources of thangka painting tradition, only specific divinities may be created with animal glue.[178] The "benevolent" divinities are painted with plant glue/sap, and the fierce ones with animal glue.[179]
Jackson and Jackson mention that an artist, for particular paintings, would employ only materials that do not derive from animals, thus enhancing the religious strength of the depiction [180] or, that those paintings which have been created by famous religious master painters with particular materials such as their own nose blood have an even higher religious value.[181]
Analyses of the paint layer of the temple in Wanla have provided results indicating the use of proteins in the binding medium, sometimes found in addition to an oil. The combination of protein and oil could be an evidence of the use of egg as binding medium, but further detailed analyses will have to be carried out.[182]

In comparison, the analyses of other wall paintings in the geographic and/or stylistic vicinity revealed that the pigments in the Alchi Sumtsek were bound in plant gum or sap and size[183], and examinations of the paint layers in the Tsug-lakhang temple in Kanji[184] and in the temples in Nako identified protein, probably animal glue, as a binder.[185]
Concerning the pigments in the Tibetan-Buddhist painting tradition, the use of particular materials does not depend solely on their availability and their workability, but also on their link to the actual representation and religion altogether. According to Griesser the use of fine and precious pigments such as azurite and malachite can be considered an outstanding merit.[186] Precious metals like gold are considered as having a particularly high merit and the client, if it would have been in his/her economic capacity, would have enhanced the painting with gold or silver, which in turn augmented the religious power of the image.

175 This is especially true for the buon fresco method where the pigments are bound into the wet lime plaster. The fresco technique (buon fresco) has been used however very rarely in Indian wall painting, but rather always the so-called fresco-secco or pure secco techniques. COOMARASWAMY 1934: 60, CHAKRABARTI 1980: 15.
176 CHAKRABARTI 1980: 61.
177 BIRSTEIN 1975: 8, DASSER 1996: 274, BOGIN 2005: 47.
178 Information kindly given by a thangka painter from Kanji in July 2009.
179 Information kindly provided by a Tibetan thangka painter in Choglamsar in July 2010.
180 JACKSON, JACKSON 2006: 115.
181 JACKSON, JACKSON 2006: 12.
182 BLÄUER 2011: 1.
183 DASSER 1996: 274.
184 JÄGERS, JÄGERS in 2003.
185 BOGIN 2005: 213.
186 GRIESSER 2008: 37.

So far, only some analyses of the paint layer in the temple of Wanla have been executed.[187] Through samples analyses, azurite, ochre, orpiment, indigo, red lacquer and carbon black could be identified. The presence of cinnabar still has to be verified. This colour palette is typical for this period in this geographical area.

Carbon black was utilized for black areas and it appears also in mixtures with a pink coloured dye. In addition, carbon black was also employed as an undercoat for azurite. Azurite with carbon black and brown-orange ochre was used for blue areas. A brown-orange ochre was utilized as undercoat for dark blue.[188] Green can only be found as a mixture of orpiment and indigo.[189] The examination of a sample with a blue dye - presumably indigo - could establish also the presence of a fibrous mineral[190], which could be an indication that indigo was mixed with some *Karsi* material. Further examinations will have to be carried out to verify this assumption.

Some of the sample analyses executed so far, seem to suggest that cinnabar was employed, which however now seems to present itself in an altered blackened form.[191] Further analysis will be necessary to confirm the presence of cinnabar. Interestingly, the samples presumed to contain cinnabar are taken from a wall at gallery level, which is the area most exposed to light within the whole temple interior. The poor light-fastness of cinnabar was a known fact in the past and advised against for wall paintings.[192]

We may only make assumptions as of the pigments' origins. Some ochre sources are known in the vicinity of Wanla. Both the red ochre - employed to paint temple facades - and the yellow ochre are found. Other pigments originate probably from regions further away.

CONCLUSION

The comparison of the the wall paintings in the temple of Wanla and other paintings in the region demonstrate that the Wanla murals are an outstanding example of these historic work techniques. In fact, the use of gold underlines the high quality of the paintings and indicates the importance of the Wanla kingdom during the times when they were created.

Also in the Western Himalayas modern synthetic colours and binders have completely changed the painting technique and visual qualities of paintings. Before the use of these new materials, the painting technique had only slightly changed over the centuries. One example of these changes is the dot shading method as employed for the Green Tara in the Sumtsek in Alchi, which has become obsolete in later Tibetan wall paintings.

In general however, the comparison of paintings of different periods shows that they correspond to the ancient writings of Indian painting technique. This makes it difficult, as in the case of the temple of Wanla, to compare and date the different paintings based on the technological criteria.

187 Examinations in 2005 und 2006 by the Expert Center in Zurich and CSC Sàrl in Fribourg in 2011.
188 KÜNG 2005 b: 1-6.
189 KÜNG 2005 a: 16.
190 KÜNG 2010: 5.
191 KÜNG 2010: 6.
192 ISTUDOR 2007: 26.

8 APPENDICES

254 North-eastern view of the chortens. DL 2009.

255 Top view of the gateway chorten. HN 1998.

256 The passage through the gateway chorten. DL 2009.

8 APPENDICES

Holger Neuwirth

THE PAINTED GATEWAY CHORTEN

The gateway chorten is located at a spot in the valley where the access path to the temple coming from the settlement branches off from the bottom of the valley. After passing through the gateway chorten, the path climbs steadily upwards, finally reaching the temple's entrance and front area. The gateway chorten offers a stunning view with its striking red colour, monumental size and shape. It is also surrounded by numerous votive chortens and an accumulation of mani stones. The path passes through the chorten's square-shaped pedestal. The chorten's central cap is emphasized by four smaller chortens which are attached to each of the four corners of the pedestal. In the middle of the pedestal, there are niches on both sides. Inside the square-shaped cap of the chorten mural paintings have been preserved on the four walls of the inner chamber.

Bob Linrothe's article on the etymology of the Kankani Chorten not only mentions that kankani is used as a word for "door", but also makes reference to Aksobhya, on the other. Together, "kankani chorten" implies action and, thus, means "the chorten of dispelling evils". While the paintings inside the chorten were probably added during the 16th or 17TH century, the structure itself is likely to date back to an earlier period.[193]

193 See LINROTHE 2006: 171–179.

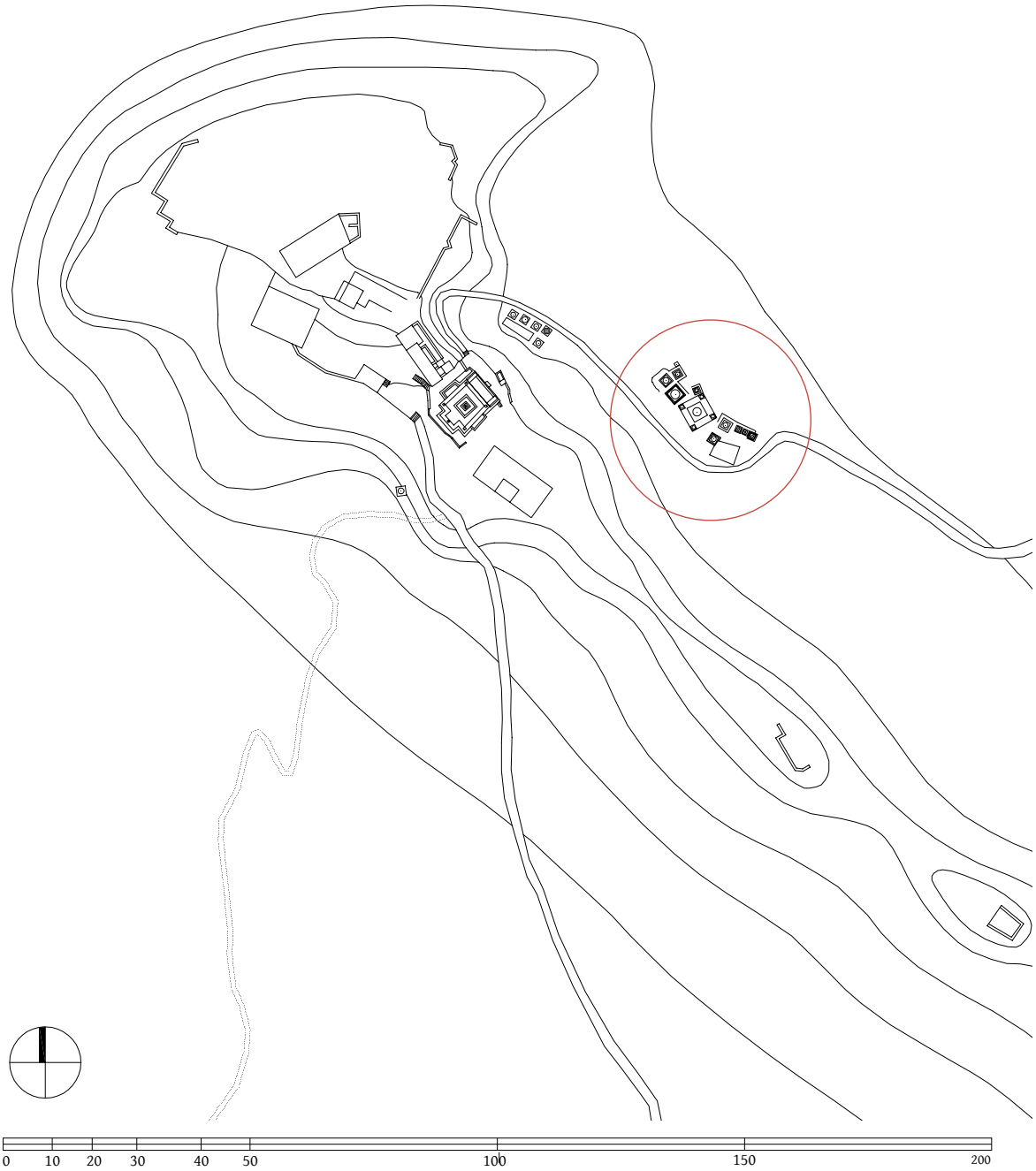
257 Ceiling construction inside the gateway chorten. DL 2009.

258 Opening to the painted chamber inside the chorten. DL 2009.

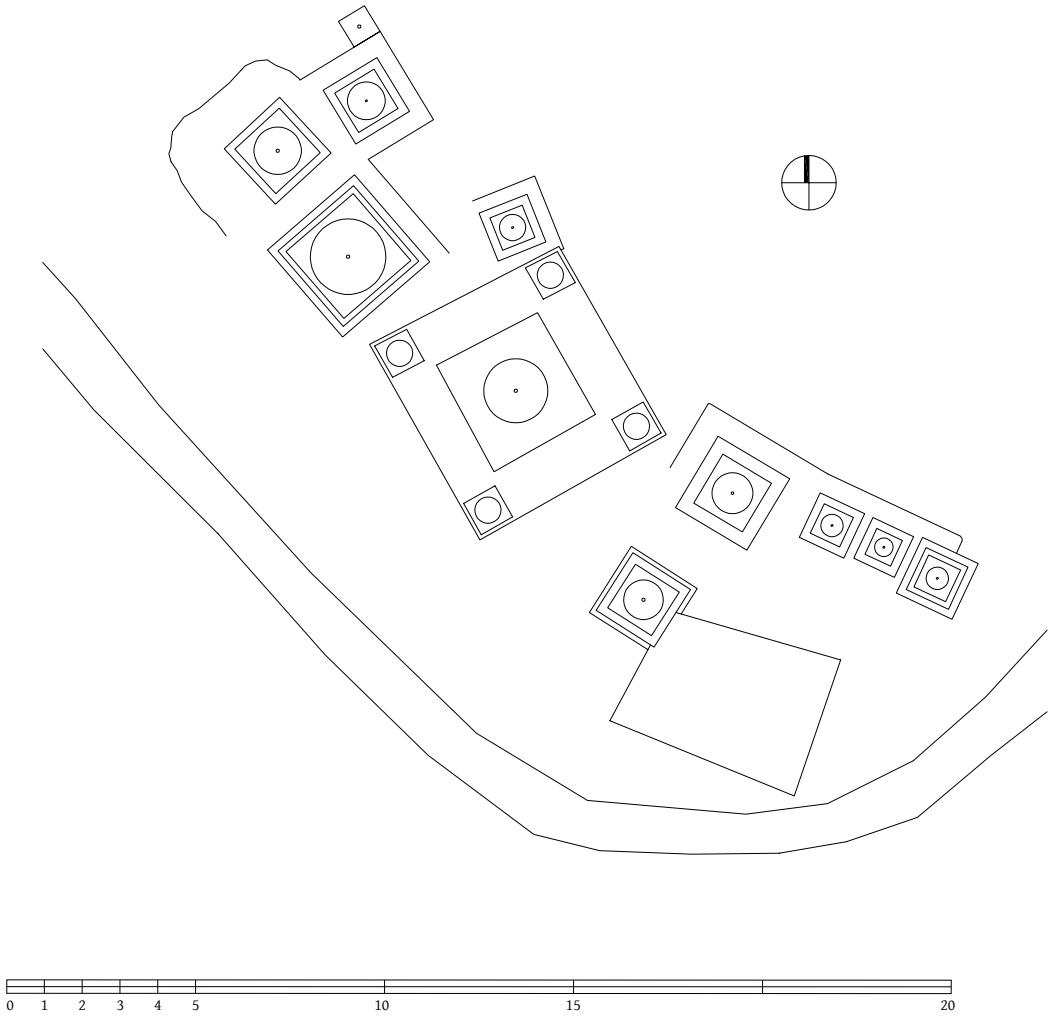
259 South-western (above) and north-western interior walls of the gateway chorten. DL 2009.

260 North-eastern (above) and south-eastern interior walls of the gateway chorten. DL 2009.

PLAN DOCUMENTATION

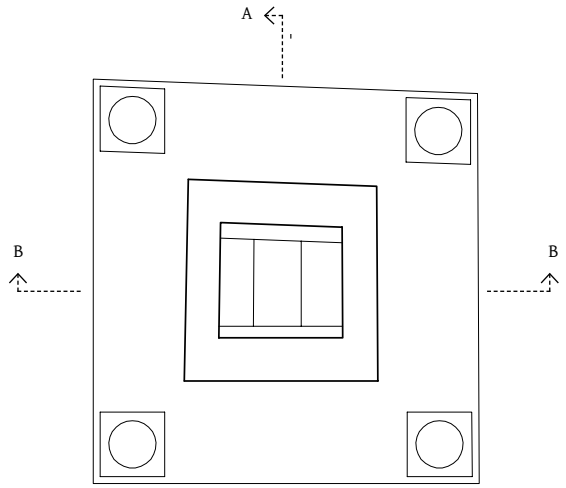


261 Site plan showing the location of the painted gateway chorten at the eastern side of the temple. TU Graz 2014.

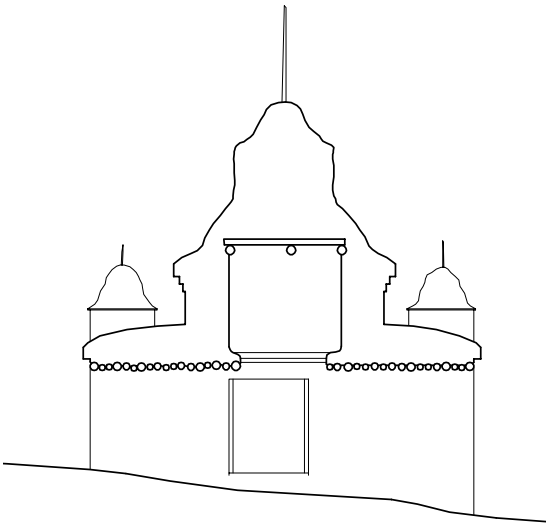


262 Roof plan of the group of chortens with the gateway chorten in the centre. TU Graz 2014.

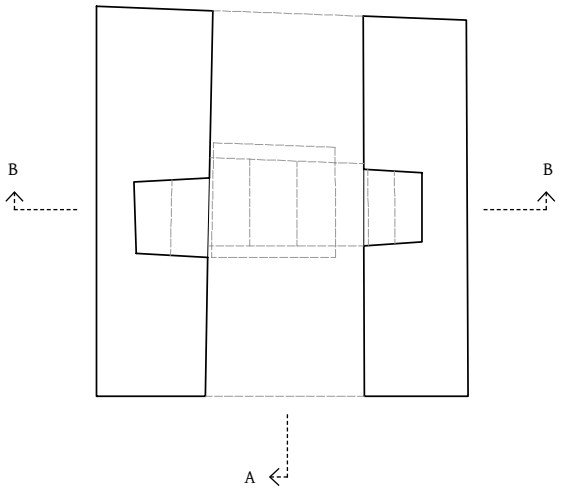
SECTIONS



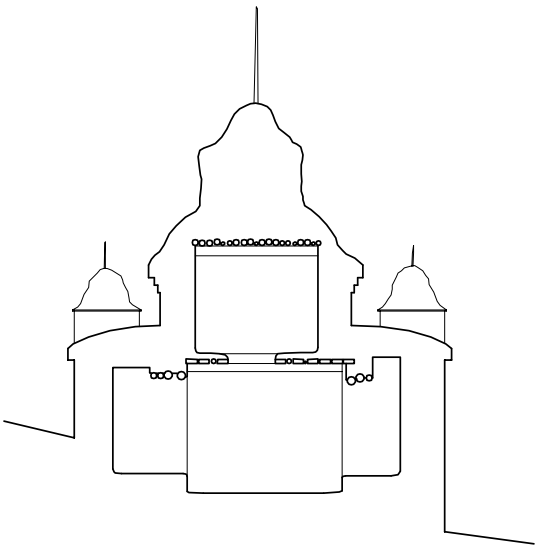
Horizontal section of the upper part



Longitudinal section A-A

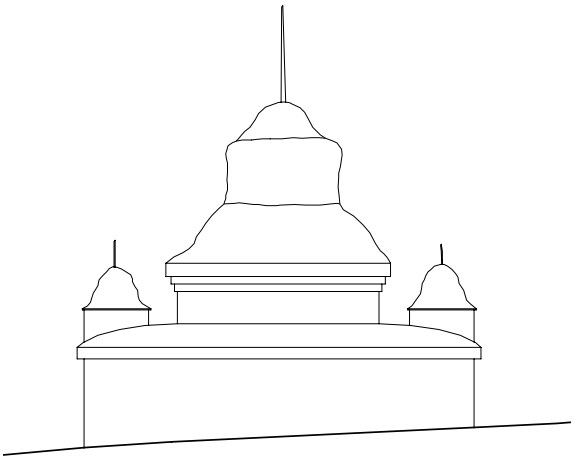


Horizontal section of the lower part

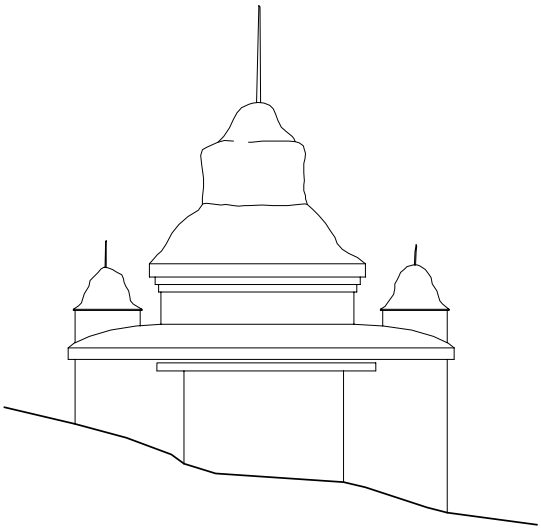


Cross section B-B

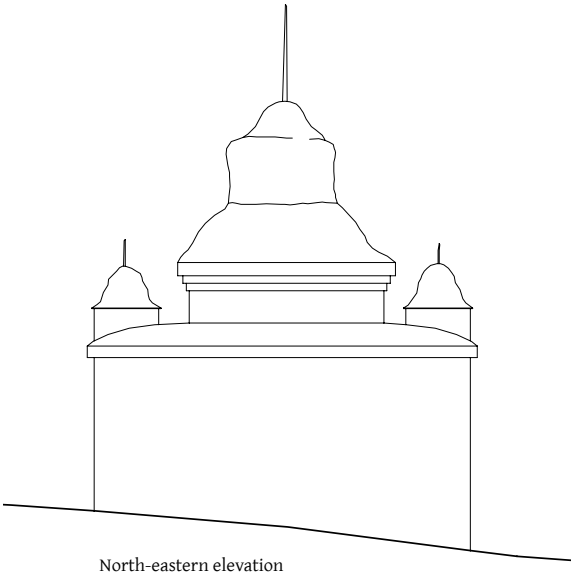
263 Horizontal and vertical sections of the gateway chorten. TU Graz 2014.



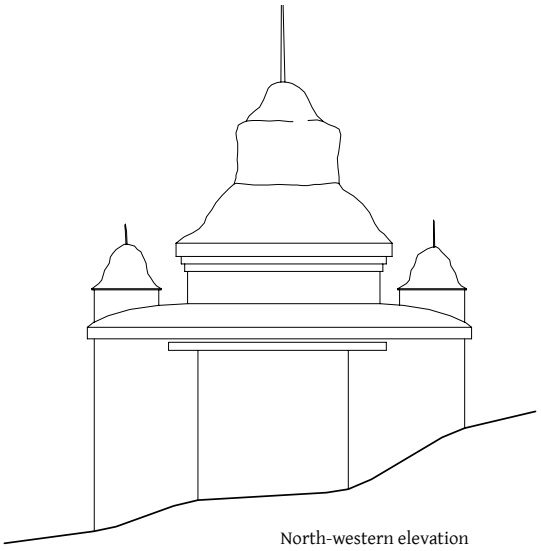
South-western elevation



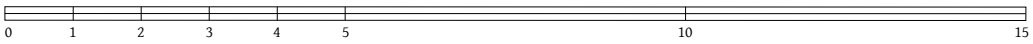
South-eastern elevation



North-eastern elevation



North-western elevation



264 Elevations of the gateway chorten. TU Graz 2014.

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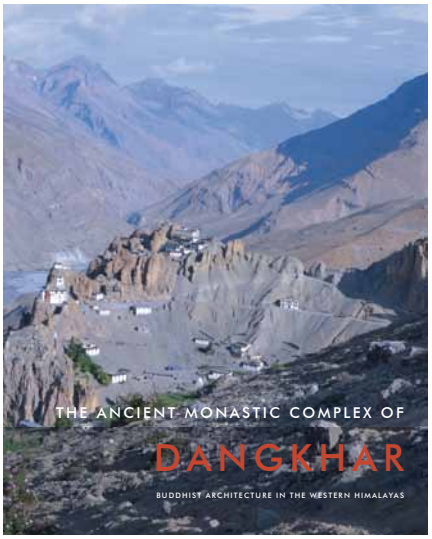
THE ANCIENT MONASTIC COMPLEX OF

DANGKHAR

BUDDHIST ARCHITECTURE IN THE WESTERN HIMALAYAS - VOL. 1



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Dangkhar is located within the Spiti valley in Himachal Pradesh, India, a region inhabited by a Tibetan-speaking population for more than thousand years. The ancient monastic complex, situated in the village of the same name, is nested on a vertiginous cliff at the impressive altitude of 3,850 m overlooking the meanders of the Spiti-Pin river confluence. The origin of this fortified site is believed to go back to the 10th -11th century when a powerful dynasty of royal patrons and kings initiated a Buddhist renaissance in the Western Himalayas. It gradually assumed the double function of a political centre and a religious establishment and witnessed the various influences from the neighbouring states (e.g. Ladakh, Tibet) which competed for political supremacy and religious hegemony. Despite the lack of historical sources and archaeological evidence available, the monastery of Dangkhar is intimately linked to the history of the Spiti valley which was an important centre for trade, communication and religious ideas between the Indian subcontinent, Central Asia and West Tibet.

After Markus Weisskopf had secured the funding, the research project was launched at Graz University of Technology with the aim of compiling accurate documentation of the ground plan and buildings of the monastery area as a basis for a restoration concept. The first field research in Dangkhar finally took place in summer 2010 under the expert leadership of Holger Neuwirth who was assisted by Carmen Auer and Dieter Bauer from Graz University of Technology, and actively supported by Lobsang Nyima Laurent, a Swiss archaeologist and Buddhist monk at Tashi Lhunpo Monastery, South India. In order to complete the documentation elaborated in 2010, the fieldwork in the following year included the participation of various actors. Due to the nature of the location, a geological assessment of the site and its stability were evaluated in an interdisciplinary cooperation with the Institute of Applied Geosciences of the TU Graz. A team of restorers from the University of Applied Arts Vienna surveyed the wall paintings of Dangkhar and elaborated the technical preconditions for their restoration. This publication presents the cumulative data gathered during the fieldwork research program 2010 and 2011.