

GUARDIANS OF THE EARTH: CULTURAL DIMENSIONS OF EARTHEN ARCHITECTURE IN LADAKH, INDIA

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Abstract

In the arid mountainous region of Ladakh (northern India), people have developed a unique relation with the austere environment in which they live. This is reflected in a range of belief patterns and traditions that influence their habitats. Each Buddhist village has its own mountain deity (*lha*), which protects the village from evil and misfortune often seen in natural calamities, including drought and floods. The layout of every village is marked by symbols of protection, as are the houses within the village. Rituals and beliefs associated with the construction of traditional earthen- and stone-masonry houses reflect this constant need for maintaining a balance with nature. The selection of sites for construction of houses and, even more so, for monasteries and temples is governed by special consultations with astrologers, most notable being the monks from Tagthog monastery in southwestern Ladakh. From the first digging of the foundations and the placating of the earth lords, to the laying of the roof and the final blessing of the house, everything is marked by rituals. To this belief was added the deep knowledge of the traditional village mason and carpenter who knew exactly what kinds of mud, stone and timber were to be used for what purpose. Today as these beliefs gradually erode and modern construction materials replace traditional material, the impact is being felt on settlement patterns and the architecture across the region. The flashfloods of 2010, one of the worst in living memory, highlighted the loss of some of this traditional wisdom as newer construction fell prey to the wrath of nature. This paper will highlight some of the indigenous practices and beliefs associated with the earthen architecture of the region, the gradual decline of this traditional knowledge base and its resulting impact on Ladakh today.

1. INTRODUCTION

In geographically remote and climatically harsh regions of the world, many communities have developed a unique relationship with their landscape which is manifested in all forms of culture. This is particularly true for Ladakh where its indigenous architecture and the associated belief and knowledge systems have for centuries dictated how, where and when a building should be built. It is these knowledge systems stemming from centuries of experience that permitted a relatively sustainable lifestyle. These belief and knowledge systems functioned as informal planning and building guidelines. The gradual erosion of these knowledge systems and their replacement with unsustainable development frameworks, are proving detrimental to the fragile earthen architectural landscape of Ladakh.

1.1 Geography and climate

The arid cold desert region of Ladakh in northern India is one of the world's highest inhabited places, which is flanked by

two of the world's highest mountain ranges, the Karakoram and the Himalayas. The area is essentially a cold arid desert where temperatures plummet in winter to -40°C and can rise in summer to over 30°C. The region is denied access to the monsoon-laden winds that sweep across much of north India by the Great Himalayas. So the main source of water remains the glaciers and heavy winter snowfall that feed the network of springs and streams. Many of these streams eventually join the major rivers that traverse the region. Foremost among them is the River Indus, which begins its journey near Mount Kailash in Tibet and enters Ladakh at Demchok, about 155 miles (250km) southeast of Leh. According to one legend, the river emerges from a large opening in the shape of a lion's mouth and the mighty Indus is, therefore, given the name of Sengge Khabab (Lion's River). The Indus continues flowing through the central Ladakh heartland, before entering Pakistan. It was along this river and its tributaries – the Zaskar, Shayok, Nubra and Suru Rivers – that human settlements first arose (NIRLAC, 2008, Vol. 2, i).

1.2 Historical introduction

The valleys have been home to humans since at least the Bronze and Iron Ages (2500-300 BCE). The mountain passes created a network of routes that linked Ladakh to the larger region of Tibet and Sinkiang in the east and Central Asia in the west. Apart from trade, the routes also served as corridors of exchange for building and decorative arts, religions and cultural practices. One of the most significant movements of Buddhist novices and teachers travelling from the great Buddhist universities of Kashmir and Bengal in India to Tibet resulted in the introduction of Buddhism to Ladakh and Tibet. In Ladakh as in neighboring Tibet, Buddhism was accepted here in waves, successfully amalgamating the local animistic and nature-loving deities, many of whom became protectors of the new faith. Thus sacred mountains depicting the protectors, village-mountain deities and underworld deities became part of the landscape helping people maintain a balance with nature. The architecture of Ladakh arises in this setting – one element in a complex web of relationships.

2. SETTLEMENT PATTERNS – THE SACRED AND CULTURAL CONTEXT

2.1 The heavenly, earthly and underworld realms

The Tibetan Buddhist landscape is divided into several realms – the realm of the gods (*lha*), the realm of human beings and the realm of the underworld deities (*lu*). Each realm has its place in the balance of nature and a disruption of this balance can lead to catastrophes and misfortune. Each Buddhist village in Ladakh has its own protector deity (*lha yul*) who often reside up in the mountains. An earthen altar (*lha to*) for the deity is built by the village community usually in the purified setting of the mountain overlooking the settlement. Almost every village has its own story of how the village deity came to reside there, often at the time of the first settlement. Every year, the *lhato* is renewed with much ritual including the replacement of offerings of bundles of juniper (*shug pa*) branches, known for its purification properties, at the time of Losar (Ladakhi New Year) when the mountain deity's protection is sought. In some villages, the *lha* is manifested through an oracle every year, as in the case of the village of Shey. The oracle can make prophecies for the coming year, as well as give strict guidance for any transgressions. Interestingly, in the case of Shey, the oracle manifesting the spirit of the deity, Dorje Chenmo, has in recent years been speaking out increasingly on the need to preserve ancient earthen chorten (Buddhist stupa) and temples. The oracle's proclamation has a deeper impact than any government policy. Angering the oracle can prove disastrous and if the guidance is not followed the oracle may refuse to appear the following year – causing further calamity. The next realm is that of humans. This realm is also exposed to malevolent forces in the forms of *tsan* – a type of demon who



Fig.1 A traditional Buddhist house with marks of protection – a rigsum gonbo built over the entrance and red markings on the walls to protect the house from the tsan (credits: Tara Sharma, 2011)

can inhabit a person and cause disease and misfortune to befall a house or locality. To protect the house against the *tsan*, protective markings in red color are painted on the exterior walls of houses. The third realm is that of the underworld serpent deities known as *lu*. The world itself is believed to rest on a mythical serpent on whose coiled body the earth rests. The *lu* are very powerful, controlling the supply of water and the balance of the earth. Disturbing them could result in catastrophes usually occurring in the form of natural disasters, such as floods, earthquakes, drought or epidemics. Specific cubical-shaped earthen structures known as *lu bang* (residence of the *lu*) were erected in the pastures (in fact, near most water sources) to placate the *lu*. The *lu* find mention in many folklores. In a legend of the 9th century, it is said that the Buddhist sage, Nyima Gungpa, was meditating in the Ladakh region, which at the time was covered by a network of lakes. These lakes were ruled by the *lu* who resided deep below. Impressed with the sage's meditation, the *lu* offered him a place to meditate in the middle of the lake. The saint blessed the lake and its water gradually began to recede, enabling human beings to settle here. He offered votive offerings to the *lu* and prophesied the founding of a great monastery. The ritual offerings of barley were tossed into the lakebed, which sprouted in the shape of a swastika (*Yung-drung*). This site later became the site of the Lamayuru monastery. 2.2 The traditional village setting In the past, settlements were usually located along the mountain slopes, often clustered together, and surrounded by protective fortified walls, with village fields located in the midlands, lower down the slope. The ruins of hilltop fortifications are found throughout Ladakh. Comparisons with still-occupied settlements suggest that these ruins were sometimes villages clustered around the castle of a local ruler, and sometimes an independent settlement built for self-defense. As defense became less imperative in more settled times, villages began to disperse into their fields, and the rulers' palaces were built in more accessible locations (Harrison, 2005, pp. 20-33). In many older villages these settlement patterns can still be seen. Most



Fig.2 Monastery at Chemday with monks residences built along the slope of the hill and village fields beyond. The village today extends on the flat plains at the foot of the hill (credits: Tara Sharma, 2013)

monastic settlements still display this setting. In Ladakhi folk literature, an ideal village is portrayed as having its head (upper regions) touching the snowy mountains, which form the source of water for the streams and springs that irrigate the land, a central broad midland with fields surrounded by verdant hill slopes on the side ending in a thin tail which forms the outlet for surplus water and floods. In a popular folk song, Lha Yul na Mi Yul (between the Land of Gods and the Land of People), this setting is appreciated by the villagers of Shakar who praise their king for this beautiful land (Khan, 1997, p. 197).

The boundaries of the village are often marked by symbols of protection. In a typical Buddhist village, the entrance and exit to the village is marked by rows of long mane walls and chorten. These are circumambulated by the villagers as acts of merit, which garner protection for the lives of all sentient beings. Chorten are also built as acts of merit following a natural disaster. In the village of Lingshed, the Lung Ze Mane ("mane in the middle of the fields") chorten was built to protect the fields from drought and insect attacks. In 2011, a number of chorten are being built across Ladakh following guidance by H.H. The Dalai Lama to build them at specific locations across last year's flood-affected villages for the benefit of all sentient beings.

Consultations with senior Rimpoches (abbots) are constantly taken by the village community to understand what needs to be done to protect the village from disasters. More specific structures, the rigsum gonbo are built particularly to address natural calamities. Interestingly, a mapping of these structures gives some indication on sites of previous flooding, landslides/rock slides. In a study carried out last year (INTACH, 2010, pp. 41-42), it was discovered that the flood paths followed older routes, and evidence of earlier flooding were highlighted by the presence of rigsum gonbo at vulnerable points.

2.3 Changing settlement patterns

Over the past century or so, settlement patterns have changed. Initially the move was made lower down the mountain slopes. Over the past 50 years or so, the move is towards the village streams or on the barren boulder-strewn flood plains – a dangerous pattern that was highlighted in the floods of 2010. In the case of Leh town, the gradual expansion of the town to the suburbs has resulted in rampant development along flood-prone tracts. Choglamsar, the worst affected settlement in the 2010 flash floods, is a recent settlement where much

of the construction was built over subterranean networks that channeled water outflows from catchment areas up in the mountains towards the river Indus. With a scarcity of space for expansion, reconstruction of flood-affected homes and commercial complexes continue even today in these very areas.

However, in other instances, particularly in the villages, it is the breakdown of traditional knowledge and belief systems that has resulted in increased construction on pasturelands and along the banks of streams. This is one of the major causes of damage in recent flooding. When natural calamities occur, it is ascribed by a senior monk, to a disturbance of this natural order where human beings have not fulfilled their role in maintaining the balance.

3. EARTHEN ARCHITECTURAL TRADITIONS AND PRACTICES

3.1 Selecting the site – sacred and cultural considerations

Within the village, there were belief systems that governed where houses could be constructed. The selection of a site for construction was determined after lengthy consultations with learned *lama* (monk) and *onpo* (astrologers) – monks from Tagthog Monastery being some of the most well-versed in the field of astrology. The traditional almanac is consulted to determine an auspicious time for digging. This contains information on the subterranean spirit lords of the soil (*Sa-bDag*) who move their position according to the cycle of the years, months, days and hours and infringing on their geomantic space can incur their wrath. The Wheel of Sadak Tochey was used in the astrology of geomancy for laying the foundations of monasteries, stupas, palaces, houses etc.

The wheel depicts the earth lord with the upper body of a human and the lower body of a reptile. After precise calculations of an auspicious time of year and selection of the site, the initial ritual digging is located under the left armpit of the earth lord (Men-Tsee-Khang, 2012). Blessings are taken from the gods and permission from the earth lords before beginning any construction through ritual purification of the land (*sab chog*) and recitation of Nang Gyad to place the underworld deities.

The site was usually never selected too close to major water sources (such as the pastures where village springs emerge or the major village streams) where the *lu* are believed to reside.

The house would not be built at the foot of a mountain that projects out onto a ridge nor in front of a mountain that has a second mountain hidden behind it (*rhi wo phag te* – a mountain that cannot be seen), as the second mountain could be malevolent and cause harm to the inhabitants. Interestingly, this belief translates into more a pragmatic rationale of not building along the route of water catchment areas that can flood in times of heavy precipitation.

3.2 Architecture and layout

The Ladakhi house has evolved over centuries and portrays a remarkable evolution of building knowledge and craft skills combined with an intrinsic knowledge of the landscape in which it flourished. Built primarily out of earth (adobe and rammed earth), stone and the scarce timber, the houses testify to the knowledge of the ancient building craftsmen. The layout of houses was dictated both by socio-cultural needs and, more importantly, climatic considerations.

Houses are generally double or sometimes three-stories high. In the more remote villages, they could be just a single story. The architecture is very robust – massive walls at the ground-floor level, which narrow upwards towards the roof. In some of the oldest single-story houses, the central living room cum kitchen, known as the *chantsa*, was surrounded by the various animal pens. The *chantsa* served as a living room cum kitchen, where the traditional clay stove burned through the day warming the room. Families usually slept in this room as well. A single opening in the roof permitted the smoke to escape. In some of the oldest houses, this room has no window opening at all. The *chantsa* was surrounded by a passage or *srol* around which the other rooms were arranged. There were animal pens around the *chantsa* – *tangra* for cows and sheep and the *stara* for horses. The heat generated by the animals helped retain warmth in the mud walls of the *chantsa*. In summer, the animals were kept in an open pen outside the house known as the *yarlas*.

Near the *chantsa* was the *changkhang*, where the traditional fermented-barley beer was stored in large jars. The *dzod* was used for storing grain, while the *bang* stored vegetables. In a corner of the house on the ground floor was the *shilkhang* or cold room where dairy products, such as milk, curd and butter were stored. Water channels were cut at the corner of the room and covered with stones to keep the room cool (NIRLAC, 2008, Vol. 1, p. xiv).

In the more affluent houses, the ground floor was used to stable animals and store fodder for the winter months, the first floor used as winter habitation, while the second floor was used for summer habitation.

Openings are kept to a minimal at the lower level – usually narrow slit-like openings for ventilation. Before the advent of glass, the windows of the upper levels although larger than the openings of the ground floor remains relatively small. Grand wood-carved *rabsaal* (projecting timber-framed balconies sometimes with intricately carved lattice screens) were seen in the more affluent houses.

The layout of houses has altered dramatically over the past 50 years. Houses are built on low plinths of stone masonry with larger window openings at the ground-floor level itself. Concrete frames are now erected within which mud-brick walls are built often of a single-brick thickness. Walls are no longer tapered but are of uniform width from base to roof. The roofs, considered to be the most vulnerable part of the house, is now increasingly being laid in concrete with metal or PVC pipes providing drainage. The advent of glass permits wider window openings



Fig.3 A lubang built over a boulder near the village pond, Chemday (credits: Tara Sharma, 2012)

and the introduction of a glazed room, usually at a south-facing corner of the house, is today seen in almost all houses. The recent floods highlighted the danger of some of these changes, as large boulders crashed through the fragile walls and window openings causing serious damage to the affected houses.

3.3 Traditional materials and techniques

The architecture of the region highlights the judicious use of scarce resources – walls are generally built of sun-dried mud bricks based on foundations of stone masonry. The ground floor is built in stone masonry, while the upper levels are constructed in adobe. Timber ring beams encircle the masonry ensuring seismic stability. Timber posts and lintels provide the structural framework for the building. In the past, only local timber would be used, which was primarily poplar (*yarpa*) and, in rare cases, juniper (*shugpa*) – the latter being used largely in temples. Today, timber is brought in from neighboring Kashmir, and with relatively easy availability is used more lavishly now.

Window frames, lintels and doorframes were all created out of timber. To begin with, these were sparsely embellished, but gradually became more elaborate with the *shing tsak* (carved timber lintels) becoming a major architectural feature in later architecture.

The roof was laid out in layers – layers of *taalu* (twigs usually of willow), over which were laid layers of *yagzes* or *umbu* (local hardy shrubs), followed by different compositions of mud carefully pounded and laid in courses. Drainage outlets were generally made of timber sections.

The walls were traditionally tapered, narrowing upwards as they reached the roof. An elderly mason, Meme Sonam Palgyes (Chemday), responsible for the periodic repair and new construction

at Chemday monastery, demonstrates the knowledge of the traditional builders. Stone was quarried from specific sites near the monastery and carefully dressed. He points out to the quality of the masonry in older construction where each course is carefully laid and bonded and the slope of the tapering wall measured according to the number of stories. Corners were specially bonded to ensure structural stability.

Varieties of mud (*tsha*) were known to the traditional masons and an understanding of the properties of each type informed what kind of mud was used for what purpose. Local clay/mud pits and stone quarries were sourced for raw materials depending on the financial capacity of the homeowner. Each village traditionally had its own network of sources for procuring raw materials needed for earthen construction. Today, with the advent of modern materials, the knowledge of traditional materials and their sources is gradually being lost.

One such example can be seen in the production of commercial mud bricks. Specific soils were used for the production of mud bricks that were known for their strength. To the soil were added small pebbles or chopped straw to bind the mud together. The soil was usually watered a day before production and then mixed with chopped straw and aggregate as needed. The mixture poured into the moulds (traditionally wooden moulds now replaced by metal frames) was pounded repeatedly with a stout willow branch, especially at the corners to ensure it is well compacted with sharp edges. The mould was then lifted and the brick left to cure for up to a week depending on the weather. The knowledge of the production process is now getting lost. Today, the mud pits are contracted out to migrant labor unfamiliar with the local technique. Mud is poured into the moulds without any additions of straw or aggregates and lightly pressed by hand to form an even top surface. This results in air pockets inside the brick and especially uneven edges.

Stone masonry is another declining local skill today. Meme Palgyes of Chemday highlights the poor quality of construction seen today. He points out newer construction where rough infills of stone are used to fill in the now narrower bases and where there is very little bonding of the masonry. The poor quality of contemporary earthen and stone construction was highlighted in last year's floods.

3.4 Traditional calendar of repair, renewal and maintenance

The deterioration or decay of earthen architecture is attributed to the action of natural elements – earth, water, fire and wind. To address this, earthen houses traditionally followed a calendar of maintenance. Periodic maintenance of the houses is manifested in the traditional Tibetan calendar (*Lo to*), religiously followed by most Buddhists, which highlights dates every year when houses should be repaired (usually in early summer after the building has undergone the winter's snowfalls). This usually meant adding additional layers of mud or *markalag* (a type of clay) over weak spots in the roof and



Fig.4 Contemporary production of mud bricks in the village of Shey (credits: Tara Sharma, 2011)

correcting the slope. Drainage outlets were also regularly cleaned. Other structures, such as the village chorten, *mane* and *rigsum gonbo* are annually renewed on the *Zhipe Chonga* (15th day of the fourth month of Tibetan calendar).

Unfortunately, with declining knowledge and skills and replacement of traditional materials by incompatible materials, these maintenance cycles are not regularly followed. The floods of 2010 revealed that damage to earthen architecture was linked to poor maintenance and repair cycles. Ironically, it was seen as a general failure of earthen architecture, although earthen architecture in the region dates back over a thousand years and has stood the test of time.

Notes

(1) A structure comprised of three stupas (chorten) on a common platform. The chorten are usually painted in the traditional colors of red/orange, blue and white, denoting the three Bodhisattvas, Manjushri (Wisdom), Avalokitesvara (Compassion) and Vajrapani (Strength) who protect the three classes of beings – gods, humans, serpents or demi-gods.

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4. IMPACT OF CLIMATE CHANGE

The increased frequency of floods in the region is seen in the larger context of global climate change. Usually, the area experiences heavy snowfall in the winter, particularly in January and February, with less snowfall till the end of April. There are aberrations to these trends, though, and over the past several years, it has been noted that there are years when there is relatively less snowfall in winter followed by heavy unseasonal snowfall in May and June The onset of summer in such instances leads to a rapid melting of the glaciers causing water to gush down the village streams. A single spell of unduly heavy rain can prove catastrophic in such cases, flooding the already heavily saturated banks. Seasons of unprecedented heavy snowfall over a few weeks of winter in 2013 saw a huge loss of the valuable pashmina goats reared by the nomads of Changthang.

Meteorological records, vouched for by village elders, however, reveal that floods and earthquakes have occurred in the past (in 1921, 1933, 2006) and are not unknown to Ladakh. While natural disasters are not new to Ladakh, what is unprecedented is the scale of devastation, which has been exacerbated by the increased frequency of such disasters. The scale of damage can be linked to the declining belief in traditional knowledge systems and associated changes in settlement patterns, architecture and declining traditional building-craft skills. Integrating this traditional knowledge, evolved from a profound understanding of the landscape, into contemporary regional and local development plans could help perhaps reduce the scale of damage in future disasters.