

# A Report on the Structure and Conservation of the Temples of Helambu in Nepal

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## Introduction

The Department of Archaeology H. M. G. has taken the initiative under the 5th Five Year Plan of H. M. G. of Nepal to preserve the culture of the Northern regions of Nepal, and to this end have already sent teams into the field in Helambu and Rasuwa in 1975 to record the state of the culture and conditions of the buildings.

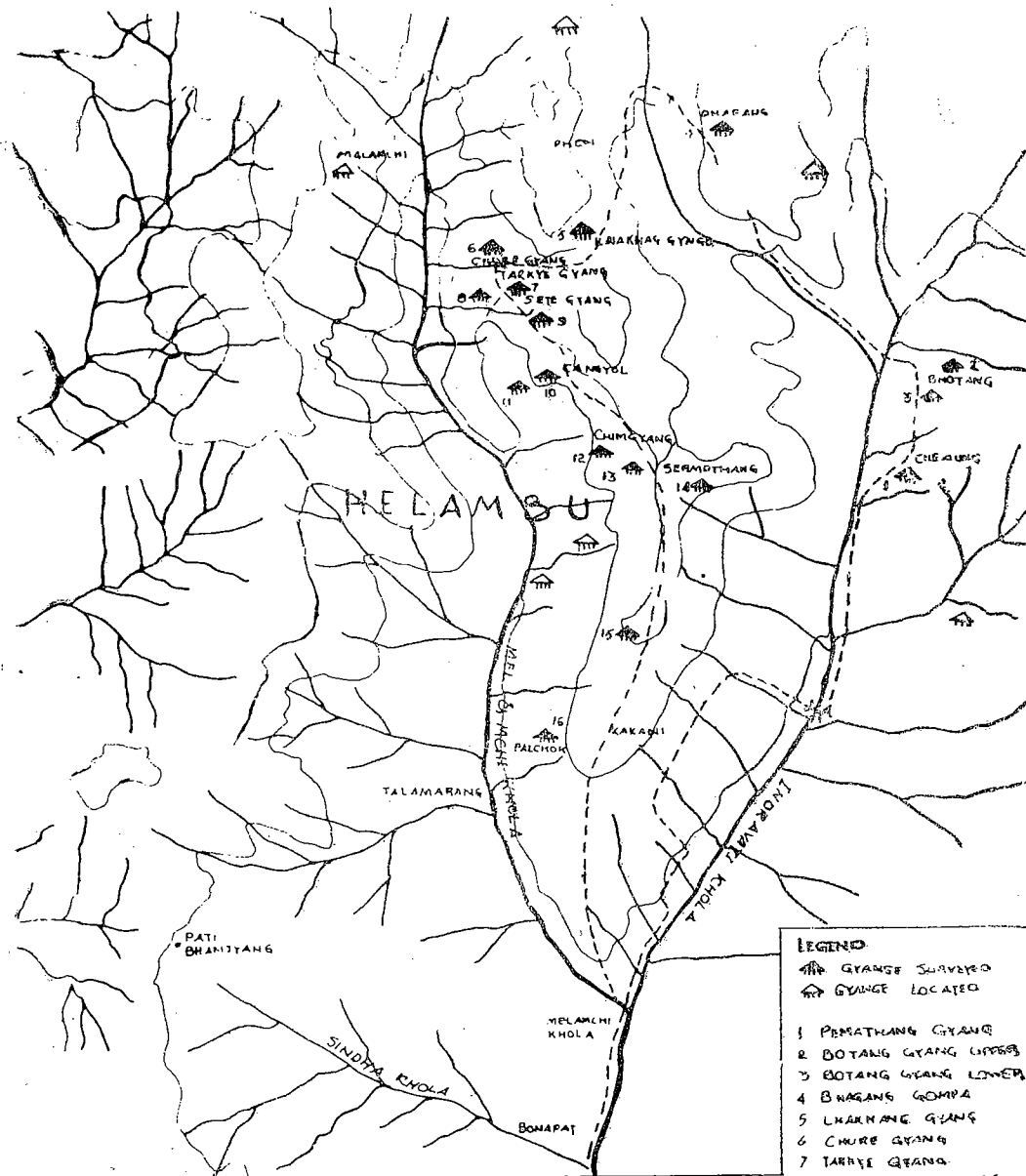
The Department proposed a return trip to Helambu with experts in building repair and conservation and in anthropology to make a detailed study and survey of the religious buildings and their contents.

The outcome of this has been the preparation of guidelines for a method of surveying, reporting and recording, which the team considered adaptable to the other Northern regions, and which are included in the body of this report.

This study was carried out in May 1976 by a team selected from the Department of Archaeology: Janak Lal Sharma, chief research officer, H. Shakya, epigraphist, T.R. Tamrakar, photographer, J. Sanday, architect, C. Jest, anthropologist. The composition of the team was, by design, multi-disciplinary and as such the benefits of the field work were increased.

Our contacts were greatly benefitted by the kind benediction of Lama Kusho Tsechu who saw us before we started the survey.

As a result of our field work we have already received requests for advice from responsible members of the Helambu communities in Tarkeyang and Sermotang, and we hope that at the next gathering in Kathmandu further discussions can be held on the maintenance of the temples and other elements of cultural interest in Helam-





A SURVEY OF THE RELIGIOUS BUILDINGS OF HELAMBU LOCATION MAP

SCALE 1/2" = 1 MILE  
DATE OF SURVEY

ROUTE -----  
6-15 MAY 1976



LEGEND

-  GYANSE SURVEYED
-  GYANSE LOCATED
- 1 PEMATHANG GYANG
- 2 BOTANG GYANG UPPER
- 3 BOTANG GYANG LOWER
- 4 BHAGANG GOMPA
- 5 LHAKANG GYANG
- 6 CHURE GYANG
- 7 TARKYE GYANG
- 8 DECHENTHANG GYANG
- 9 SELE GYANG
- 10 GANCOR GYANG
- 11 GOMPA GYANG
- 12 CHHI GYANG
- 13 SERMOTHANG GYANG
- 14 KESHME GYANG
- 15 PITANG GYANG
- 16 PALCHOR GYANG

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bu. This report should be in line with the activities of H. M. G. / UNESCO / UNDP proposals for the Master Plan for the conservation of the Cultural Heritage of the Kathmandu Valley.

The report of this survey was of necessity incomplete, and the following notes cover only 16 of the 30 gompas that have been registered in the area.

### Landscape, Men and Culture

Helambu or Yol-mo, in the local Tibetan dialect, is a region located to the North-East of the Valley of Kathmandu, and it belongs to the administrative district of Sindhu-Palanchok. It is a well known area for trekking.

Several groups of houses comprising the villages are located on a ridge running North-South from the Ganjala Range, and the region is limited by the rivers Melemchi on the West and the Indrawati on the East.

Helambu is accessible, by road as far as Panchakhal, and a further, two day's walk.

Yol-mo comprises traditionally '500 households'.

### Ecology

The monsoon is a dominating feature in the Helambu region of Nepal, where 90% of the rain falls in the summer: Helambu is one of the regions of Nepal where rainfall is the heaviest.

Leaving the banks of the Indrawati (500 m) one reaches first a level of Sal forests (*Shorea robusta*) which are taken slowly over by Pine trees (*Pinus roxburghii*). This type of subtropical forest has become

rather rare due to the fact that much of its suitable habitat has been converted into cultivated fields.

Between these two levels, are the human settlements of Helambu proper, and the settlements use the sub-alpine level (3000-3700 m) characterized by forests of Firs (*Abies spectabilis*) and Rhododendrons as pasture for their animals.

Above the subtropical level one reaches the evergreen Oak forest (*Quercus lanata*, *Q. lamellosa*) (from 2000m to 2600 m), and the mountain level (2600 m to 3000 m) with another type of Oak forest (*Quercus semecarpifolia*).

### Historical Data

The history of the region, as in other Himalayan areas, is linked with religion.

Tibetan sources:

Data is scarce and sources have provided minimal information. (Tibetan and Nepali).

Yol-mo (Tibetan classical spelling) was a hidden valley (c. t. *sbas-yul*). The valley, considered sacred, was 'opened' by Lama Ra-chan ca-kya bzan-po, who came from Tibet. (A biography of this Lama was preserved until recently at Tsuru Gumpa, but seems to have been destroyed by fire). This lama established himself in Yol-mo.

One must mention another event prior to Lama Ra-chan's arrival; the visit of the Tibetan saint Milarepa to the neighbourhood of Tarkyegyang where he is said to have spent a period of his life meditating in a cave.

The more recent and accurate data is given in the biography of Lama Senge

or Nyi-ma Senge. He also came from Tibet about 300 years ago.

### The Population of Yol-mo

The inhabitants of Yol-mo call themselves Sherpa. They are of Tibetan stock, anthropologically and culturally.

The term Sherpa (Shar-pa: easterner) is given to all people of Tibetan stock who inhabit the northern districts of Nepal. (As the level drops below 8,000 feet, one meets with people of mixed or entirely non-Tibetan stock). These Sherpas have not abandoned their Tibetan inheritance, and their religion beliefs, festivals and food are all Tibetan in character.

The group of villages known as Yol-mo forms an entity with a pattern of 'Tibetan' social organization. (See Haimendorf, Jest...)

This society is divided in a number of exogamic lineages, ru.

Up to a few years ago marriage outside the group was not only unusual, but practically impossible. There seems to be a consensus about the origin of a number of lineages of Yol-mo. Their ancestors came from Kyirong, a locality in southern Tibet, five-days journey to the North of the main range of the Himalaya.

A long time ago an epidemic broke out in the Kathmandu Valley, in Yerang (Patan). The Newar king finally called a lama who was said to take away the calamity.

Lama Surya Senge of the Ten-gni Ling-pa lineage, performed the sku-rim ceremony and the epidemic stopped at once. The king wanted to reward the lama and asked what was his wish. The lama asked

for a hundred horses and took a place which was called from then on Tarkye: 'the hundred horses.' The lama's wife suggested to demand land from the king as the horses had not enough pasture. The lama went to the king and asked for land, and he got a place called Lang-ri gya-sa†.

Another story, noted in Tarkyegyang, says:

"The Priests of Patan were not able to stop an epidemic and an astrologer predicted that only a saint lama, whose name was 'Sun-Lion', could stop the disease.

The lama living in Yol-mo was called and when he reached Mulkharka, above Sundarijal on the rim of the valley of Kathmandu, the sick people began to shout, in fact the demons who were possessing them, were frightened and left at once.

The King rewarded the lama who asked for a hundred horses. He then left Patan, returned to Yol-mo and, at a place called Tarkye Khet, the lama met his wife who said: "there are no tracks for these horses, what will you do with them? Return them to the king and ask for some land..." The king gave land which was called Tarkye Birtha (In 1965 A. D.?). The lama then built a temple; Jo-mo Yang-ri, but the lightning hit twice the building, followed by a heavy hail. The lama decided to return to Kyirong where he came from, but the villagers asked him to stay. He built another temple at Lang-ri".

The following names of lineages have been noted:

Kuram Chimba (Tsuru)  
Tergyilingpa (Tarkyegyang)  
Lhowa (Kangyul)

† Lang-ri gya-sa is another name for Tarkyegyang.

**Karmapa Tewa Nitung** (Gortseling, Serma-  
thang, Kaje)

Dongba

Dong group who came from Tibet

Sangba

Chawa

Shingjung

Waiba

Chowa

Shangden

Ayokpa "Those who had no clan name,  
a lama gave them this name"

Some of these names are the same in the Tamang communities living in the same area.

### The settlements

The human settlements are located on slopes in groups between 5 and 20 houses.

The highest settlements of Gangkharka and Tarkyegyang are more compact the houses being built in rows along the altitude line. These settlements are certainly the oldest if the shrines are used as a method of comparative dating.

Up to now, no precise dates are available to establish exactly when the settlements were originally formed.

### History of the settlements :

Local legends and the study of the toponymy should help us to follow the history of the colonisation of Yol-mo.

The oldest inhabited places are located around Tarkyegyang (= the cave where Milarepa, the Tibetan saint of the XIth century, is said to have spent some time in meditation), the temple of Chure ..

But we have no indication of the extension of the settlements on the southern slopes of the main ridge, around Sermo-

thang, for example. We can suppose that the populations of Tibetan stock came from Krirong and/or Khumbu and settled first at a high altitude (over 2500 m), extending the cultivation of land by burning down the forests and moving slowly, they came in contact with the lower altitudes where they met the Tamang and Nepalese caste settlements.

There still remain large spaces of forests which are 'primitive'.

The elders quote a time, about 50 years ago, when the gap between the Sherpa communities and the 'lowlanders' was far greater.

### Economy

At an altitude of over 2.000 m, two crops are produced annually :

Barley (two different varieties) from  
Oct -Nov., to May.

Potatoes; February - July.

Maize; February - August.

Buckwheat; August - November.

Eleusine coracana; June - August.

A few families own rice fields, Khet, in the valley of Melemchi khola, rice is produce in important quantities.

A few years ago (1950), the Yol-mo people came down to Panchkal Bahunapati, Sipaghat to barter potatoes against paddy (1 pathi - 1 pathi). Nowadays part of the potato production is sold in the valley of Kathmandu.

We must also note the development of other crops, such as apple production.

Cattle breeding, not so developed as in the lower valleys and includes yak hybrids, goats and sheep.

Periodical migration to Assam and Bhutan over the went generations brings an

income to the remaining members of the family.

### Religion

The members of the religious community are all followers of the non-reformed sect of Tibetan Buddhism, and religion seems to be a 'family affair'. They belong to four sub-sects, the most important being the 'Sarma'.

The lamas have a secular life, usually receive their education (in Tibetan and religion) from the father or near relatives.

An important religious development took place in 1935† with the creation of the monastery of Bagang by a Bhutanese lama, Sherab Dorje of the Brug-pa Kagyupa sect. This lama devoted his life to building temples, monasteries and monumental prayer-wheels in central Tibet (Kyirong), Bhutan and Nepal (Tsum-Bagang) and Bigu, this last monastery being occupied by nuns).

Another event of importance happened in 1960 when Tibetan refugees, mainly lamas, fled Tibet and settled in the northern districts of Nepal, such as Langtang. Yolmo was one of the places where Tibetan religious persons could find shelter in Buddhist communities, speaking the same language.

This is reason why a number of lamas of Tibetan origin are settled in Yolmo, as well as a group of nuns living in Gotseling.

The local religious authorities distinguish the following orders:

Religious order	Temples associated
Nyingmapa	Tsoru Gompa Palchok Gompa Pagu Gompa Kaje Gompa
Tergyelingpa	Tarkyegyang Gompa
Brug-pa Kagyupa	Kangyul Gompa
Sarma	Pangthang Geltar Para Dursagang Lakangyang Gotseling Dechenthang Chimi Kildung Gompa Sermothang Taongsa Taparka (= Ningale) Menja (= Chatare) Gombagang

One fact which is of interest is the organization of the members of the community in *guthis*, or societies for organizing the after-death ceremonies (on the model of the newar *guthis*). This *guthis* have property (fields) and the income of the property is used for religious festivities and repairs of the shrines.

### Religious festivals :

All religious (and social) ceremonies follow the Tibetan lunar calendar. The new year is held around the middle of February.

In Tarkyegyang, in *Jeth* (29th day of the lunar calendar), a religious dance is performed.

† See: Dobremez J. F.; Jest C.; *Manastu, Hommes et Milieux des vallees du Nepal central*, Paris, CNRS 1975 (Lite of Lama Dorje pp. 120-122)

**Religious buildings :**

Temples (referred locally as :gyang) situated between the river Indrawati and Melemchi of Helambu.

**Name of gompa**      **Name of the Panchayat**  
(local spelling)

Banang Ghyang	Baru Panchayat
Lhagang	" "
Vangdang	" "
Yangri	" "
Dhiltar	" "
Para	" "
Ghursagang	" "
Unjekhor	" "
Salmi Vremang	" "
Khasere	" "
Pau	Bansharka Panchayat
Jatan	" "
Tallo Jatan	" "
Palchok	Palchok Panchayat
Rajithang	" "
Nigale	Kiyul Panchayat
Chitre	" "
Mani Ghungyur	" "
Kesare	" "
Sermathang	" "
Chhyumi	" "
Keldhung	" "
Kola	" "
Tarke	" "
Chyuri	Timu Ghangyul Panchayat
Sete	" " "
Dhesingthang	" " "
Ghangyul	" " "
Gompa Ghang	" " "

**Other religious monuments :**

Around the temples, at the entrance of the villages and in them, and along the trails, are built Buddhist monuments such as Chorten, mani, walls and in a few

places some special chorten, architecturally entrance-porches conceived as a chorten usually painted inside on the ceiling and four walls with sets of divinities representing the school of religion which is practiced locally.

**General Recommendations**

There is hardly building visited in the Halambu region that does not suffer from a defective roof, and most of them suffer from the effects of moisture, whether rising or penetrating. Most buildings show the effects of earth-quakes and earth tremors, damage was reported after the most recent tremors, and the very nature of their construction, using random stone bedded in mud mortar and very crude carpentry for the roof structure, explains the relatively high failure in both structure, and fabric noticed during this study.

As this is only a preliminary attempt to record both the building and there condition, it has not been possible to make a detailed report on each of the religious groups (details of two of the most historically important buildings are given as a guideline, should it be felt necessary to make a study of all the religious groups at a later date) and therefore a general study of both the construction, as well as the defects of the standard of traditional type of building encountered is set out below.

This general section follows the standard pattern that should be adopted when surveying any building of this type. It is not necessary of course to go into extensive written detailed but when the surveyor is looking over a building it is recommended that the following points be covered. Other

useful information such as measured drawings of each building group and a photographic record is essential, together with historical and socio-religious informations, constitute valuable archives on a region where records at present are very recent.

### 1.00 Definition and Form

**1.01 Location.**— The religious buildings fall into basically three different categories and this generally decides their location:

- a. **The Monastery - Gompa**— This is usually a separate group of buildings consisting of a fairly large main temple, centrally placed, and surrounded by ancillary buildings and dwellings for the community. Often these monasteries form isolated units far from anywhere and are usually self-sufficient.
- b. **The Village Temple - Yul-gi Lhakhang**— As their name implies, these buildings are usually located fairly close to, or in the centre of village settlements and belong to the community as a whole. They are a single unit generally with a caretaker's dwelling attached to the temple, usually on the right hand side of the building. They generally front onto a forecourt which is flat and are surrounded by Mani Walls and Chorten.
- c. **The Family Temple - Lhakhang**— These temples or small chapels are attached to private dwellings and are to be found either in villages or alone surrounded by their own land. They usually belong to the more wealthy members of the community and act as a demonstration of their religious intentions.

**1.02 Building Description:**— Although each religious building has its own particular and individual features, it is true to say that they all seem to follow a fairly standard pattern in their basic layout. The type of materials employed also follows a regional pattern which has only recently been disturbed with the advent of corrugated tin sheeting, now being imported from the Kathmandu Valley. Externally the buildings, except for the larger monastic buildings, follow the domestic scale and design and are only immediately recognisable because of their white painted exteriors and, on closer inspection, their open porches. The buildings are constructed of stone. The building has few windows, save those openings which light the attached dwelling, occupied by either the caretaker or the owner. The structure stands on a low platform that serves as a pathway around the building and is protected by the overhanging roof. The roof is usually of a very low pitch with plain gable ends and traditionally is covered with wooden shingles. These buildings, at the temple end are single storey, with the dwelling raised above the stabling and storage areas to the right hand side.

The interior of the temple consists of an inner and outer porch or lobby which is open to the South or West. Centrally placed in the main wall is the entrance door to the chapel which usually has a high threshold. The chapels are generally square in plan (11mX11m), very dark as there are seldom any windows giving light to the interior and when there are windows they are nearly always shuttered and the internal layout very seldom varied. Directly



opposite the entrance there is usually the altar upon which stand the various divinities and religious offerings. The walls are covered all the way round with highly decorative murals depicting elements of the Buddhist pantheon. Centrally placed in the room are four large posts forming a grid to support the ceiling and roof above. The posts, brackets and beams are often carved and ornately painted to become the striking features of these chapels. Set at right angles to the altar and usually between the posts, are low tables and rugs where the members of the community sit to recite the Buddhist Cannon. Occasionally the altar will be flanked by racks of religious texts that are to be recited each year.

The building is nearly always freestanding, allowing the religious community to encircle the temple during some of their religious ceremonies. In front of the building there is a forecourt, varying in size according to the location, where pilgrim can gather, and also where the religious banners, often of great height, are placed.

## 2.00 Construction

2.01 Walls:- The walls are usually built of locally available stone, generally a limestone that is crudely split into manageable sizes with a "snapped" face, and bedded in mud mortar. This is not a special type of mortar, but any soil that is readily available, mixed with water to a suitable consistency for bedding the stone. The walls are about 0.40 metres thick and are rather crudely coursed and bonded. The whole building is set on a simple platform, obviously to overcome the problems of rising damp. The walls are

often externally plastered over with mud to receive a decorative finish, or have a thick coating of a white silicate type of clay.

Windows, doors and the openings to the porch are formed in timber, using the simple local carpentry techniques and on some of the more important buildings, such as monasteries or private chapels owned by wealthy families, the frames, brackets or posts are carved.

2.02 Roof:- The roofs are of typical domestic style, shallow pitched, with plain gables and traditionally covered in wood shingles - "Panglep" - that are loosely laid and held in position by battens weighed down by boulders.

The roof structure is very simple. It consists of massive unhewn purlins straight from the log that are laid between the external walls onto the central or party wall. These will be as many as three or even five to each side of the roof. These in turn support scanting timbers of either split branches or cut rafters that are often bound rather than nailed to the purlins and these carry simple split battens as a support to the shingles. In some of the smaller buildings, certain of the above elements will be omitted and in some cases the shingles were found to be laid directly onto the purlins. Unfortunately, in many cases, shingles are being replaced by corrugated sheeting, denoting a sign of wealth and progress but destroying the environment.

2.03 Upper Floor and Ceiling:- The upper structure is carried off the lower grid of four posts, supporting long brackets, that carry the beams spanning the

chapel. The posts usually rest on a padstone and are tenoned through both the bracket and the beam above. These elements are often carved and embellished with traditional motives. These beams in turn carry smaller ceiling joists fairly closely spaced, with boarding over, that either runs parallel with the joists or sometimes at right-angles to them. There is normally a direct structural link with the roof to transfer the roof load to this sub-structure.

- 2.04 **Ground Floor:-** The community will sit directly on the floor and for this reason the floors are boarded with often very wide planks set loosely onto a sub-frame laid directly on to the earth below. Sometimes the floor to the porch will be paved in stone but this also is normally in timber.
- 2.05 **Inner Linings:-** According to Buddhist tradition merit for one's next life

can be gained amongst other deeds, by adorning religious buildings with paintings. Although in most cases it is very difficult to see them, the internal walls of all temples are lavishly decorated with murals. The walls are either plastered over with a course mud plaster and then given a special finish with a good quality clay mixed with paper on which is smoothed on, sized and then "ironed with a conch shell", to achieve a smooth and crack free finish. The paintings are then executed on this backing, originally using a water based colouring. Today the paintings are being coated with a poor quality varnish that traps the moisture and causes peeling and discolouration. Never carried out in oil paints, another method is to line the interior of the chapel with timber panels, set away from the walls, and to paint the murals on this timber base.

## Present Condition

## Repair Recommendations

### 3.00 Structure

#### 3.01 General Foundations and Walls:-

Hardly a single wall in any of the religious buildings has not moved at some time or another. Movement is inevitable in the walls of old buildings, whether due to materials which would be considered weak by modern standards, from foundation inequalities, by the interaction of structure and building upon each other, or through natural "aging" processes. Structural movements are only of significance in the following circumstances:

- a. Where movement is still "alive".
- b. If initial movements, although expended, have caused significant structural weakness.
- c. Where structural cracks or winded joints have opened points for weather penetration and further weakening.

Most of the structural weaknesses in these buildings have been caused by earthquakes and tremors; these movements are and will always be a constant threat to the buildings. (R)

3.02 Inner Structure:- The timber inner structures to the chapels are usually of sound and solid construction. The timbers used are nearly always oversized, but often, because they were very "green" when they were inserted, have warped and twisted and give the appearance of being unstable. Occasionally the spans are excessive for the beam sections, but such instances are noted in detailed descriptions. There is hardly a case where

R. 3.01 If there are signs of serious movement in the building it must first be ascertained whether this movement is still alive. To do this is quite simple. The fracture is bridged with a "small telltale", a thin strip of glass that is firmly bedded in cement on either side of the fracture. If the glass breaks it shows there is movement and usually close examination can tell in which direction. Another more reliable method is to establish a triangle of fixed points over the fracture which can then be accurately measured to the nearest millimetre. Depending on the severity of the fracture, its repair, is usually a simple matter of bridging the opening either with well bonded stonework or the insertion of a simple reinforced concrete bond (maximum dimensions: 1 metre X 25 cm X 25 cm) cast in situ and hidden in the masonry.

Where there is failure at roof level a ring beam, either in stone bedded in a cement mortar can be used in cases that are not serious or, where the walls are very instable, a reinforced concrete beam should be inserted. The reinforcement can be a thick gauged mesh rather than steel bars.

R. 3.02 Ideally the inner structure should be well connected to the outer walls as this will help to consolidate the structure. In some instances it was found that the inner structure was self dependent and in such cases it would be advisable to tie the two elements together. This can be done by bolting steel anchors onto the beam ends and setting them in a concrete padstone. Failures in the structures themselves are usually at the joints and again these weaknesses can be strengthened by the judicial

the presence of beetle attack has caused damage of a structural nature and most of the structural failure has resulted from defective roof coverings, permitting quantities of rain water to penetrate the building and causing severe attacks of Wet Rot to the structural timbers. Such cases are described in the detailed descriptions. (R)

- 3.03 Roof structure:-** Compared to the inner structures where there is not only sound structural sense but also reasonable workmanship, the roof structures are of very low standard. The simple roofs may consist of unhewn timber purlins, possibly with a single central support of the inner structure, spaced in such a way that the shinegles or stone slates can span them. The more standard method is to use rafters, both hewn and unhewn, with battens to receive the roof covering. On the more complicated roof structure, entailing hipped and tiered roofs, the inner structure is extended in diminishing sizes to eventually support the purlins or trusses of the roof structure. Unfortunately many of the roofs have been adapted or modernised to suit new materials or progress. It is in such cases that the roofs will need reconstructing, either because the pitch is insufficient for the roof covering or it has become structurally unstable. (R)

#### 4.00 Fabric

- 4.01 Rising Damp in Walls:-** Old buildings are nearly always susceptible to rising damp because in their structure, unlike modern structures, they have no damp proof barrier built into the wall. As a result wall base damp may occur from the following causes:

a. By ground damp rising within the

insertion of steel plates, thus overcoming the necessity of dismantling the structure.

**R.3.03** The traditional roof structures are suitable for the simple roofs as long as they have a suitable covering over them. Their life expectancy can also be prolonged by chemical treatment. Some of the newer roof designs will need either strengthening or altering and in many cases cited in the detailed descriptions, it will be necessary to make policy decisions prior to designing the new roof. The roof is the most critical element in the building. In many cases a carefully designed and constructed timber truss would save timber and simplify building construction. These elements are not generally visible and if a major building programme is envisaged in the region, and as most of the buildings follow a standard model based on available timber sizes it could be feasible to arrange for standard mass produced trusses for both new and old buildings.

**R. 4.01** There are nowadays many sophisticated methods of combatting rising damp such as silicone injection, insertion of mechanical damp proof membranes and high capillary tubes, but none of these are really suitable for the type of material used in the construction of the Khumbu buildings, as most of the moisture is borne by

thickness of the walls through capillary attraction, sometime assisted by water pressure.

- b. By saturation from rainwater splash or surface water runback.
- c. By water penetration, caused by external ground levels being higher than internal floor levels.

Once rainwater has infiltrated the wall base from any of the foregoing conditions, it can often rise to remarkably high levels through capillary movement.

Rising damp is not of itself necessarily dangerous, sufficient to cause the actual desintegration of the basic structure. It is of significance, however, in the following cases:

- a. When rising damp carries with it natural earth salts in solution, which in recrystallising just below the internal plasterwork, can cause irreparable damage to the murals.
- b. When timber is present in or adjacent to damp areas, particularly when unventilated, favourable conditions are created for Dry Rot or Wet Rot and subsequent beetle attack. Once initiated in a damp area, true Dry Rot can then spread to affect adjoining timber. (R)

- 4.02 Wall Coverings:- In most cases where
- 4.03 Ground Floors:- both walls and floors are of timber, they are subjected to the likelihood of fungal attack. The common factor encouraging timber defects is a damp and unventilated environment. The charac-

the bedding material the mud mortar, between the almost non-porous stone used in the wall construction. If the wall bases were properly protected against rainwater most of the problems would be solved. The following are some desirable alternatives:

- a. The laying of porous land drains in a gravel filled trench along the wall externally, to collect and control ground water. The gravel topping must always be left clear of vegetation and rubbish to allow continuous evaporation.
- b. Correct and careful tabling of the ground around the wall base to ensure that all the rain water is directed immediately away from the wall. In many cases, if the plinths around the buildings were correctly maintained as well as kept clear of any growth (as this attracts moisture and prevents the wall from drying out).

The murals painted on a mud based plaster are those most susceptible to damage. Normally the paintings start above the limit of rising damp but often the lower parts of the murals are damaged by moisture drawn up by capillary attraction. It is recommended that in such cases the lower section of plaster removed up to where the murals begin. The wall beneath should be allowed to dry out before it is replastered and a gap of 23mm should be left between the old and new to prevent the passage of moisture.

**R. 4.02 Dry Rot:-** The presence of dry rot must always be fully investigated and treated as a matter of the greatest urgency.

In suspect areas, the structure must be fully opened up at the point where conditions are right for an outbreak, and all paths of water travel, and all timbers within

teristics of the various defects are as follows:

### Fungal Decay

#### True Dry Rot *Merulius Lachrimans*:-

This, the most damaging of all timber defects, was traced in only a few of the buildings inspected. Other cases may not have been discovered, as no opening up was carried out. In all cases the confirmed or suspected presence of Dry Rot is a serious matter.

The fungus needs the following circumstances for inception and growth:

- a. lack of ventilation
- b. relatively warm conditions (An ambient temperature of between 20 and 30 Cent.)
- c. a moderate moisture content (20% to 25%).

In circumstances such as these, the spores of the fungus can germinate and reproduce, often travelling considerable distances in search of suitable timbers. In well established attacks fruitings bodies (i. e the mushroom) develop and ripen to produce millions of spores, any one of which is capable of starting other outbreaks. The result of Dry Rot is total destruction of all timber in the area and the infection of adjacent building materials in which the fungus may lay dormant for several years ready to be re-activated by favourable conditions for further attack.

**Wet Rot:-** There are many differing species of wet rot related to differing circumstances of light, humidity, ventilation and types of material. However all their characteristics are basically similar.

the area very carefully examined. If and attack is found, each line of its spread must be fully traced to its farthest extent and beyond. All affected timber must be scrupulously removed and burned, and retained timber around the perimeter of the attack, together with walling and finishes, must be fully sterilized with a suitable fungicide. Thick walls or large timbers sometimes need to be drilled for irrigation.

In reinstatement, the use of timber must be reduced to a minimum, and any use needs through precautionary treatment. Most important is that the conditions causing the outbreak must be rectified; the cause of the damp conditions identified and stopped, and ventilation introduced wherever possible.

**Wet Rot:-** The actual treatment of wet rot is relatively simple. It must comprise the removal of weakened timbers and their repair or replacement and precautionary treatment with fungicide. A careful check must be made that its presence has

Wet Rot is normally found in the following places :

- a. In the ends of timbers built into wet walls especially at ground level, in floors and posts which are in contact with the earth.
- b. In areas of localised roof leaks.

As the name implies, this type of fungle attack requires much damper conditions than dry rot for its existence (50% to 60% moisture content). It occurs indeed in conditions that are too wet for dry rot and is of itself far less dangerous. It is considerably less destructive and has a much reduced ability to spread. Wet rot can cause weakness in structural timbers but its real significance is that it indicates defective conditions which could indeed lead to dry rot.

**Beetle Attack:-** The extent of beetle attack was remarkably low. There was some evidence but never sufficient to cause any cause for concern. One of the reasons for the lack of beetle is the fact that all the timbers are very well ventilated. Therefore, a detailed study has not been made of the deffering species as they are not a threat to the buildings. (R)

4.05 **Roof Coverings:-** By and large the major problem besetting all the buildings in the Helambu region is the poor condition of their roof coverings. Very few buildings reported that their roof was watertight and if they were, they had probably recently renewed their roof with a corrugated metal sheet roof. It is true that these metal roofs do keep the building dry and in many cases this action has saved

not led to conditions of dry rot. The source of damp must be traced and stopped, and extra ventilation is again most desirable where possible.

**Beetle attack:-** The treatment against beetle is similar to that used against fungal attack and the chemical used is usually a fungicide combined with an insecticide. The timbers have firstly to be cleaned and defrased and then thoroughly treated with the chemical. The best method of application is by spraying, but applection by brush is also satisfactory. The recommended treatment to floors and roofs has generally been to protect the timbers against fungal attack but often these attacks are accompanied by beetle infestation-

R 4.05 The traditional roof coverings must be adapted by using modern techniques to give them longer life expectancy than at present. This will be essential to persuade the local people to revert to them rather than using the corrugated metal sheeting which typifies development and progress. This can be achieve by treating the shingles in the following way:

- a. **Treatment:** The shingles should be chemically treated against fungal and beetle

the contents of the temple. However this type of roof covering is very detrimental to the local environment.

There is basically one traditional roof covering in this region which we know as **Shingles (Panglep)**. These are wooden roof tiles of varying sizes that are riven from a tree known as "tingri", *Tsuga dumosa*. The shingles are split off the tree trunk across the grain into widths of about 15 cm. and of lengths of about 1 metre or occasionally, on some of the older and cruder buildings, they can be longer. The shingles usually rest on battens spanning the rafters and were originally held down by battens laid over the shingles that were held in place by large boulders. The shingles usually warp or curl and as a result it is necessary to turn each tile after the first year from head to tail. The shingles fail as a result of fungal attack a species of wet rot - and the roofs often leak because of displaced tiles that are never reset.

- degradation; the same chemical can be used as for the other treatments. They should then be dipped in a silicone solution to prevent water penetration
- b. **Fixing**:- The shingles should be laid on battens and be held in position in the traditional manner by battens weighed down by boulders. Possibly after a year or so, if the shingles should curl, they should be turned head to tail and then fixed by nailing, if possible with non-ferrous nails.
  - c. **Base**: If the roof covering is at present metal sheeting, it can form a base. The roof can be battened and counterbattened over the sheeting and the shingles can then be laid as described above. If there is no sheeting, then polythene should take its place.

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### Detailed Description

As an example, a more detailed study of two of the most interesting buildings: Lhaxhang Gyang and Chure Gyang, has been made, detailing their construction and present condition, with notes on their cultural and historical importance.

It is hoped that using this as a model, the remaining 30 odd religious settlements will also be catalogued.

#### General Data :

- The temple of **Lhaxhang Gyang** located at an altitude of 2800m belongs to the villages of Gangkhaka and Pangthang.

Lama sanskrit is in charge of the ceremonies :

- 2nd lunar month 1st day, reading of the Yum.

- 4th lunar month 9th day, festival.

Statues of Uryen Rinpoche (Padma-sambhava) and Lama Tenzing Ngawang Namgyal.

- **Chure Gyang** (clas. Tib : rCod-Ru) is located below the village of Tarkyegyang, altitude: 2500m.

The founder is Lama sNag-chan Ca-kya bZan-po who came from Kyirong. To locate the place where he intended to build a temple he threw his stick which fell near Langrigyasa, the stick became a fir tree and a cristal vase is enshrined in an important chorten built below the temple.

A religious ceremony is performed in the 8th lunar month, 1-10th day.



On the altar a statue of Padma-sambhava and his two wives. The head of the statue is said to have been made in Tibet. On the right side a statue of Lama sNag-Chan Ca-kya bZan-po.

### **Lhakhang Gyang**

#### **1.00 Definition and Form**

**1.01 Location:-** This temple is one of the most beautifully situated religious groups in the whole region. It is set on a North Eastern slope with a background of a pine forest and overlooking a deep secondary valley to the Indra-wati, known as the Ripar Valley. The temple has a few scattered dwellings around it and a collection of derelict structures suggesting the former existence of a small village which is said to have moved to another site lower down the valley two generations ago. The weather conditions in this valley are extremely inclement and there are at least six months of mist, rain and snow, the latter often falling to a depth of one metre.

**1.02 Building description:-** The structure follows a typical pattern with the temple to the left, in this case the Western side, of the attached dwelling. The portico, which is larger than normal, gives access centrally through a double leaved door into the chapel. The chapel interior, which is finely decorated with murals and carved and painted pillars, brackets and beams of unusual quality, follows the traditional plan of four central posts supporting the roof and with the altar on the wall opposite the entrance doors. The dwelling is fairly typical with storage and a pilgrims kitchen and quarters on the ground floor, and on the first floor the caretaker's living quarters, which are set behind a large projecting verandah

opening to the South. The quarters consist of a large guest room and kitchen with the living area and the caretaker's room beyond. Some time during the history of the building there appears to have been some alteration to the portico. The original opening must have been much wider and this has recently been half blocked. The supporting posts and brackets are all of different styles.

#### **2.00 Construction**

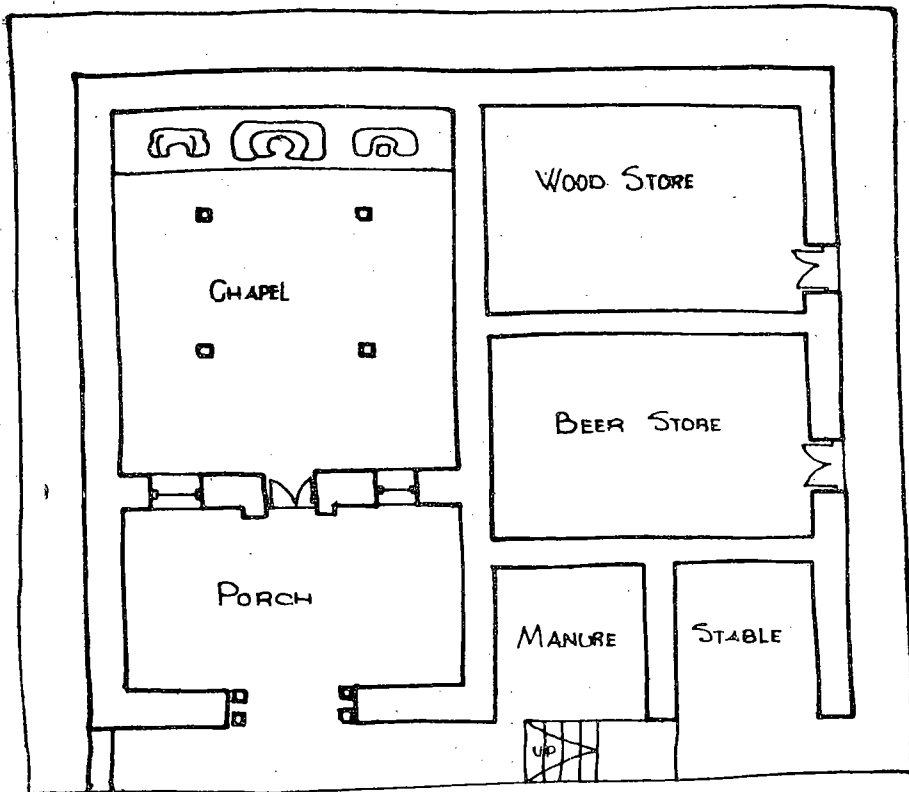
**2.01 Walls:-** The walls are of split stone that is random coursed, and bedded in mud mortar and set on a low platform. The cross wall is of a similar construction. The main entrance to the temple and the dwelling are on the South, there are window and door openings on the East elevation but the two remaining walls are blank.

**2.02 Roof:-** The roof coverings are wood shingles laid on split battens which are set on unhewn purlins spanning the width of the temple and the dwelling of the dividing wall.

**2.03 Upper Floor and Ceiling.-** The ceiling to the chapel is of typical construction with moulded timber beams and carved bearers supporting ceiling joists which are infilled with planks. The ceiling is painted in traditional colour. In the portico the joists are widely spaced with boarding in between.

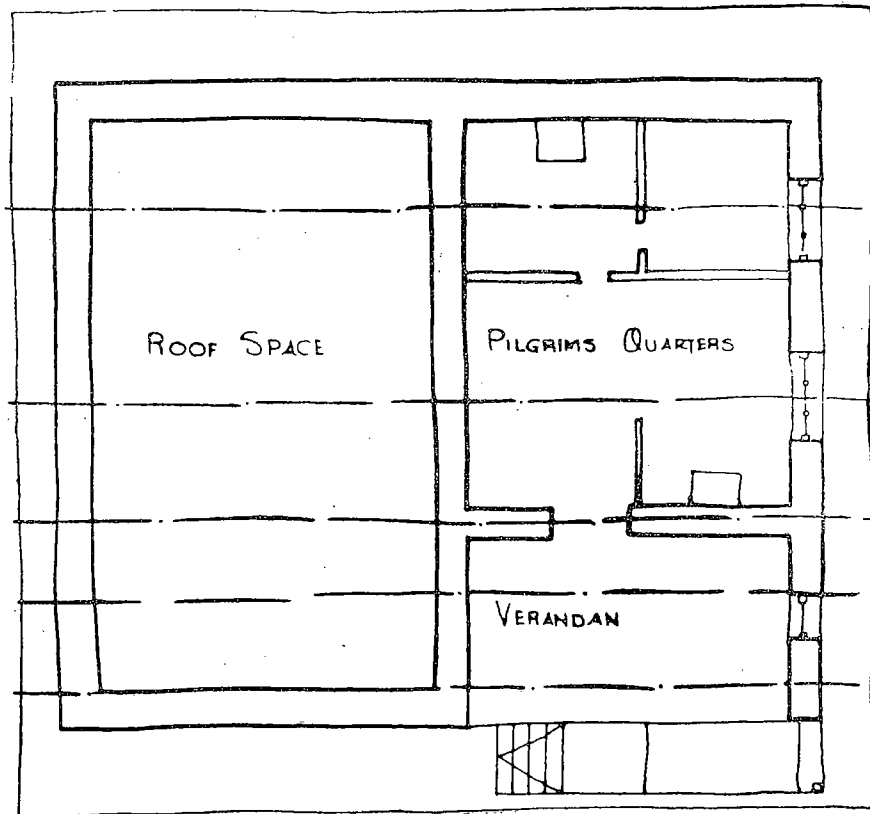
**2.04 Ground floor:-** The floor to the chapel is of wide boards set on joists that are set directly on the earth below. There is a similar floor in the portico.

**2.05 Inner Linings:-** The walls are plastered with a mud plaster and decorated with murals of reasonable quality, using a water based paint. The murals are set above a 1.50 metre projecting stone band.



GROUND FLOOR  
 LHAKHANG GYANG — HELAMBU NR/HL/4

SCALE: 1:125



FIRST FLOOR  
 LHAKHANG GYANG

SCALE: 1:25  
 HELAMBU NR/HL/4

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**Present Condition****Repair Recommendations:****3.00 Structure**

**3.01 General Foundations and Walls:-** It is obvious that the structure of the building has been altered, making the opening to the porch smaller. This alteration was not motivated for structural reasons. However the walling on either side of the opening is out of true. This is not a result of structural weakness, but more the effects of poor building in the first place. The remaining walls are all of reasonably sound construction. (R)

**3.02 Inner Structure:-** The basic structure of the central pillars and the beams is fairly sound but there does seem to have been some lateral movement, possibly as a result of an earthquake. On the Southern wall there are fractures on the interior which are of little consequence but there has been considerable movement in the North Eastern post and bracket. The pillar is inclining slightly and the bracket appears to have slid horizontally. The South Western pillar has a split in it and the bracket has a severe fracture through it. Added to this there is a heavy beetle infestation which is bound to weaken the structure. (R)

**3.03 Roof:-** The simple roof structure carried off the lower structure is basically sound. Some of the purlin ends that are exposed have rotted and are badly weathered. (R)

**4.00 Fabric**

**4.01 Rising Damp in Walls:-** Because of the adverse weather conditions, especially in this area, the whole of the

**R. 3.01** It is necessary to keep a careful check on the movement in the walls and it may be necessary to stabilise the fractures either by rebuilding the section of walling and bonding across the fracture or the insertion of small concrete bonders in the critical places.

**R. 3.02** Similarly this movement should be monitored and should it continue, it may become necessary to reset the leaning posts and realign the brackets. The structure will need chemical treatment against beetle infestation.

**R. 3.03** The roof structure should be treated against beetle and fungal attack and the defective timbers should be checked and if necessary replaced.

**R. 4.01** Proper rainwater drainage should be provided along the back and sides of the building and all paving should

building fabric has considerable moisture content. At ground level there is evidence of high moisture as a result of rising damp, especially in the South East corner of the chapel. However the wall paintings begin at the height of almost two metres and are not affected. The North wall is very damp as a result of splashback and a heavy growth of lichen. The passage of rainwater along the back of the building is very poor. (R)

**4.02 Wall Coverings:-** The condition of the wall paintings is good. Although exposed to a very damp atmosphere, they have remained intact because they have not been sealed. Minor defects are apparent as a result of fractures caused, most likely, by earth tremors. The painting in the portico have, due to their exposed position, been affected by moisture but are still in reasonable condition.

**4.03 Ground Floor:-** Because there is high moisture content in the walls, the timber floor adjacent to the walls is liable to be affected by both beetle and fungal attack. Added to this the floor is laid directly on the earth beneath which must be very damp during the heavy rains. The space beneath the floor is full of debris which also attracts moisture. The floor to the portico is very uneven. (R)

**4.04 Ceiling and Roof Space:-** Generally the condition of the ceilings is satisfactory. There are signs of damage caused by earlier water penetration and there is evidence of beetle attack in the North East corner. The ceiling to the porch at one time had a painted Mandala design on it and this has now been removed and parts of it are still to be found in the building. (R)

be set to throw the water away from the walls.

**R. 4.03** The space between the floor should be thoroughly cleaned out and ventilation holes should be formed on two of the exterior walls to help dry out the under side of the floor. The whole floor should be treated against beetle and fungal attack with a suitable chemical.

**R. 4.04** The area infested by beetle should be cleaned and treated with a suitable chemical.

**4.05 Roof Covering:-** The shingle roof covering is well maintained and the present shingles were turned five years ago and it is reported that the roof is watertight over the temple but that there is some leakage over the dwelling. (R)

#### 5.00 Associated Buildings

**5.01 The Dwelling:-** As is the case with the temple, this unit been reasonably well maintained, is structurally sound and in serviceable condition.

**R. 4.05** The roof coverings are always the most prone to decay. The shingle covering is very traditional in this area and it is important to retain this tradition. It is proposed that roofs should in future be treated with a silicone based chemical which will protect the shingles from both fungal attack, as the result of heavy saturation, and from beetle attack as the timber used is very susceptible.

### Chure Gyang

#### 1.00 Definition and Form

**1.01 Location:-** This temple of particular historic interest is situated about ten minutes walk below the better known temple of Tarkygyang. It is set on an East facing slope in a small forest. Other than for one neighbouring dwelling, the temple is on its own.

**1.02 Building Description:-** This temple is considered to be one of the oldest in the region of Helambu. Although partly damaged by the 1934 earthquake, the upper storey is said to have been rebuilt, the chapel and the artefacts in it are some of the oldest and finest visited. The building is larger than the usual private temple and has a secondary private chapel above the main hall. The building conforms to the standard layout with the Lama's dwelling on the right side of the temple. It is a two storey unit with the living quarters on the upper floor and storage below. An interesting feature on the main elevation is a carved window of Newar craftsmanship.

The exterior of the building is whitewashed and the roof is of wood shingles.

The interior of the chapel, which is accessible through an open porch is a well proportioned room with fine decorations and carvings on the four central posts and brackets above.

The whole building is set on a metre high platform forming a walk way around the building. In front there is a small yard with a collection of religious banners.

#### 2.00 Construction

**2.01 Walls:-** The walls are constructed in split stone that is random coursed and bedded in a mud mortar. They are set on a high paved platform above the courtyard. The front elevation contains a collection of carved windows obviously brought from Kathmandu and the decorated openings to the porch. The East elevation has some windows lighting the dwelling on the first floor. The North and West elevation are blank, save for some small lights the upper chapel.

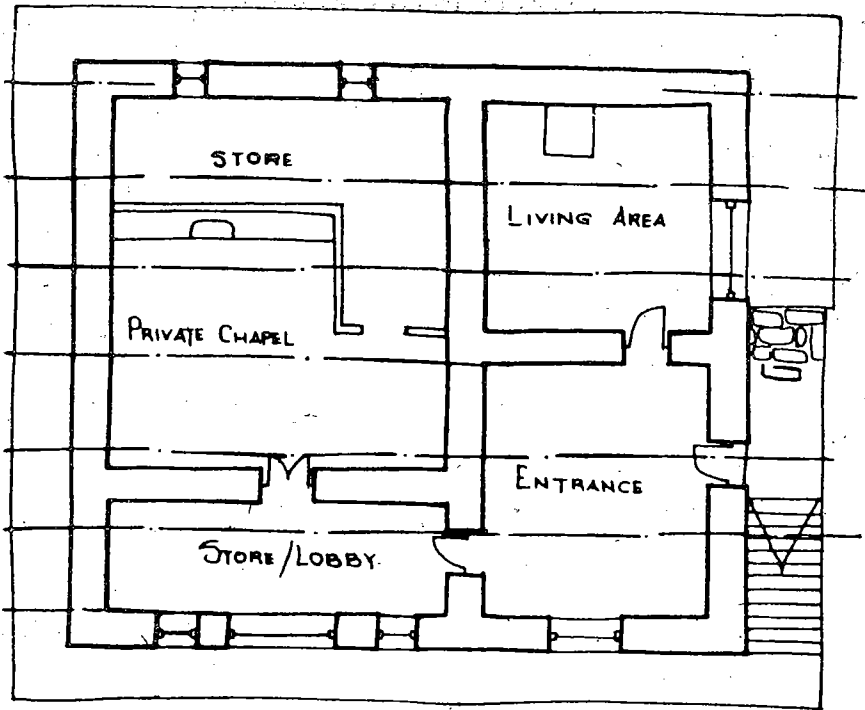
**2.02 Roof:-** The present roof was put on approximately 15 years ago and is a shingled roof set on split battens which are lashed by split bamboos to shaped rafters. The rafters are carried

off three large unhen purlins spanning across the building. The rafters rest on a wall plate at the lower end and a ridge piece at the apex of the roof. The roof structure is self-supporting as there is no continuity of structure between the lower and the upper floor.

**2.03 Upper Floor and Ceiling:-** The upper floor is supporting off four centrally placed posts that carry composite beams spanning chapel. These beams carry ceiling joists with boarding over.

**2.04 Ground Floor:-** The floor is boarded floor which has probably been recently laid as the boards are of narrow width. Some of the original boards still remain at the West end. The porch is also boarded over with wide planks but there is a stone threshold to the door.

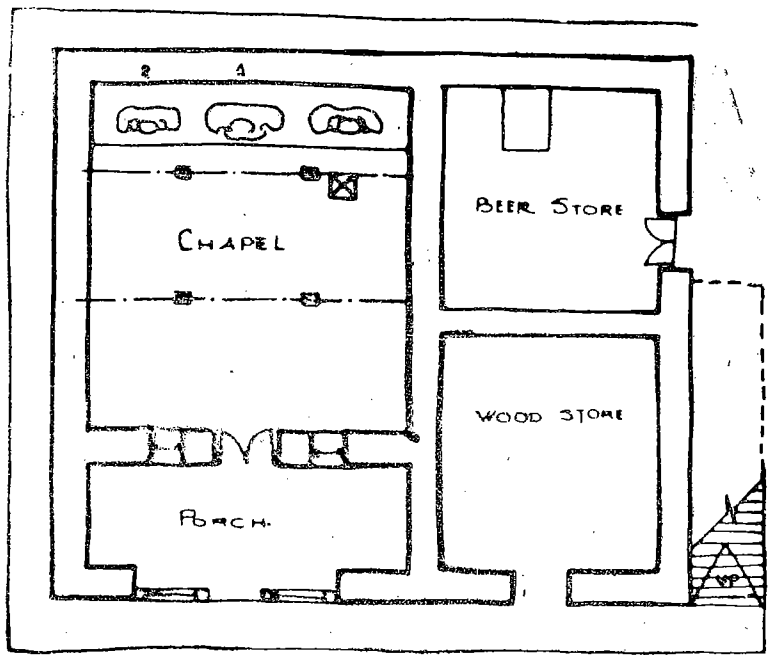
**2.05 Inner Linings:-** The walls are plastered over with a mud plaster and decorated with murals painted in a water based paint above a plain dado of 1.50 metre. There is a similar lining to the walls of the porch.



FIRST FLOOR  
CHURE GYANG

SCALE 1:125

HELAMBU NR/HL/5



GROUND FLOOR  
CHURE GYANG

SCALE 1:125

HELAMBU NR/HL/5

**Present Condition****Repair Recommendations****3.00 Structure**

**3.01 General Foundation and Walls:-** The effects of earth tremors and earthquakes are in evidence on all the elevations. On the West elevation the most recent tremors, it is said, were the cause for the fractures and especially the more severe fracture rounding through the length of the building. Further effects are to be seen on the East elevation though these are of little significance. The South elevation, having several openings in it shows signs of structural movement, especially in the South Western corner, and at the Western end of the porch. (R)

**3.02 Inner Structure:-** The basic structure of the temple seems sound, but there is evidence of fairly heavy beetle attack in the majority of the timbers. The main timbers have a series of fractures in them. The beams have several horizontal fractures and the North West post has a vertical fracture, both of which are not liable to cause structural weaknesses. (R)

**3.03 Roof:-** The general condition of the roof is excellent and it appears to have been well maintained.

**4.00 Fabric**

**4.01 Rising Damp in Walls:-** This is another damp region and there is evidence of considerable rising damp at floor level all round the building. This diminishes rapidly further up the wall and does not affect the murals. The drainage around the building is satisfactory. (R)

**R. 3.01** It will be necessary to monitor all fractures to establish if they are alive. When the roof is relaid it would be advisable to consolidate the defective sections either with well bonded stonework or in the more serious cases with short concrete bonders.

**R. 3.02** All structural timbers should be carefully cleaned and thoroughly treated for beetle attack with a suitable chemical.

**R. 4.01** A regular check should be made to ensure that the rainwater drainage around the building is well maintained.

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**4.02 Wall Coverings:-** The conditions of the wall linings is surprisingly good. There is evidence however that some damage has been caused by condensation although the readings taken at the time showed little indication.

**4.03 Ground Floor:-** The floors have been relaid probably as a result of the earlier floor having disintegrated from fungal and beetle attack. The conditions are still the same as there is no under floor ventilation and there is considerable dampness as well as debris below the floor. There is considerable beetle attack throughout the planking. (R)

**4.04 Upper Floor and Ceilings:-** Part of the ceiling on the Eastern side has been replaced. All the ceiling timbers are suffering from heavy beetle infestation. (R)

**4.05 Roof Covering:-** Although quite old, the shingle roof covering is maintained in reasonable condition. Its life expectancy is however running short. (R)

#### 5.00 Associated Buildings

**5.01 Dwelling:-** Compared to most, this dwelling is quite extensive consisting of a network of rooms on two levels. The lower rooms are used for storage and as pilgrims quarters, whilst the Lama and his family occupy the upper floor. Its condition is satisfactory and it appears to be well maintained.

R. 4.03 Ventilation ducts should be inserted on two of the external walls. The debris should be cleared away from below the floor and all the timbers should be bleaned down and treated against beetle attack with a suitable chemical.

R. 4.04 All timbers should be thoroughly cleaned and treated against beetle attack with a suitable chemical.

R.4.05 When the roof covering is renewed the covering should be treated with a silicone preparation to lengthen the lifespan.

### Conclusion

#### Recommendations for immediate Action

Recommendations for the basic action proposed as a result of the survey; establish the need for the following action:-

1. Survey should be completed along these lines for the other gompas of the region:

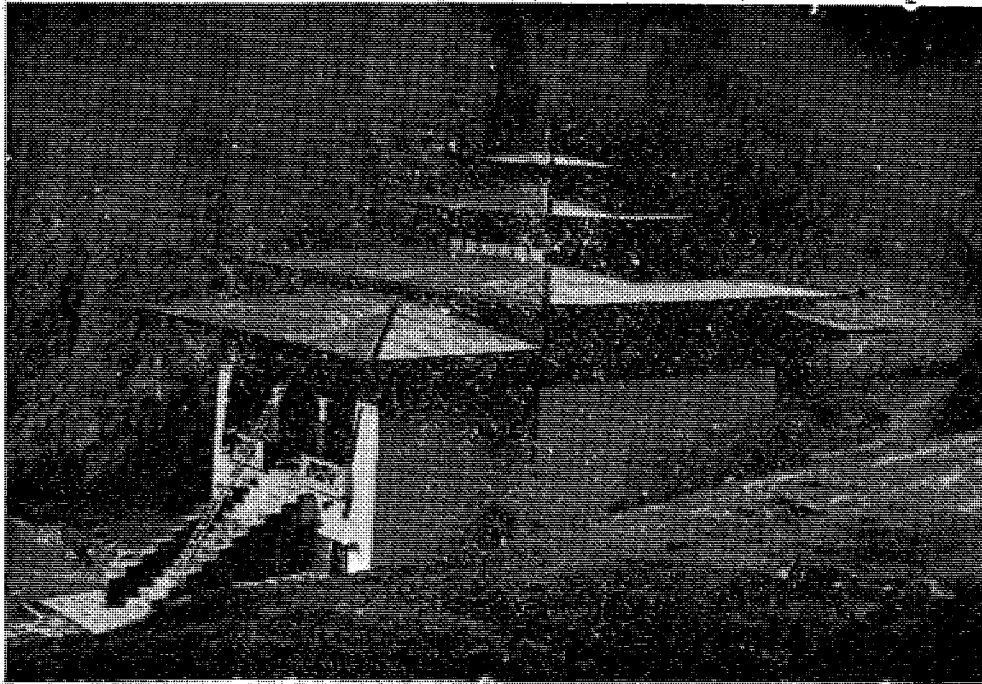
(It is difficult to tackle an individual building because selection automa-

- tically introduces competition, the merits of buildings of historical interest such as Chure Gompa, where we have a small religious community, versus a building of important religious significance but with no historical or architectural merit, such as Tarkyegyang, which exemplifies this dilemma; both nevertheless are in need of repair).
2. A local team of specialists should be trained by the H.M.G./UNESCO to carry out a simple maintenance and repair programme.
  3. Should H.M.G. consider it advisable, one or two buildings could be selected for experimental repair of roofs and structure as an example for others to follow.
  4. General recommendations for the buildings of the Northern regions, which would also apply to Yol-mo:
    - a. Legislation
    - b. Protection of the very important historical buildings (see also proposals of a protected area; see Inventory along the lines established in the Inventory of the Kathmandu Valley).

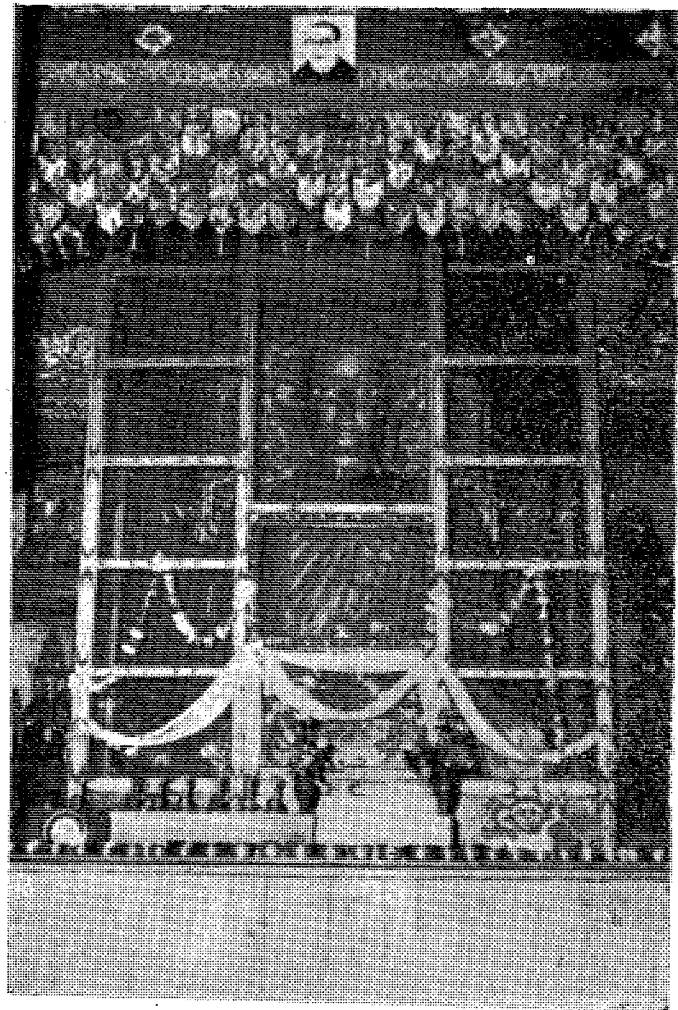
**References:-**

G. CLARKE, Lincoln College, Oxford, is finalizing a study on the Helambu Region.

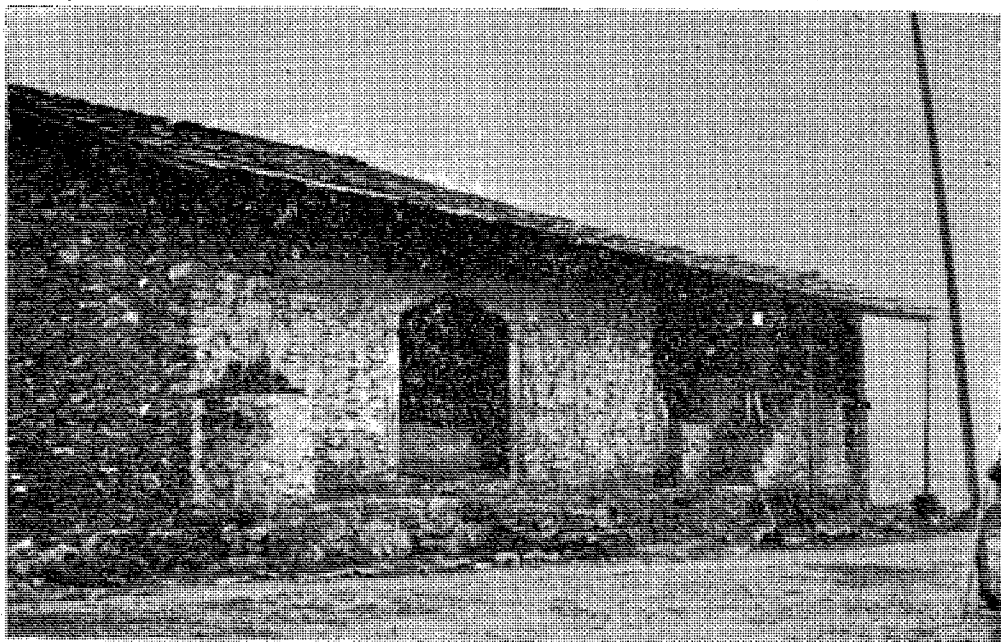
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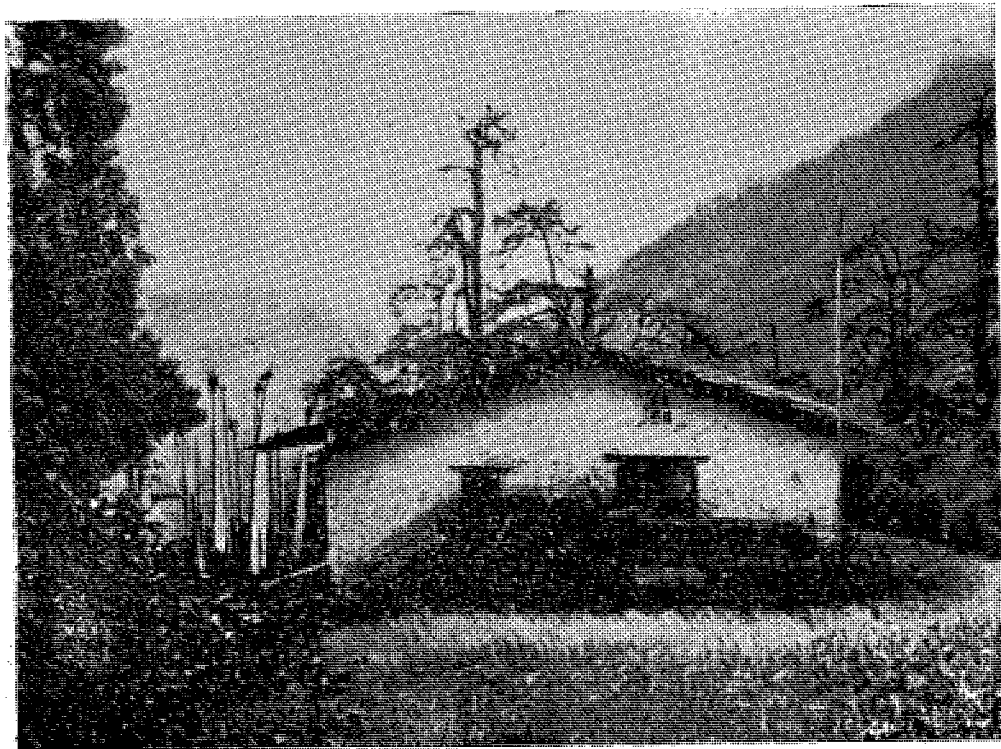
*Bhagang Gyang*



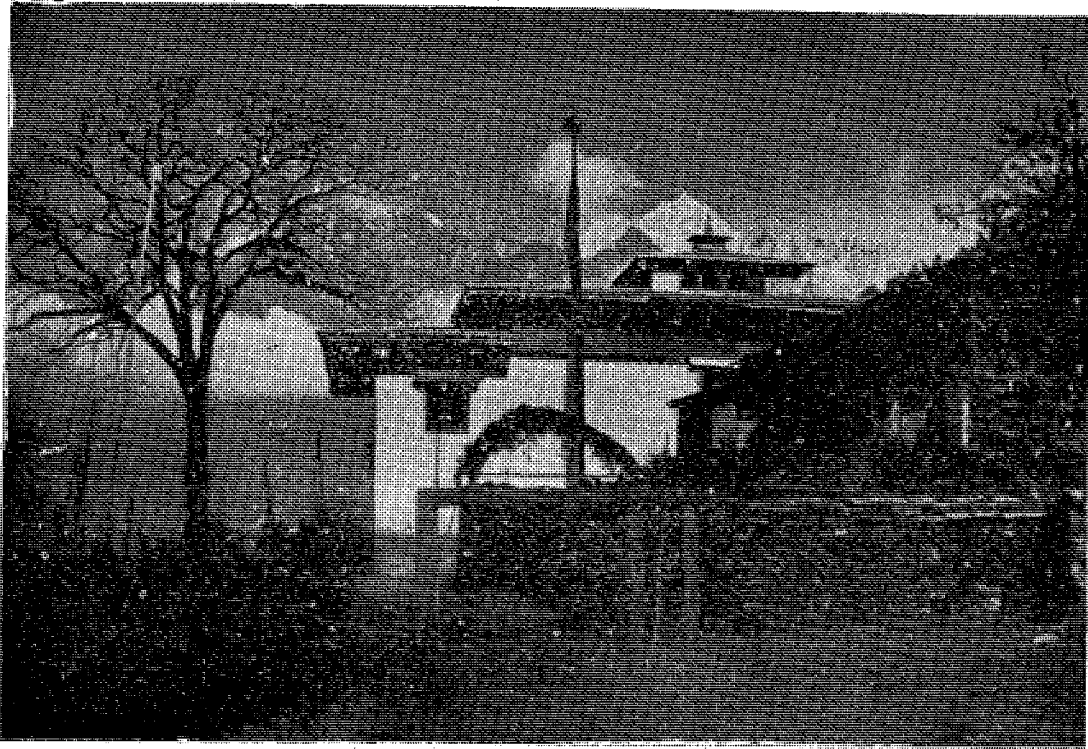
*Shakya Muni Buddha in Bhagang Gyang*



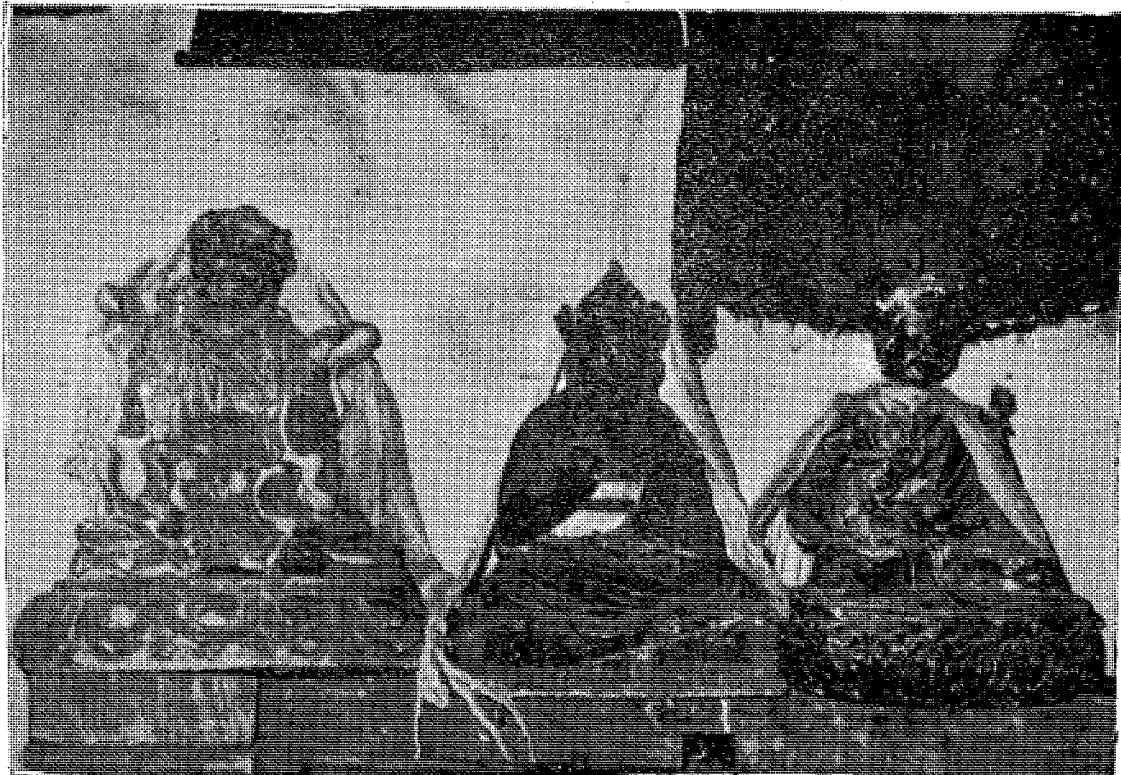
*Lhakang Gyang*



*Chure Gyang*



*Tarkye Gyang*



*Vajrapani, Vajraguru and Guru Padmasambhava in Tarkye Gyang*





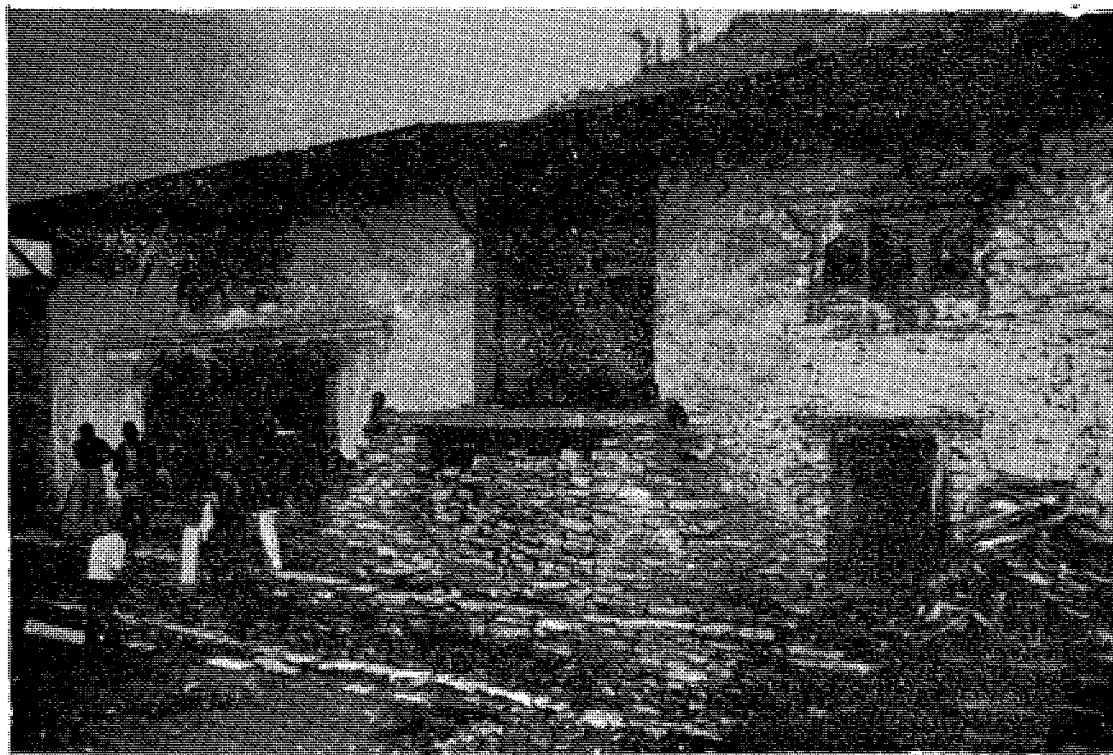
*Sete Gyang*



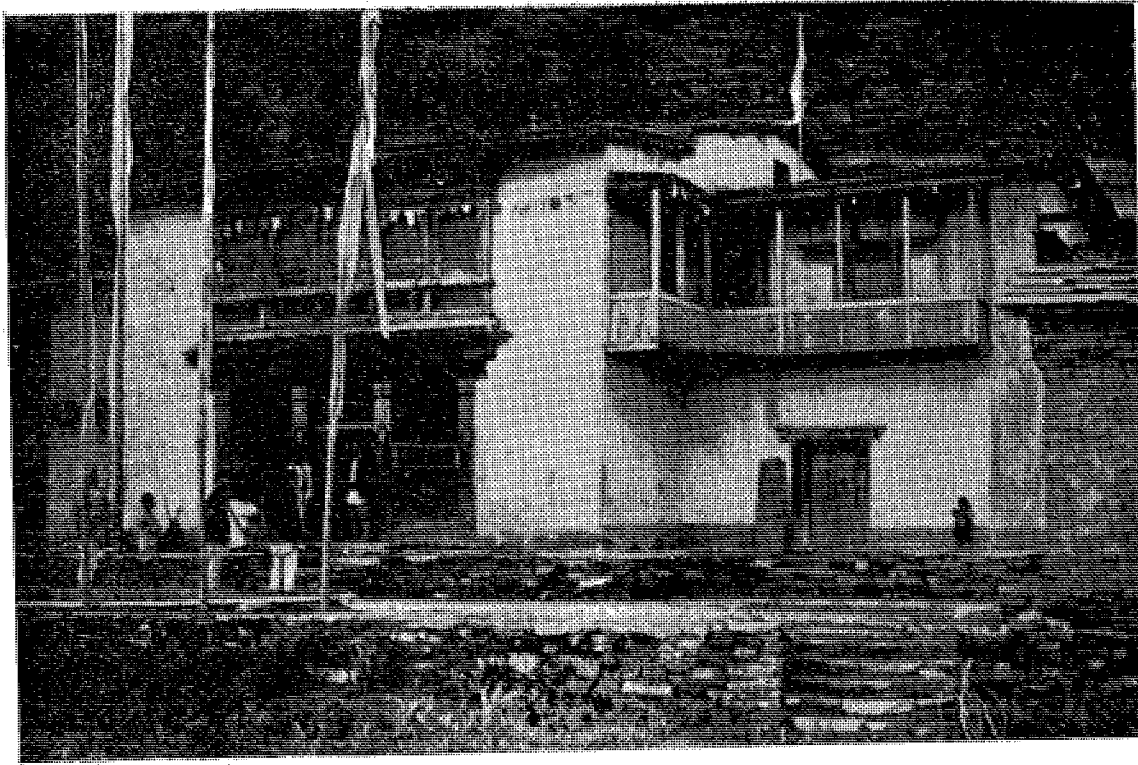
*Gangyul Gyang*



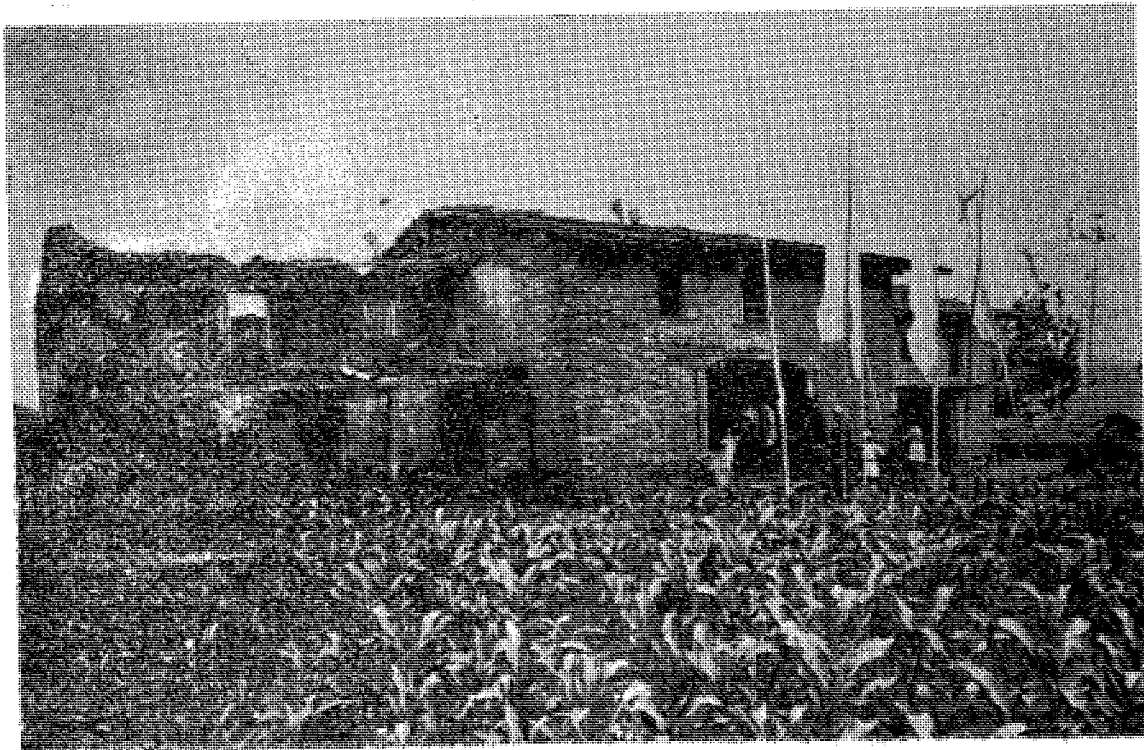
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