Technology and Traditional Khasi Architecture

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DOI: https://doi.org/10.56293/IJMSSSR.2024.5309

IJMSSSR 2024
VOLUME 6
ISSUE 6 NOVEMBER – DECEMBER **ISSN: 2582 - 0265**

Abstract: Northeast India is home to several tribes and tribal communities. In a tribal context, architecture and culture are intertwined into the day-to-day activities. Although most traditional structures in Meghalaya use similar locally available materials like bamboo, wood, mud and thatch, they are different from each other. This factor of identity stems from their diverse cultural practices and beliefs. The paper explores the relationship between technology and traditional Khasi architecture in Meghalaya, taking the case example of East Khasi Hills. It further investigates the scenario by analyzing the most important housing typologies of the Khasi traditional houses.

Keywords: Architecture, traditional Khasi houses, technology, ceremonies.

Introduction

Technology is basically considered a modern phenomenon and it is that which describes the inculcation of scientific knowledge for practical purposes. There is much to do with technology when it comes to the way that the Khasis build their dwellings. Traditional Khasi architecture portrays and reveals the usage of technology in various aspects. Socio-cultural, economic, religious, geographical as well as environmental aspects are some which require recognition in the modern world.

Traditional houses are a direct expression of existing values, ideas, perceptions and ways of life. They are built by the people who inhabit them, and therefore their houses directly symbolize the shared cultural beliefs of the society. As a human product with a distinct practical character, they have the special ability to show how the values and cultural traditions of society determine people's daily lives. According to Norberg-Schulz, only through cultural symbolization can architecture[1] show that daily life has a meaning that transcends the immediate situation and that it forms part of cultural and historical continuity. The other arts are not able to fulfill this task in the same way because they do not participate so directly in our daily existence (Shulz Norberg,1963:126; Keesing, 1960:18).

There is no denying that shelter is man's most important need. In his effort to protect himself from the extremes of weather and climate, he has created many types of dwellings over the centuries. However, if we look at the nature of house forms from the cultural perspective, we should realize that at that time man lived in a group with shared values and ideas about the world, and that his houses were the result of a group decision. Therefore, the physical systems of the environment such as location, climate, materials, and construction are themselves choices determined by cultural factors. These physical factors are merely modifying factors that help people shape their culturally determined dwellings. Climatic conditions are the physical aspects of the environment that makes certain things impossible and favors others, while materials and construction methods are the tools that humans use to achieve the desired environment. Climate and location, then, are factors that determine the possibility of producing symbols, while materials and construction techniques are the factors that give shape and form to those symbols, which have been determined by the socio-cultural system. When Rapoport refers to traditional societies, he says that man's achievements are due to the need to use his internal resources rather than to his need for control of the physical environment or more food (Rapoport, 1969: 43).

House construction and technology as one of the main cells and central unit of culture, is important for man to live for his protection and safety. We do not know since when man knew how to build a house, but we know that from the beginning man lived under rocks and in caves to protect himself from enemies and wild animals, to find

shelter from heat, cold and wind. Over time, perhaps due to population growth, there was not enough space to live there. The other reason is that humans migrated from one place to another in search of food. To secure a permanent shelter, he gradually developed a strategy and technique to build a house. With regards to this, I. M. Simon explains:

> *He needs a place to shield and protect himself from the enemies or wild animals in which he will be safe from cold, or rain or wind and storm. In the beginning, a man sheltered himself inside the caves but he cannot carry caves with him wherever he goes. Depending on the place he is, he has discovered a technique and strategy to make his own house with the materials available in that area.* (Simon, 1981:4).

It is for this reason that man finds his own strategy to make houses in which he makes and constructs a house in accordance with the place that he lives in. Therefore, we find that making and construction of houses differs from one place to another.

As for the Khasi traditional architectural concept, the indigenous people have shown a close relationship with nature in the form of seasonal changes, water bodies, flora and fauna, and other natural paradigms. As a result, this harmonizing relationship between humans and nature has developed a sense of unity that has remained perhaps the greatest source of inspiration. Meanwhile, indigenous people also enjoyed using native materials such as stone, clay and wood, which are readily available, although the use of natural materials varies according to geographical conditions.

Among the Khasis, preparation and construction of houses with their own distinct features differs from one region to the other. This shows the uniqueness and specialty of the Khasis and the usage of technology adopted by them. This dissimilarity of making and constructing houses among the Khasis is what as I.M. Simon says "depending on the place he is" (Simon, 1981). The same observation is given by Sipra Sen, who writes:

> *The Khynriam house in Khasi uplands were oval shaped thatched cottage with wooden plank and stone walls raised on a plinth of 2cto 3 feet from the ground. The house of the Pnars differs in shape from those of the Wars. The roof is hog-thatched with leaves of palm. The Bhoi and Lyngngam houses are built on high platforms of bamboos. They have 30 to 40 feet in length. The bachelor dormitories are found in "War" villages. The other groups have no such dormitories.* (Sen, 1982:7).

The observation of Sipra Sen shows that the making and constructing of houses in the Khasi Hills itself differ from one part to another. Here we will see the way of house construction among the Khasis. In the beginning, before building a house, the Khasis carefully study the site for building a house. The Khasis never build a house roughly without thorough investigation or without performing any rituals in the area they have chosen for building a house. The Khasis, according to tradition and customary laws, perform rituals to test the goodness and desolation of the site by breaking eggs in that particular place or land (Sen, Ibid).

Kynpham Singh while explaining this, he says:

> *As another auspicious occasion, eggs are broken to read the signs before preparing the site of a house.* (Singh, 1979: 173).

This type of positioning for constructing houses may differ from one part of the Khasi Hills to another within the same area. There is another process that people perform when selecting a site for construction a house, which is to place grains of rice or an egg at the selected site. If the rice grains or egg showed a good sign, they started building a house. In view of this, M. Lyngdoh stated the rituals performed in Raid Mawja as follows:

> *First and foremost, anyone planning to make a new house, search and look for a well-suited site. After selecting the suitable site, they plant*

> *trees as a mark that they have owned the site, so that others may not interfere. But in some cases, there are people who seek permission from the Mother Nature and a Goddess; they kept grains of rice and an egg inside the earth so that no pigs, poultry or any other animals reached to it. After a week or more, as per the time fixed and the words spoken and promised, they went to look for that site again. If the grains of rice or an egg remains in the same place and position, it shows that the site is suitable for making and constructing a house and its free from any untoward incidents or mishaps, and that they plant trees to mark that they have owned the land. If by chance, the grains of rice or eggs vanishes or disappeared from that site, it means that the site is not good for making a house.* (Lyngdoh, 2002: 14-15).

Here we see and understand that the Khasis are very selective in choosing a plot of land for building a house. Also, there are several conditions and restrictions that people have to follow when choosing and building a house. These conditions must not be transgressed or disregarded. Jeebon Roy explains very well about the taboos or restrictions as "The Khasis considered as a taboo to make or construct houses on a hillock or the last hill amongst all the hills that stands in order. And if the daughter of the house shifts to another house from the main house in the same compound or garden, it is considered as a taboo to construct a house in the right side of the main house (mother's house), they make either to the left side or at the back of the main house. They also considered as a taboo when the faces or walls of both the houses overlapped each other or when the roof is going towards the opposite side of the other house" (Roy, 1979). These arguments and thoughts of the Khasis show and clarify that the Khasis are very particular and precise when building a house. However, he also pointed out that the house should face towards the east (Sen:250). The above-mentioned taboos are the main things that the Khasis have to follow and not to violate them.

The construction of houses from plants is the oldest man-made product that has a circular shape. The Khasis had a sophisticated knowledge of building systems and created architecture that responded to the forces around them. They had no professional training in design and technology, but they felt that the forces that mattered should be respected, and they responded to their deep Khasi belief system and to their values and social systems. So, they also considered physical factors such as climate, earthquakes, thermal comfort, economy, and availability of resources. All of this resulted in a house form that is attuned to the Khasi way of life and to the environment in general.

Khasi houses were not large by any standard but the basic architectural style was common throughout the land as per my field study in the East Khasi Hills areas like Mylliem, Laitlyngkot, Sohra, Mawphlang, Khatar Shnong, Laitkynsew, Langkyrdem, Langkawet, Mawkynrew, Sohbar, Nohwet, etc. is concerned. This may have been due to the social and family structure which while they were close-knit, they lived in individual houses. According to P. R. T. Gurdon, "basically the traditional houses of the Khasis are oval in shape somewhat resembling a capsized boat" (Gurdon:20) likewise Sumar Sing Sawian said that "the traditional Khasi concept of building a dwelling is in the shape of an inverted boat, built on raised platforms, which acts as a shield against severe climatic conditions, such as raging storms and thunder squalls in summer and the biting cold of winter" (Sawian, 2011: 46). The shape also symbolizes the form of the egg. In fact, the egg is the true primordial form of shelter to any living creature and incidentally plays an important factor in all Khasi rituals and ceremonies. Thus, we can see that the shape of the house is tied to the belief system of the Khasis. This belief is unconsciously manifested in the house itself which is the centre of life.

The Khasi traditional house is essentially divided into three rooms, a porch or *batsha* about 7 feet long, along with the *shyngkup* or entrance, the *nengpei* which resembles the living room where the *iing-kyngdong* or sleeping area is located, and the *rympei* or fireplace around which the family gathers. Firewood and odds and ends are piled up in the porch. The imposing roof, which looks like an upside-down boat, is directly related to the *knup*, which is still used by many as a mobile rain shelter or umbrella. It is covered with the leaves of a palm tree called *u tynriew* and sometimes with *u sder* or *u traw* made of wild grass. The knup has eaves and the eaves reach almost to the ground. The ceiling of the house is usually made of bamboo and serves as a storage space for everyday utensils. The walls are made of materials such as stone masonry with lime mortar, mud walls plastered with lime, or rough-hewn

wooden boards, because they did not have a saw either, although they were experts in using the cleaver and the axe (Syiemlieh, 26). The use of different building materials depended on the prevailing weather conditions. Clay and stone walls are common in areas with heavy rainfall.[2] The floor is supported at intervals by limestone or wooden pillars and rests on a base about 2 to 3 feet above the ground. This area is called the *shyngkup*. The only window, called a *pongshai,* that protects the interior from the lashing rain and wind is a small opening on one side of the house that allows only a faint light into the smoke-filled interior. Most houses have two doors, one on the front, which is 3 feet wide and 6 feet high, with 1½ feet on each side, and the other on the side of the house known locally as the *pongshai*. However, there are no beams or frames attached to the door. The fireplace is known as *dpei dieng*. Wood is often used for cooking and other domestic purposes. It always burns on an earthen or stone hearth in the centre of the *dpei dieng*. The firewood is placed on a swinging rack above the hearth to dry, known as a *tympan* or *tyngier*. There is no chimney, but interestingly, the smoke escapes from the thatched roof.

Khasi Hills is located in the highest risk zone (V) of earthquake susceptibility in India. The area has experienced several earthquakes, including the one in 1897 (See Oldham,1899 :379; Allen, 1905; Ambraseys and Bilham, 2003: 655-673; Kulkarni, and Guha, 1983:211; Satyabala, 2002: 206) that destroyed most of the town. Among the buildings that survived the earthquake were some of the traditional Khasi houses. The earthquake-resistant characteristics of such traditional buildings were studied. Some of the features of the traditional Khasi houses meet the requirements of modern building codes, such as the fact that they are usually not built on hills and that they have symmetrical oval shapes without sharp corners, which avoids stress concentrations that are a major cause of wall corner failure in earthquakes. No nails are used in the structures, and the grooves and springs used allow for the dissipation of seismic loads. The roofs are made of light materials, so the number of fatalities due to failing roofs is limited. The traditional construction technology in Khasi Hills have earthquake-resistant features that could be useful for building earthquake-resistant houses in modern times, especially for rural and urban poor settlements in earthquake-prone areas.

For the Khasis to used nail pegs or any iron metal while making a house is considered as a taboo. The house is made up of wood and it is held together by pegs or wedges and a kind of bamboo strings. Kynpham Singh stated this as:

> *The Khasis never use iron nails or any metal to hold up the structure for it was considered taboo. The framework and the whole structure were held together by wooden pins, wooden pegs, wooden wedges, sliced bamboo etc. An example of such a Khasi house is the present Iing Sad [3] of the Syiem of Khyrim. (Singh, 1979:173).*
> *With reference to the explanation given above, we have understood that the houses of the Khasis are elliptical and circular. The walls and side walls of the house are not straight but curved and inverted, the roofs are like inverted boat-shaped roofs. The whole structure of a house looked like a giant turtle. The house is built to withstand the strong gusts of wind and rain, because in Khasi Hills it rains often and the wind and storm whip frequently. Often a house is built of hard and strong wood, specially selected and covered with grass, straw or long thatch* (Rana, 1989:70).

In a society or an association among the villagers, the Khasis have a way of life to help others in times of need. This is visible at the time of constructing a house, whereby the villagers including the neighbours and friends comes to help in making a house, especially in pre- colonial period. In favor of this, Kynpham Singh explained as: … after the owners of the house have arranged the wood from the forest, their friends lend a helping hand, right from digging the earth in the selected site till completion. The owner of the house serves only tea and rice. (Singh).

The Khasis considered use of nails as sang or taboo, and only used a certain kind of timber for the fender which surrounds the hearth; but there were references of the use of square nail or *Prek Sawdong* which reasoned that the Khasis might have had the knowledge of the excavation and smelting of iron. Again, it is a taboo to use part of a fallen tree for house construction. So, the people used only a particular timber cut from the forest during the dark moon (*dum bnai*) soaked in water or mud for almost a year. The common timbers used for construction are the *diengbti* or pooma and *diengrai* or champa.

In the year 1963, G. Costa discussed in detail the way of constructing a house right from felling off trees, putting the trees inside the water to kill the insects. He also mentioned the names of the trees that can be used to make pillars such as *Sohphan* (Jack Fruit), D*iengrai* (Champa), *Kreit* (timber), *Sohpathaw, Sohum Kynthei, Byllat* (a hard tree whose bark oozes milky substance/tree used as post), *Jalngap Iwtung, Shyrkhat, Dieng roi, Soh myllon, Dieng ngai* (Iron tree), *Lyphiang, Dieng wah* (trees grown by the river side), *Dieng Riat* (trees grown near the cliff or gorge), *Dieng Sning* (an oak tree), *Bti* (Mahogany), *Narkhasaw, Sohramdieng* (a tree of small sourish fruit), *Sohmanir shrieh* (Litchi tree), Shyrmiang, Sohryngkham, Rymiew, Shatmuit. Also, the trees used for making plank, to make a partition, to make a wall plate and a beam running round the ceiling, a rafter includes the *Jamiew*, *Lasaw, Krot, Dieng Bai, Dieng Ping wait* (a tree whose branches are used to make knife handles), Kyrbei, Dieng Lieng (tall and straight tree), Sharyntoh, (Folded hands tree), *Jalngap, Lyngoh, Btiramsong* (Mahagony), *Sohpieng shrieh* (mango tree), *Soh khyllam* and *Jakrai*. Costa also says that a *Dienngan* tree (tree used to dress as timber) is considered taboo to make house with as it worsens a patient suffering from leprosy or measles. The other is *Dienglieng* (tall and straight tree) because once upon a time the hawk who builds her nest in this tree carried away a baby; and the Patuia tree cracks. (Costa, 1963; Lamare, 1994).

The hearth, is a place to kindle fire in the form of a box filled with soil and in the middle of it, three stones (*mawbyrsiew)* that form the hearth are kept and placed, they keep another stone close together known as *Mawbyrsiew shet kyiad* (a stone to make liquor). Moreover, he also explains that these houses have three doors; one is the porch (*shyngkup*) at the front door to move out of the house, one towards the porch (*shyngkup*) and the other one towards the opening (*pongshai*). (Costa:1963).

In 1984, Pranab K. Das Gupta has written about the ways and process for construction of houses by the people of Shella. The house in Shella is square in shape and it has only one retiring room (bedroom), the rich people have two bedrooms. The house of the poor consists of one room only and the threshold at the front. Adjacent to a bedroom, there is a platform made up of bamboos where they sit, rest and chat and with the use of a ladder; people can climb to the platform. This place is called *Ka Rynsan*. He also said that the house in Shella has a verandah called as *Lithiang*. The water that they used is kept in a place known as *Lyngiar* or *Tyngkong*. The way of constructing houses in Shella is, the kitchen is made separately outside the bedroom, covered with grass or straw. Above, the hearth, there is a platform or the hanging frame known as *Pyrdot*. Things like sacks of grains are kept in a *Pakrom* daub with the soil. The author also pointed out non availability of toilet in these houses, except a urinal which is outside the house in one corner (Gupta, 1984).

Furthermore, for example in Langkyrdem community (War Khynriam), house of Phrielsila Nongsteng who informed that the house was built by her father Lphung Kharwanlang and mother Desimai Nongsteng, seven decades earlier and that she herself was born in it. Earlier there existed many traditional houses in the area but with time, all the others had been dismantled, leaving just one, her inheritance. The original house had been built entirely of wood and covered with wild grass. She had no choice but to replace portions of the wood panels with bricks just to reduce the cost of upkeep. The dwelling space of the house has a very interesting configuration: it is gently curvilinear on all its four sides, a geometry reflected dramatically in the radiating spoke like framework of its curved entrance roof. The dwelling space has been divided in the *Kyndur* or the porch like entrance bay, used for keeping baskets and other household material. At the centre of its inside face is the main entrance door. Then we have the *Kamra Shong Kai* which is the central portion of the main inner space of the house, kitchen hearth at the farther end – this is the family's dwelling room. Then we have the j*ingbuhum* on the immediate left as one enters the *Kamra Shong Kai*, is a stepped down bay for storage and keeping drinking water from which, a side door opens to the outside. The interior space is then followed by the *jynthiah* but partition off from it, an extension of the *Kamra Shong Kai* – this is the sleeping alcove with bamboo bead steads and shelves. The exterior space is divided into the *Phyllaw* the front open yard, Shakir the open yard on the rear and sides of the house. The materials and technology used in the construction of this traditional house at Langkyrdem are timber, wood for planks, mainly jackfruit. For roofing, a variety of local thatch or grasses was used and *Jyrme*, a vine for tying together various building components. Stone for foundation support, plinth wall and bamboo for furniture (beds), roof framing etc., was available from community owned forest or from lands owned by others. In Langkyrdem houses had no granary so grains and food would be stored within the house. At the time this house was built, there was no such thing a labour for hire. People from the neighbourhood and the rest of the village would turn out to help even without being asked to do so. The household would prepare food for everyone. The women would take care of preparing the grass for thatching, unlike in other places where construction was purely the work of men. The men

would handle the heavier woodworks. Cooking for the workers was the women's job. There was no system of payment for the help received; it was a customary form of social commitment. This traditional Khasi house is compact and economical, perfectly designed to effectively withstand the diverse local climate – summer, sultriness, winter chill, high winds and unremitting monsoon rain. Its structure is secured and wood framed plank walls and floor crafted using no nails, its entire framework tightly held together by bamboo or forest vine ties which provide strength as well as structural flexibility required in a highly seismic location (Sen & Dutta, 2021:155-162).

In Nohwet, Pynshok Kongjee and his wife Sidon Khongsar informed us that their original house was made before the big earthquake of 1897 and would thus be more than a century old and was first occupied by his grandfather-in-law and later by his parents-in-law. The dwelling spaces are divided into the following: *Shang kep* – which is the lobby cum store room at the entrance to the abode, with the main doors and windows a step below the floor level of the rest of the house; a mezzanine platform for storing bamboo and cane parts of the floor area. Secondly, we have *Ka-bar* – the central and main room of the house with access from the *Shan kep* (at the front); the space has multiple uses, for cooking on the hearth at its centre, as a family sitting area and the place where the elders would confer. It is also the space for guest, who by tradition would always be seated inside the house. Clothes would also be hung here on beams along the inside right wall. *Kyrpong* – the last room, across the width of the house, which is the sleeping bay; the family sleeps on the floor, over which there is another storage mezzanine. The materials used in the construction of the house are *seij* (*shken*) or bamboo, *threi* or cane, wood from the jackfruit, wild litchi, teak and sal tree, the walls or *kynroh* are made of stone, *tynriew* for local thatching roof, *Pyr-U*, *Mithied Jyrmi* or forest creepers for rope. The traditional houses in Nohwet used no nails in the construction. The *Ka Bar* (main central room) would be used only for sitting and socializing – but not sleeping. The storage mezzanine above the sleeping area would be made of thick wood planks, to shelter those from hailstones which might pierce the roof. Usually, all joinery work in the old houses would use wood of a single species. Water for building work would be carried from sources in bamboo containers. The sources for building materials would be from traditionally owned private lands, would be sourced from here either by sharing or exchange or simply by understanding the builder would take just what he needed and not to exploit the landowner's goodwill with excessive extraction of materials. Stones are usually available from one's own land or sourced as previously described. The technology and process of house building in Nohwet has always been simple. The owner would summon friends and neighbours and together they would accomplish the task. The only reciprocation by the owner would be to provide food for the helpers. The owner's arm measured from elbow to fist would provide the unit of measurement (*pruh*) for building. Thatch would be measured in *Kuri* (20 pieces); a roof similar to that of the Sidon house would need 20 *Kuri* of thatch which would last 7 to 8 years. There are no rituals at either the beginning or the conclusion of house building. Activities concerned with house building had always been seasonal – November to January (winter) would see tree felling and bamboo cutting done, February (late winter) would see construction activity begin, the period of fewest pest and April (spring) would see the house construction complete before the rains. Roof thatch would be harvested in December, folded in a particular fashion and allowed a month to dry. House building in Nohwet had traditionally been a community supported activity. Friends and neighbours pitch in and do their bit, at no cost for the prospective house owner. The implements used for constructing are as follows: *wait lyngkut* or curved iron dao (machete) for cutting wood, *lyngka – U nar* or iron shaft with point, pain tali or iron chisel, tyrnem or iron hammer, *wait bnoh* or iron dao with hook, *wait pam* or variety of dao and *wait longdang* or S-shaped iron dao with point (in olden days, iron tools were in all probability procured from Mylliem) (Sen &Dutta, 146-153).

Across history of human civilization, socio-cultural, economic, religious, geographical and ecological factors have motivated people of different periods in shaping their settlement strategy. From the very commencement of people's settlement-practice, housing practice became the symbol of protection and safety for human existence. Whenever people think of housing construction, technology has been given the principal contemplation to cope with the hostile natural calamities and unusual environmental behaviour. People around the world still maintain and practice this trend historical, pragmatic and situational in housing construction. Indigenous people across the world have hereditarily been exercising this sort of housing technology for years that includes the above reflection. However, even modern architectural design embodies the discourse of 'environmentally-sound' in construction process. With the increased economic dimension of human life, economic factors are also reflected in the domain of housing technology that includes cost-effectiveness and sustainability, etc. Architecture and culture are intertwined into the day-to-day activities. Although most traditional structures in Meghalaya use similar locally available materials like bamboo, wood, mud and thatch, they are different from each other. This factor of identity stems from their diverse cultural practices and beliefs. The paper has explored the relationship between traditional

housing technologies and traditional architecture of the Khasis in Meghalaya, taking the case example of East Khasi Hills.

Notes

[1]Etymologically the word "architecture" comes from the Greek phrase arkhitekton, which means "master builder," in practice architecture has gradually acquired the connotation "art of building". As a word, "architecture" can carry several more meanings, such as art of building shelters right from earliest times to the product or result of architectural work: buildings, urban areas and landscapes / a style or method of building characteristic of a people, place or time / the profession of designing buildings and other habitable environments by architects / the conscious act of forming things resulting in a unifying or coherent structure. (For details, see Sills, 1972: 392-397; Ching, 2011).

[2]Places like Sohra and Mawsynram which receives the heaviest rainfall not only in India but the entire world.

[3]Literally Iing meaning house and Sad meaning to comb. Iing Sad is an ancestral residence of the Syiems Mother. It is marked with reverence since it is the place of religious significance where invocation to the Gods is made and important matters of the Hima / Khasi Native States are taken. It is the centre of governance and justice of ancient state of the Khasis. Interestingly P. Thingan refers to Iing Sad as a ceremonial house whereas Lapynshai Syiem, refers it as a religious house.

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