Temples of Odisha- the Geometry of Plan Form

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Abstract

The Indian temple architecture depicts clearly their evolution, following the original ancient models, which were derived from religious consideration and this practice is further being followed, since many centuries. These temples are actually, the place of transcendence where man crosses over from world of illusion, to the world of truth. The main style of Hindu temple architecture in India had its modest beginning precisely from the Mauryan rule i.e 3rd century BC. The Indian Silpasastras recognize mainly three categories of the temple style, the Nagara, Dravida and Vesara, but there was also another style very prominent, known as the Kalinga style, which is very distinguished all over the world for their unique characteristics, that existed between 6th century A.D to 16th century A.D in Odisha. The aim of the paper is to describe the Kalinga style of architecture and the basic characteristics of the temples of this style, eventually concluding with interpretation of the plan forms of the temples, to be following a scientific and methodical path of evolution.

Keywords: Evolution of Temple, Hindu temple, Kalinga architecture, Odishan style, plan from

I. INTRODUCTION

The temple forms the focal point for all aspects of life in the Hindu community - religious, cultural, educational and social (Batchelor, 1997). In ancient Indian texts, a temple is a place for Tirtha – pilgrimage. Hindu temple architecture, apart from being a place of worship, are also the cradle of knowledge, art and culture. The facets of Hindu temple focus not only on the goal of enlightenment and liberation but also on the principles of design and construction, its architectural and decorative form, including the rituals performed (Batchelor, 1997). It is actually a spiritual destination for many Hindus, as well as landmark around which ancient art, community and economy flourished. Actually the term temple is derived from the Latin word 'Tempulum' which in its original sense signifies a square or a rectangular place for the purpose of worship (DB Garnayak , 2007). It has same meaning as the word "template", a plan for preparation of the building that was marked on the ground by the auger. Spiritual principles symbolically represented in the temple are given in the Vedas, while structural rules are described in the sanskrit texts viz. Vastu sashtras. The characteristic features of a Hindu temple includes the following major elements – an entrance, a porch; one or more than one attached or detached mandapas which are the halls leading to garbha griha ; the inner most chamber housing the deity is called the garbagriha, the sanctum sanctorum; and the tower which is build directly above the sanctum (Batchelor, 1997). It is based on a strict grid which is made up of triangles and squares which are infused in it with deep religious significance (Batchelor, 1997). The ideology behind the designing of Hindu temples, is to connect man with the god. It is the place where one can feel being close to god. These temples are actually the place of transcendence where man crosses over from world of illusion to the world of truth. Thus the bottom line is that "the temple architecture plays an important role in the existence of a Hindu".

A. Introduction to the Temple Architecture in the Indian Context

The evolution of temple architecture is marked by a strict adherence to the original ancient models, that were derived from sacred thought which persisted over many centuries. The commencement of the main style of Hindu temple architecture in India dates back to the Mauryan period i.e 3rd century BC, as evident from the archaeological excavation at Sanchi (Madhya Pradesh, temple no.40 and18) and Bairat (Rajastan), (DB Garnayak , 2007) . The Indian Silpasastras recognize three main types of temples known as the Nagara, Dravida and Vesara. Nagara temple belongs to the country from the Himalaya to the Vindhya, Vesara from the Vindhya to the Krishna and the Dravida from the Krishna to the Cape Comorin (DB Garnayak , 2007). An inscription in 1235 A.D in the mukhamandapa of the Amritesvara temple at Holal in Bellary district of Karnataka speaks of the fourth style i.e. Kalinga, in addition to the above three. The Kalinga style of Architecture is explained exclusively in the texts like Bhubana Pradip, Silpa Prakasa, Silpa Ratnakosha etc. An inscription in 1235 A.D in the mukhamandapa of the Amritesvara temple at Holal in Bellary district of Karnataka speaks of the fourth style i.e. Kalinga, in addition to the above three. The Kalinga style of Architecture is explained exclusively in the texts like Bhubana Pradip, Silpa Prakasa, Silpa Ratnakosha etc.

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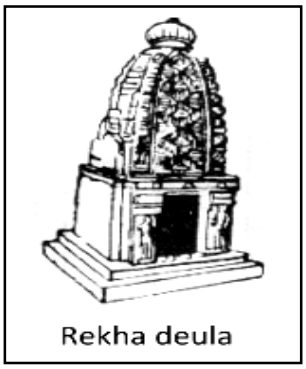
B. Odishan Temples

Fig. 2: Lingaraj Temple at Bhubaneshwar

In this land of temples with Kalinga style of Architecture, temples as freestanding structures came after the Gupta period through Dakshina Kosala. (Behera, 1993).The Hindu hegemony like Somavamsi, Bhaumakaras, Gangas inspired the Odia architects to carry on the spirit of creating their own style of architectural temple representations without any Islamic or Persian influence. (Behera, 1993). Temples of Odisha are famous all over the world, for the unique characteristics of their architecture and sculptural style. (Behera, 1993). So in India, Odisha with its fascinating series of temples, form an exciting area to study the evolution of Temple architecture. (Behera, 1993). Though differing in dimensions and details the temples of Odisha form one of the most homogenous architectural groups in India. The history of Odishan temples, started from 6th century A.D reaching to completeness by, 11th century A.D with Lingaraj temple .By the middle of the 13th century the Odishan temple architecture attained its climax. These temples are remarkable for their plan and elevation. The silpa text of Odisha mentions three types of temples, rekhadeul, pidhadeul and khakaradeul.

1) Rekha Deula



Rekha means line. Rekha Deula or Rathaka Deula are also called the Vimana or Garbhagriha or Sanctum Sanctorum.These are sub-classified based on the plan forms as:

1) Ekaratha deula (one cuboid only)
2) Triratha deula
3) Pancharatha deula
4) Saptaratha deula
5) Nabaratha deula

Out of the above mentioned Ratha styles the triratha, the panchratha and the saptratha plan forms as Shown below are mostly found in Odisha.

2) Pidha Deula

In rural Odisha Thatched Houses was a common mode of accommodation. The thatched roof is called "Challa" and these piles of Challa when formed and cut properly is termed as Piddha.

Again based on the shape of the roof this typology is sub classified into the following types :

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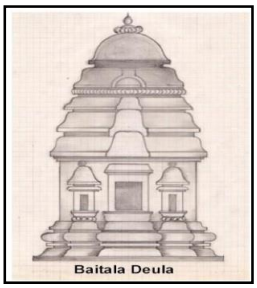
a) Dwichallia Pidhha

Which had the roof form which resembled the vernacular houses of Odisha with two layers of slopes on three sides and the opening in between them, Nahachallia Pidhha- having sloping roof on four sides, Kathachalia Pidhha- is an improved version of the Nahachalia Deula. Here, Katha means wooden &chhalia is the slating roof as discussed. The pidha or roof section of of kathachalia Pidha Deulas have more prominently and geometrically shaped Pidhas or the pyramidal stack of stone Slabs as roof which appears as if made of wood, lastly Ghantashree Mohana- mainly of the shape of a bell over square or rectangular slab.

3) Khakhra Deula

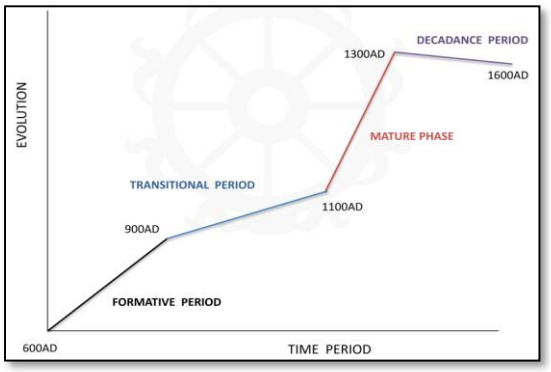


Khakara or Baitala temples are a unique and highly decorative type of temple. It resembles the shape of a Pumpkin. Owing to the shape of Mastaka which resembles a 'Kakharu' these types of temples are called the Khakara Deulas. These temples resemble the shape of an Inverted bell. The Odishan temple constituted a sub style of the Nagara style of north Indian temples. Bhubaneswar, served as the experimental ground of theses temple building activity without being distracted by the change of the ruling dynasties. It is because of this that the temples are identified with the land Kalinga instead of the royal families such as Pallava art, Chandella, Chalukyan art, Rashtrakuta art etc.

C. Phases of Evolution of the Odishan Temples

The temples of Odisha portray a picture of organic evolution from Parasuramesvara to Lingaraja, not forgetting Muktesvara and Vaital, which eventually culminated in Puri and the gigantic Konark .The evolution can be observed during four distinguishing phases of temple building; viz.

1) Formative phase (6th -9th) century A.D
2) Transitional phase (9th –11th) century A.D
3) Mature phase (11th – 13th) century A.D
4) Phase of decadence (14th – 16th) century A.D



D. Plan forms of temples

After the broader description of the temples, coming to the plan forms existing during this period, it is observed that the temples are majorly having square plans and very few temples have rectangular plans. Study of the plan forms of the temples in different phases indicates that initially, The Formative phase stretched between the 6th century A.D till the first half of the 9th century A.D, when the Sailodbhavas ruled. Few temples belonging to this period are Mohini, Parsurameswar, Lakshamaneswar etc. The temples had a triratha plan with offset in the central graha and two corner projections (one on each side).

The Transitional period, started in the second half of the 9th century A.D till the first quarter of the 11th century A.D, when there was the rule of Somavansis and the Bhauma-karas. Few temples like Markendeswar, Sisireswar, Swapaneswar etc. came up during this period. The temple of Mukteswar was considered as the gem of this period, also being the last monument constructed. Taking a look into the plan of the temple it is observed that,during this period the plan of the mukhasala got transformed from a rectangular hall to a square hall. Initially very few temples were made in triratha style but later on the temples had pancharatha plan with two corner projections flanking the central projection, on each side.

During the Mature phase which extended from the 11th century A.D to the 13th century A.D under the rule of Somavamsis and the Gangas. The temple architecture reached its maturity with Lingaraj temple. The magnificent Konark temple depicts the climax of this period, of Odishan style. In order to meet the growing need of the rituals the Natamandap (dancing hall) and the Bhog

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mandap(hall fo offerings) were added to the Jagamohan in this mature phase itself. The initial temples had the same panchratha plans eg Kapileswar and Siddheswar Shiva Temple but the Lakheswar Temple and Sari deul temple which were built in the later period, had the plan in the saptaratha style.

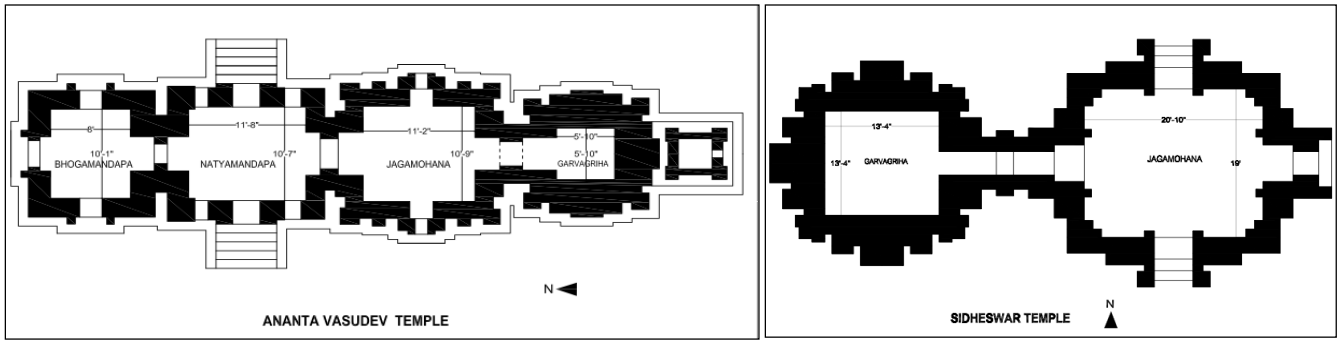
Lastly in the Phase of Decadence, between the (14th – 16th) century A.D the temple building activity came to a halt. Lack of royal patronage and decline of Hindu power resulted in the decline of temple building activity. Inspite of all this, Odisha is said to possess the rich Temple heritage.

II. METHODS USED FOR ANALYSIS OF ODISHAN TEMPLE PLANS

Many researchers have done different kind of studies on the Temples of Odisha, some historians like Henry Sterling (1957) – His book "Architecture of the World- India" is based on deciphering the underlying geometric grid of the Temple. According to him the temples are based on a basic square grid. Some like Percy brown, Sir Banister Fletcher, Satish Grover have given the dimensional description about the temples, showing their sections and elevations. Many like George Michell in his book "The Hindu Temples, An Introduction to Its Meaning and Forms" has discussed about the cultural, religious and architectural significance of the temple.

Few researches have analysed the temple plans on the basis of "Fractals geometry". "Fractal" was the term used for the first time by a mathematician named Benoit Mandelbrot in 1975. Important characteristics of the Fractal geometry is that : they are recursive; that is, the process of their creation gets repeated indefinitely, they are self-similar; that means, replica of the whole fractal may be found, in reduced form, within the fractal and fractional dimension which tells that, they have dimensions which are not discreet but continuous i.e. always in fractions.

K Trivedi, 1993, in his paper "Hindu temples: models of a fractal universe" has evaluated the temple based on, Fractals. He studied that due to iteration Hindu temples have given rise to distinct architectural style. This form of temple expresses certain concepts of Hindu philosophy about cosmos using symbolic vocabulary of forms. Few authors like Iasef Md Rian, Jin-Ho Park, Hyung Uk Ahn, 2006, in their paper, "Fractal Geometry as the synthesis of hindu cosmology in Kandariya Mahadev temple, Khajuraho", have analysed the Kandriya Mahadev Temple at Khajuraho using Fractal Geometry for the plan of the temple using Box counting method. Partha Sarathi Mishra in 2012, in his research paper, "Orissan Temple Assessment through Geometry" has analysed the temple based on Plan area ratio, relation between height & time of construction, present slenderness ratio and the relationship between width & length of the local build and how all these factors have lead to the evolution of the Odishan temple architecture. Some have analysed the Odishan temples based on vaastu purusha mandala. Thus from the above researches or study, it is clear as to how researchers have tried to analyse the plan of the Odishan temples. Now looking through a different angle which is still untouched, if when one observes the development of the plan forms of the temples through different phases, they appear to be compact and homogenous in nature . Looking into the details of plan and the way one part is attached with another part, the proportion it follows, it becomes very apparent that the evolution of the plan forms of the temple must have been methodical and must have followed some scientific method or technique to reach to its actual form, apart from the canonical influence on them.



Taking example of few temple plans as shown above it clearly appears that the basic form of the temple has evolved out of a simple square. These squares were either scaled, subtracted or added one after another resulting into the evolution of the final plan following a step wise generation. This method of scaling, adding or subtracting is nothing but Euclidian geometry. This indicated clearly that, the temple plans of Odisha followed geometrical evolution, following different steps where an initial basic shape of square after undergoing addition and subtraction or scaling, resulted into the final plan. This step wise generation resulted into a similar kind of pattern which was basically same for the plans of temples of all the phases with minor variations. This actually could have been the reason for the distinctive features or a commonality in the plans of temples of Odisha.

III. CONCLUSION

Several buildings when are seen, creating a similar kind of impression, they are said to exemplify a particular style of architecture. The finite corpuses of the buildings are then perceived to be alike in some sense, consisting of basic similar characters for this likeliness. It is very clear that, among all the different kinds of temples, existing in different eras and depicting different style, the distinctive features of Odishan temples form a style in itself. The underlying commonality of the structure of temples, manifest to

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the original corpus in an instance of style. Any temple plan can be determined, which are an instance of style. This paper will do away with personal biasing given by different historians about the temple architecture of Odisha. A systematic and a methodical way of understanding the evolution of plan forms of the Temples of Odisha has been discussed which explains that, apart from the canonical influence on the plan forms of the temple of Odisha, there is also an underlying geometry that dictates the evolution of the plan form through different phases of Odishan architecture. Therefore there is scope for further understanding the hidden aspects in the plan form of the Odishan Temple.

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