

Architecture in Archaeology

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Abstract: This paper deals with the architectural sociology that is renewed subject yet remains neglected area in the field. This paper draws a bridge between architectural community and mundane society through the blending boundaries of architecture and archaeology through comparison between two Indian cities of ancient and modern architecture, certain conclusions are drawn to depict the correlation between built form and human behaviour and how both complement each other in ways that make it difficult to separate them as separate aims. To prove the lifestyles and ideologies, Space Syntax theories of Hiller and Hanson and Fisher theory of visibility are diagrammatically shown to draw a caricature of lives then and now.

Keywords: Archaeology, Architecture, Civilisations, Space syntax, Symbolism, Town planning, Vastu shastra

1. Introduction

The research focuses on studying on the bridge between the archaeological data collected and the growing concern of urban stabilizing and conserving the foundation remains. Formerly built structures have always attracted the wonderings and since the study of archaeology has started impacting on lifestyles, so has the study of architecture within the field. Modern studies in architecture have turned towards domestic settings in order to better understand the day to day lives of the mundanes. The 'built environment,' or the way humans create their surroundings and create structures, concerns both of these domains. The examination gives out the study of private spaces along with social and political aspects conclude the overall perspectives.

Architecture is often a canvas for changes with a society or culture. The most far-reaching changes in the evolution of societies have usually involved the changes in settings of households and function or the lifestyles adopted according to the prominent architecture.

According to architect-archaeologist Sebastiano Tusa, the relationship between archaeology and architecture has aspects such as technology, human psychology, material and construction techniques. Different elitism, epistemology, and reciprocal individualism have produced a disrupt between architecture and archaeology - not only concerning research and analysis, but also the design of new facilities, restoration, and the transformation of the asset into a modern scape.

The studies in archaeology tends to give out the information of past suspenses in architecture, yet rather it is restricted to objects only.

2. The basis of two cities

The studies are done on the basis of comparison between an ancient city and a contemporary city; the Harappa civilization and Chandigarh.

The major distinction between two cities is only the time frames that are both drawn out of need and luxury. The later being the most prominent one in the contemporary world. Yet the main similarity still remains in the need of the society.

With speeding evolution the civilization both now and then has established certain parameters to maintain their growth and control their influencing environment.

- Social structure
- Religious conceptions
- Lifestyle ideologies

According to the above they formed their cities resulting into several fields to execute,

- Formal arrangement of building and settlement patterns
- Organization of societies
- Construction techniques
- Transformation of landscape and topography

3. The need

The ancient theories and techniques have always been a base for modern development and civil evolution. In order to strengthen the rate of development there is a need to know the past of the place to understand the requirements and the resources that will only be known from its history.

The ancient cities were merely the illustrations of need and basic formal yet correct example of social settlements. Today in order to develop an area one can evolve or modify their old planning according to their customized requirements that is time saving and better execution of settlement without forcing on original concepts.

Conservation of heritage buildings is needed field today so as to provide a sense of identity and continuity in a fast changing world for future generations.

4. Archaeology in India

The term has its origin from Greece since 17th century; Arkhaios= ancient, Logia= study, arkhaiologia= ancient history. Flavio Biondo, an Italian Renaissance, was a humanist historian who created a organised guide to study the ruins and

topography of ancient Rome in the early 15th century, for which he has been called an early founder of archaeology.

A. Basis of planning

The concept of Hinduism about morality is a steel frame foundation of spiritual life. Hindu ethics are mainly subjective belief wise in order to eliminate mental impurities, greed, egoism and works for social welfare.

1) Social structure and religious concepts

The Indian caste system describes the social aspects of ethics of the Hindu society. It is based on the essence of renunciation and self-denial as cardinal virtues. Evident from Vedas; specifically, from *Bhagavad Geeta*, the society is divided into four groups based by their actions and virtues.

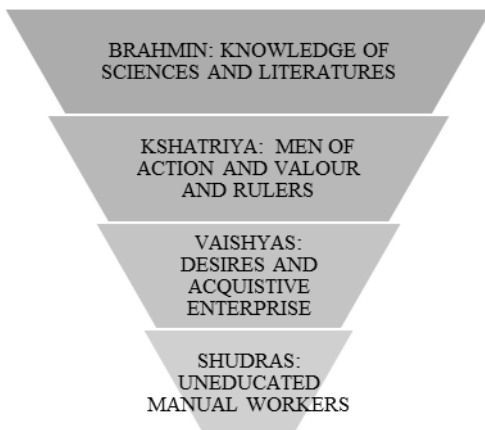


Fig. 1.

In Vedas, the four castes are described by the body parts of a cosmic person; *Vastu Purusha Mandala*. The head, the arms, the stomach and the feet describes the positions in planning.

2) Architectural ideologies: Vastu Shashtra

The planning and designing is done according to the conditions of the site location, direction and disposition of the building that have direct bearing on the human being. Vastu Shashtra is drawn from the *Atharva Veda* having an upaveda *Sthapatya Veda* allocating the ancient science of designing and constructing building.

Vastu Shashtra is an art of arranging a setting whereby one can optimize maximum benefits of the *Panchbhutas* (five elements) of nature, earth's magnetic field and the rotational influence of the sun, moon and the other planets surrounding the earth. There are five basic principles are:

1. The doctrine of orientation (*Disha*)
2. Site planning (*Vastu purusha mandala*)
3. The proportionate measurement of building (*Maan*)
4. The Six Canons of Vedic Architecture (*Ayaadi-Sadvarga*) Base (*Aadhistaana*), column (*Paada or Stambha*), entablature (*Prastaara*), ear or wings (*Karna*), roof (*Shikara*) and dome (*Stupi*).
5. The Aesthetics of the Building

5. Plotting of residence

Caste (Varna)	Brahmin	Kshatriya	Vaishya	Shudra
Land Slope	North	East	South	West
Feature	Wisdom	Power	Wealth	Toil
Site Shape	Square	Rectangle	Rectangle	Rectangle
Planet	Jupiter	Mars	Venus	Saturn
Soil Colour	White	Red	Yellow	Black
Soil Taste	Sweet	Bitter	Sour	Pungent
Site Dim	L=B	L=B+B/8	L=B+B/6	L=B+B/4

1) Town planning

Town planning is a civil architecture. The considerations of design should take into account the site location first-situation and surrounding's climate and soil. Availability of natural resources can add to the development of the land. According to Shukla 1993:261-263,

1. Shape of town

There are five shapes; *Chandura* (square), *Agatara* (rectangle), *Vrita* (circle), *Kritta Vrita* (ellipse) and *Gola Vrita* (full circle). A site resembling a *Vajra-suci* or a diamond (octagonal) is considered inauspicious and a site part resembling a bow is considered prosperous. The *Agri-purana* recommends a semi-lunar shape of the town. The holy city of Banaras is situated on the convex side of the bank of the river Ganga.

2. Site selection

According to the Rao 1995:84, the sites generally are divided into three categories

- Barren land: *jangala*, where wind is hotter and soil is black.
- *Anupama*: fresh, humid and cool
- *Sadharana*: average quality land

The text from *Manasara* says that a city is recognized by its smell, taste, shape, touch and direction. The streets and road planning should be interlinked and the land should be developed near a water resource. After all, water is the basic necessity of civilization to exist.

3. Site planning

After the site selection, on an auspicious day the site ploughed with two oxen having white spots on their heads and knees. Next, the cardinal directions are determined with a gnome and the *vastu-purusha-mandala* is fixed on the site according to the need of residential or temple construction.

4. Execution

For town or cities, the architect decides which *vastu purusha mandals* fits the approximate dimensions of the site. The peripheral limits are fixed according to the road patterns and avenues planted with shady trees. The east-west directional longer streets are named after *Mahakal* or *Vamana* (Bhat 1967). The whole *Vastu Purusha Mandala* is broken into *padas* or land parcels and then certain zones are made on the site. The centermost parcel is called the *Brahmasthan* (Misra 1975) and the temple is fit into it. The different classes of societies are put into *padas* (Kangla 1965). While planning the roads, cosmic cross was used to pinpoint the principle roads along East- West

and North-South directions. The eastern roads get purified by sun rays during day time and northern streets ventilate with cool breeze (Rao 1995:84-87). Some of the most important cities planned according to the Vastu Shastra is mentioned in Arthashastra; cities of *Patliputra* and *Takshila* (Schlingloff 1967; Scharfe 1978). Volwahn (1969) described the geometric patterns of the city of Jaipur.

6. Architecture in archaeology

Designed physical environment is a symbol of self-lives and physical beings and socio-cultural phenomenon designs the physical environment. Despite the different subjects of two fields, there is a highlighting coincidence between architectural sociology and archaeological sociology as both contribute to development together.

A. Space and Symbolism

Forms denote the identity that is known to works for ages. For example, a home is designed according to one's cultural belief and lifestyle. Amor in 2004 concluded a study on Arab Muslim immigrant communities in Dearborn, Michigan, Chicago, Illinois, Modesto and California and he found certain elements like Majlees (sitting room), Al-madkhal (doorstep), Atajmeel (decoration) and sutra (privacy). Mead in 1934 tells a story of an engineer constructing a bridge and he metaphors the stress and strain in the bridge to a human being.

Types of Symbolism:

- 1) *Religious symbolism. Eg, temple and mosque*
- 2) *Belief symbolism. Eg, residential planning*
- 3) *Function symbolism. Eg, court and lighthouse*
- 4) *Memorial symbolism. Eg, tomb and pillars*

B. Towards architecture modernism

The recent generation is targeting to discover the hints to ancient Indian architecture and its significance for our times through archaeology. This is stated by Raj Rewal.

There is an uncharted region of 20th century architecture that has a dissemination of modern forms. The architecture now is evolving but is biased towards western rationality and debasing the national authenticity and indigenous elements.

Le Corbusier, Louis I. Kahn and B V Doshi work out the crossbreed of climate and indigenous elements. For example, Adalaj ki vav, Chandigarh town planning and IIM, Ahmadabad.



Fig. 2. IIM, Ahmadabad by Louis I. Kahn

There is an integration of spiritual and local into a liberal, democratic and industrial system. Certain experiments are

made into technology and science like in combination of slab range and vault solutions in hot climate house.

Legislative assembly building, Bangalore is made out of national style and Hindu purity. IIM Ahmedabad, 1963 is a dense network of streets, courts and squares on different levels. Dormitories are planned according the prevailing breezes and interiors are planned to avoid direct glares. Bold brick columns gashed by shadow work, raw industrial structures and archaic mood. Sangath, a derelict placement of built forms without disturbing the naturally made environment.

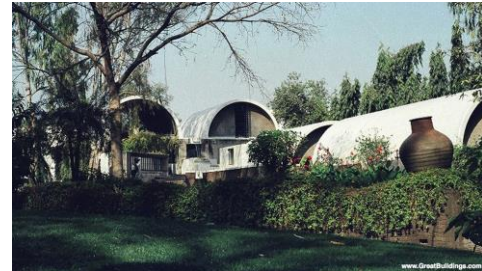


Fig. 3. Sangath, Ahmadabad by BV Doshi



Fig. 4. Legislative Assembly Building, Bangalore by B R Manikam

7. Architectural investigation of ancient and modern from archaeological viewpoint

A. Building as an artifact

Taking example of a house, it can be analyzed through its typology, pattern, sequence and details of décor. Stratigraphic analysis organizes the stages of building into chronological manner (Villa, Rotea and Borrazas 2003:7). Geographic determinism analyses on the basis of material used, landscape and climate (Villa, Rotea and Borrazas 2003:2). Semiotis is the study of non-verbal symbols that give out social significance of status or power by its outer appearances (Hiller and Hanson 1984:8).

B. Activities area within a building

Using architecture and artifacts, one can determine who used the space for what purpose at what time. This can give out conclusions about economy, gender, class segregation and ethics (Steadman 1996). Spatial analysis by Ethno archaeology concludes studies of artifacts and culture of current societies to draw them parallel with ancient ones (Smith and Schreiber: 201).

C. Space confinement methods

Study of boundaries especially those that are not quite visible such as screens and curtains can determine the lifestyle and

social rules.

- 1) *Psychology of an architect*
- 2) *Status*
- 3) *Social interaction*
- 4) *Privacy*
- 5) *Function and cultural practices*

The access to the certain spaces and movement in the area determine the psychology of space and activities. Rapoport (1990) divides the opening into

- 1) *Fixed (walls, doorways and windows)*
- 2) *Semi-fixed (movable furniture)*
- 3) *Non-fixed (curtains and screens)*

8. Methodology

A. Data collection

1) Ancient city of Harappa

It is the earliest and the most standardized and sophisticated complex civilization in the world with standardized weighing system and standard proportions in architecture. With pyrotechnologies and undeciphered writing system and detailed network of urban water and drainage management, the city was rich in culture in coherence order and anthropological theories in spatiality, social interaction and identity in trade context with neighbourhood corporate statistics. The city maintained a balance between local and political communities through two endogamous social strata (ruled and rulers) i.e., articulation between kin and politics.

The city was divided on macro-level into Upper Town and Lower Town. The Upper Town also known as Citadel is a small westernmost elevated architecturally complex mound with a simple amalgam of uniform architecture and plausible civics. The monument there depicts the political and complex working. There were no open spaces and every corner was an enclosed area restricted only to street intersections only. Whereas Lower Town an extensively eastern and shorter mound where domestic architecture could be seen. There were more unbounded open spaces to enhance community interactions. The buildings had sharing walls and were in clusters. The clusters were separated by broad avenues and staggered lanes. The city was interconnected by well, drains and sewers.

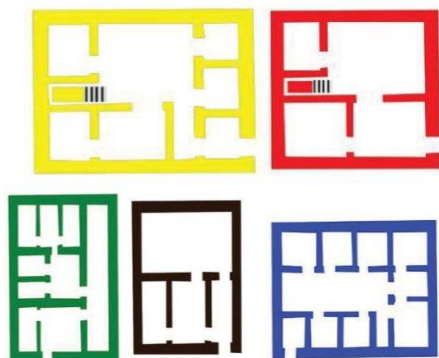


Fig. 5. Sarcina's Models of residential architectural plans at Mohenjo-Daro (Sarcina 1978:159) North is in upward direction.

The yellow model shows that a north placed courtyard indirectly accessible from the street. Two in-grid planned rooms on the west and kitchen is in the south.

The red model has north easterly placed courtyard with large room on the south side.

The green model has a courtyard inaccessible from street and not sharing any boundary wall with the neighboring building. It has a convoluted spatial planning.

The brown model shows that the courtyard has half of the total surface area and is in the north. Rests of the room are in the south.

The blue model shows that the centrally placed courtyard is surrounded by single row of houses on 3 sides. The free side shares a wall with neighboring building. According to Sarcina's conclusions the plans seemed to be for administrative, public and cultural purposes and are located in the Citadel area.

Distinguishable architectural attributes are corbelled arch doorways, wide external doorways, opposing stairways, internal buttresses, column capitals, thick walls, niche recesses, vertical chases and double stairways.

Building fabric as gypsum mortar, ornamental brickwork and ceramic nodules.

Internal wells with square or oval copings, entrance galleries and capital bases.

Framing corridors are the long and narrow passages formed between articulated rooms.

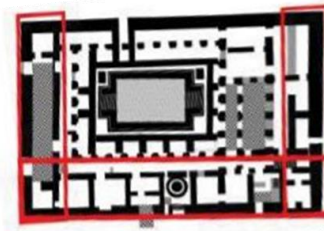


Fig. 6. Great Bath, Mohenjo-Daro, red line showing framing corridors

The city walls were surrounded by great walls and gateways. The streets were east west oriented. The city had granaries running 150feet long, 75 feet wide and 15 feet high and had 27 compartments in 3 rows. There were no temples or weaponry found that meant having great bath shows some religious practice and city believed in peaceful trade and military was not given that much attention.

2) Chandigarh town planning

Chandigarh was planned by Le Corbusier for administrative purpose for 5 lakh people. It was built in 2 slots. The first phase has sector upto 30 later on more till 47 were added as it developed. The city was planned on the principles of CIAM (Congress Internationaux d'Architecture Moderne). The concept was human body. The Capitol complex, sector1 was the head, the heart as the city center, sector 17, the lungs as the

Leisure Valley and city green spaces, the intellect as the institutions and the circulatory system as the road networks, the 7Vs and the industrial area. The emphasis was drawn on the conducive lives. Each sector only allowed 4 vehicular entry.



Fig. 7. Sector size determined by walking distance sketch by Prof. Vikram Aditya, University of Washington, USA.

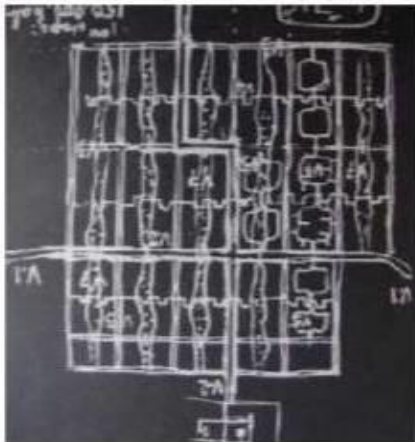


Fig. 8. 7V Plan Sketch by Le Corbusier

Concept of 7Vs

- V1-busy roads from Chandigarh to other towns
- V2-Arterial roads
- V3- roads around the sectors
- V4-streaming shopping streets
- V5-Sector circulation roads
- V6-Access roads to houses
- V7-Footpaths, cycle tracks

Buses will move only on V1, V2, V3 and V4 roads.

The city planned with in the mind the arboriculture and plantation alongside the roads. Each road is made to have a view of Shivalik Hills. The Capitol Complex is built on the elevated mound. Each sector is 800*1200m according to the walking distance of 10 minutes measured from each amenity (schools,

shops, etc.) the city is planned according to its low-rise development.



Fig. 9. Setting of Capitol Complex



Fig. 10. View of Shivalik hills from roads

B. Data analysis

The Indus valley civilization showed great planning strategies especially in street network and water and drain management. The planning was pre-done as the entire area was in grid plan and showed method development. In modern times, Le Corbusier’s Chandigarh planning shows rectangular regular plans and grid like street networks that ensures fast traffic movement. The demarcation was shown between residential and public areas in Harappan civilization. The granaries in Harappa were designed with air ducts and platforms divided into units. The houses were planned to not disturb the road networks. Both the ancient and modern cities have prominent epicenters. Harappa had Great Bath in Lower Town. Chandigarh has Open Hand Monument in the Capitol complex. On the basis of Hiller and Hanson theory of space syntax, both the masterpieces followed symmetrical and uniformly distributed planning.

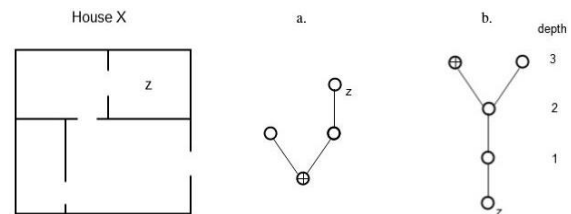


Fig. 11. Plan of house X a) showing planning b) space planning with depth

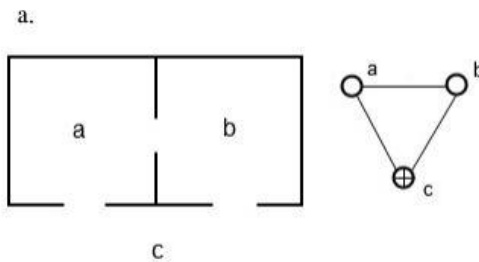


Fig. 12. Symmetric and uniform distribution

These figures are called gamma maps prepared by Hiller and Hanson to space distribution and called as space syntax. Later on Fisher worked on theory of visibility in which he concluded how the opening and places were defined to show hindrance for privacy and visibility for public places. Using Hiller and Hanson's control and relative asymmetry values Fisher concluded spaces into interaction spaces, public and private spaces.

9. Conservational architecture

Heritage is an identity of a nation, its cultural and economy. Conservation is looking after a place connected to heritage or important person to retain its value and save its knowledge for future generations. In India, the first conservation was when emperor Ashoka conserved in wildlife. In 14th Century AD Firoz Shah Tughlaq conserved many ancient buildings. The Archaeological Survey of India (ASI) was founded in 1861 and has legal provision to protect the historical structure all over India.

10. Conclusion

The studies in architecture have begun to focus on domestic settings in order to better understand the day to day lives of the common citizens, the way they manipulate their surrounding according to their advancing needs and how symbolism has affected the lives in order to get organized planning and resulted in architects and engineers to design modern master planning and how conservations plays a role in enhancing and preserving the ancient knowledge for future development. The utmost relation between major changes in society and those evolutionary found in past showcase that the connections are not merely coincidences but a science and knowledge to preserve. There is clear interdependency of architecture and archaeology.

References

- [1] Ronald W. Smith, "Symbolic interaction theory and architecture", *University of California press*, vol.29, no. 2, pp. 123-155, Nov. 2016.
- [2] Kelly A. Driscoll, "An archaeological study of architectural form and function at Indian Key, Florida, M.A. thesis, Anthropology. University of South Florida, 2003.
- [3] Megan E. Drennan, "Architecture in Archaeology: An Examination of Domestic Space in Bronze Age Mesopotamia," Scholar Honors thesis. University of Connecticut, Nov. 2010.
- [4] Navneet kaur, "Symbolism in Religious Architecture A Study of sacred buildings", *International Journal of Engineering Research & Technology* vol.1, no. 10, Dec. 2012
- [5] Curtis Carter, "Symbol and Function in Contemporary Architecture for Museums", *Passage: Essays in Honor of Professor Dionysis Zivas*, pp. 172-17, Jan. 2010.
- [6] Chandigarh Master Plan-2031, http://chandigarh.gov.in/cmp_2031.htm
- [7] Handbook of Conservation of Heritage Buildings <https://cpwd.gov.in/Publication/ConservationHeritbuildings.pdf>
- [8] The ancient city of Harappa by Jonathan Mark Kenoyer 1996. https://www.harappa.com/sites/default/files/pdf/Kenoyer1996_The%20Ancient%20City%20of%20Harappa.pdf